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THE SECTORAL DISTRIBUTION OF MONEY
SUPPLY IN THE EURO AREA

by Giuseppe Ferrero[*], Andrea Nobili[*] and Patrizia Passiglia[*]

Abstract

The strong and prolonged deviation of money growth from its reference value since 2001 has caused concern among policy-makers about the upside risks to price stability from monetary developments. In this paper we provide evidence that excess liquidity might be smaller than previously assumed. We provide a sectoral breakdown of money holdings and show that current excess liquidity conditions are in some measure related to the acceleration of non-bank financial intermediaries' money demand, as well as to the accumulation of marketable instruments. Such increases are likely to be related more to portfolio choices than to transaction motives. We also find evidence from balance sheet data on investment funds that points to a general increase of this sector in the economy, rather than to a higher degree of liquidity of their asset positions. This is likely to imply that recent dynamics reflect, to a large extent, a permanent change in the financial structure of the economy. Finally, our sectoral analysis suggests that excess liquidity did not appear before the end of 2005, which is also when the ECB started to raise the official interest rates.

Contents

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1. Introduction[1]

A well-known stylized fact in macroeconomics is the high correlation between money growth and inflation in the long run. A positive and almost one-to-one relationship between monetary growth and inflation at low frequencies has been highlighted for a wide range of countries, using different analytical and empirical tools and employing various definitions of money and data sets (McCandless and Weber, 1995; Lucas, 1995).

For the euro area, many empirical works have found a stable long-run relationship between the broad monetary aggregate M3 and the price level (Coenen and Vega, 2001; Brand and Cassola, 2000; Calza et al., 2001; Bruggeman et al, 2003) and have shown important leading properties of several monetary indicators for future inflation at medium-term horizons (Nicoletti Altimari, 2001).

This evidence provided justification for the prominent role of money in the ECB's strategy, signalled in December 1998 by the announcement of a reference value for the annual growth rate of M3 of 4.5 per cent. The computation of the reference value was derived using the "equation of exchange" in the context of the quantity theory of money, by using the former ECB's definition of price stability for the inflation rate (annual increase in the HICP for the euro area below 2 per cent), a trend growth rate for real GDP in the range 2.0-2.5 per cent and a trend decline in M3 income velocity in the range 0.5-1.0 per cent.[2]

Since 2001 the annual growth rate of M3 has been persistently higher than the reference value, raising concerns on the implications for future price stability (Figure 1). These risks were also confirmed by the evolution of alternative excess liquidity measures

[2] The Governing Council arrived at the reference value of 4.5 per cent by noting that summing the three upper bounds for the components of the reference value would lead to an implicit rate for M3 growth of 5.5 per cent. In view of the definition of price stability, which indicated that inflation should be below 2 per cent and noting that the actual trend decline in velocity was likely to lie somewhat below the extreme of the range, the reference value was then set at 4.5 per cent.

derived under the assumption of stable money demand equations, such as the "real money gap" and the "monetary overhang", which represent money stock deviations from measures of equilibrium money balances and have been shown to have higher predictive power for future inflation than money growth at horizons between one and three years (Trecroci and Vega, 2002; Nicoletti Altimari, 2001; Gerlach and Svensson, 2003).

Figure 1

M3 ANNUAL GROWTH RATE IN THE EURO AREA
(percentage changes; data adjusted for seasonal and calendar effects)
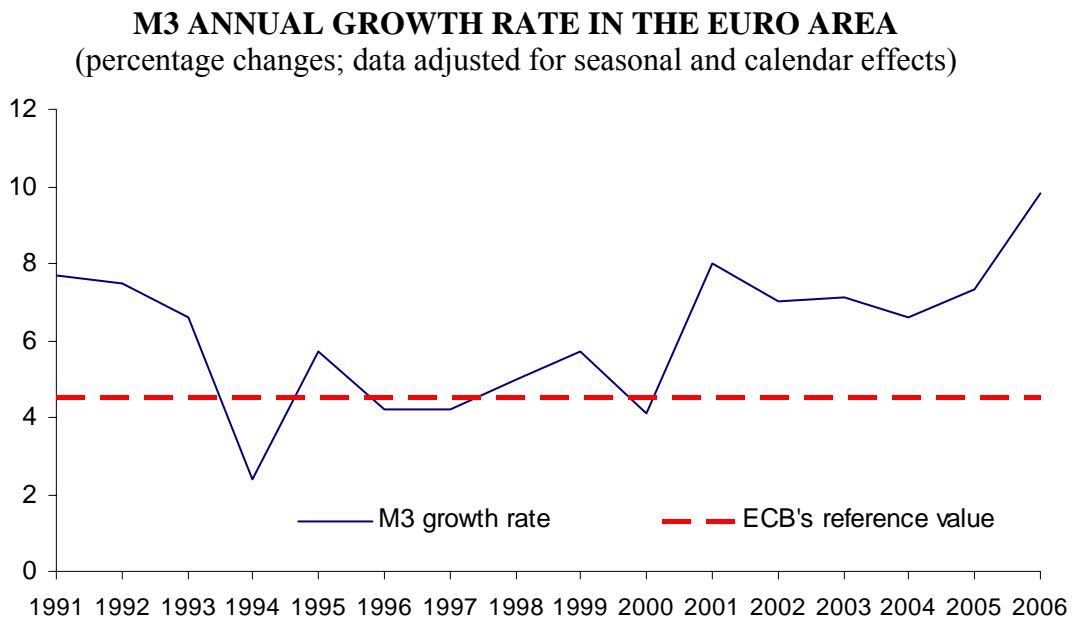
Source: ECB.

The excess liquidity measures are nowadays a standard tool in the monetary analysis conducted by the ECB and are frequently discussed in its regular publications (Masuch et al., 2001; ECB, 2001, 2004). Nevertheless, their usefulness for monetary analysis has recently been questioned, as money demand equations appear to have become unstable over time (Carstensen, 2004; Alves et al., 2006) and their predictive power for future inflation seems to have consistently decreased (e.g. Hofmann, 2006). These findings suggest a certain degree of caution in interpreting their implications for monetary policy.

As argued by Laidler (1997) the main economic explanation of the relation between monetary and future price developments, in the context of the quantity theory of money, is that the accumulation of excess liquidity is likely to be spent by private agents in order to re-establish monetary equilibrium, thereby increasing private demand, especially households'

consumption, independently from the interest rate channel (*Pigou effect*).[3] This framework, even if not as rigorous as that offered by Dynamic Stochastic General Equilibrium models (DSGE), has a strong intellectual tradition and appears to have empirical relevance in the context of so-called *P-star* models (Hallman et al., 1991).

In this paper we argue that the usefulness of monetary aggregates as leading indicators of inflation at different horizons crucially depends on the ability to distinguish movements in money reflecting underlying inflationary developments from those arising from structural changes (Orphanides and Porter, 2001). We do that by analyzing monetary developments in the euro area at a sectoral level in the period 1991-2006. If the excess liquidity is mainly concentrated among households and non-financial firms it is more likely to foreshadow an increase in future private demand and, therefore, to signal upside risks to price stability in the medium term. On the contrary, fewer risks should be inferred if the build-up of liquidity mainly reflects developments in financial firms' portfolio choices or permanent changes in the financial structure of the economy.[4]

Our sectoral breakdown shows that since 2001 the large accumulation of excess liquidity in the euro area partly reflected money demand by non-bank financial intermediaries, as well as the dynamism of some marketable instruments (especially money market fund shares), which are likely to be held by private agents for portfolio motives rather than for transaction purposes. In addition, we find that the accumulation over time of monetary instruments held by non-bank financial intermediaries was due to an increase in their size in the economy, rather than to a higher degree of liquidity of their asset positions. This evidence suggests that part of the current excess liquidity is likely to reflect permanent changes in the financial structure of the economy, as opposed to temporary portfolio shifts from risky assets to more safe and liquid assets included in M3. Overall, we may conclude

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[3] In the context of structural VARs, Coenen and Vega (2001) showed that a positive money demand shock, defined as innovations in the growth rate of M3, leads to a temporary increase in real output within a year and a permanent rise in the price level. These results have been also confirmed by Cassola and Morana (2002) by identifying a preference liquidity shock.

[4] On the other hand we could not rule out that actual monetary developments could signal risks to financial stability, as well as to real economic growth. Past evidence for OECD countries suggest that boom-bust cycles in both asset prices and house prices are also more likely to harm the entire economy, whenever the build-up of the financial bubble is associated with excess credit and liquidity conditions (e.g. Borio and Lowe, 2002, 2004; Detken and Smets, 2004; Adalid and Detken, 2006).

that monetary developments observed in recent years should imply lower threat to price stability than generally considered. We note that, by excluding non-bank financial intermediaries' money holdings and other marketable instruments, excess liquidity conditions (e.g. a positive value for the monetary overhang) would emerge only from the end of 2005, which was also the timing of the ECB's first increase of official interest rates.

The paper is organized as follows. In Section 2 we provide the sectoral breakdown of the overall M3 growth; in Section 3 we show the corresponding breakdown for our measure of excess liquidity, based on the estimate of the velocity of money. Section 4 presents a selective survey of the literature regarding the role of non-bank financial intermediaries' money demand in the transmission mechanism. In Section 5 we focus on investment funds, giving an assessment on their degree of liquidity. In Section 6 we analyze the case of Italy. Section 7 concludes.

2. The sectoral distribution of M3 growth

In this section we assess the contributions of different money holding sectors to the overall increase in M3. In order to provide a sectoral breakdown of M3, we use the new ECB time series for euro-area holdings of short-term deposits and repurchase agreements – the broadest aggregation of M3 components for which information by holding sector is reported, accounting for over 80 per cent of the stock of M3 – available since the first quarter of 1991. This new dataset allows us to derive a more accurate breakdown of M3, as it is based on financial liabilities of both MFIs and central government (post office and Treasury) while, by contrast, the previously available dataset (which is regularly used by the ECB staff to construct the Table 2.5 in the euro-area statistics section of the Monthly Bulletin) was built on the basis of total deposits and repurchase agreements held only with MFIs (excluding the Eurosystem). In addition, it allows longer-term deposits not included in M3 (deposits with agreed maturity over two years and those redeemable at notice over three months) to be dropped from the overall sectoral aggregates over the entire sample period.[5] The sectoral breakdown is computed on a yearly basis using indexes of notional stocks, which have the

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[5] For further information see the box entitled "New euro area historical series on holdings of M3 deposits by sector" in the ECB Monthly Bulletin of August 2006.

advantage of being adjusted for reclassifications, revaluations, exchange rate variations and any other changes that do not arise from transactions.[6]

The resulting sectoral breakdown is showed in Table 1, where the non-sectorized components include currency in circulation and an aggregate labelled "other items", which comprises other marketable instruments (money market fund shares and debt securities up to two years) and the residual discrepancies between the overall M3 and the sum of the corresponding sectoral aggregates. Some stylized facts can be highlighted.

During the period 1992-2006, the annual growth rate of M3 was, on average, about 6.0 per cent. Households' money holdings, which represented about 60 per cent of the overall M3 stock in the euro area at the beginning of period, provided the largest contribution to the overall increase (about 46 per cent), reflecting an average annual growth rate of 4.8 per cent. The money stock held by non-financial corporations contributed by around 18 per cent to the overall accumulation of liquidity. Interestingly, non-bank financial intermediaries, which instead held only 7.0 per cent of the overall stock, more than doubled their share of total M3, thus providing an important contribution to the overall increase in liquidity (13 per cent). In particular, OFIs more than tripled their share (the annual growth rate of their money holdings was, on average, 13.0 per cent). Finally, there has been a strong acceleration of other marketable instruments, whose average contribution was around 10 per cent.

It is interesting to compare the sectoral distribution of money holdings in two different sub-samples. The first is the period 1992-2000, which was characterized by a relatively stable M3 annual growth rate, 0.5 percentage points higher than the reference value; the second is the period 2001-2006, when the money M3 experienced a phase of strong and persistent acceleration and its annual growth rate always stood above the reference value, performing an average annual growth rate of 7.6 per cent. In this period, the concern among policy-makers about the upside risks to price stability from monetary developments became considerable.

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[6] We thank the ECB staff for pointing out this issue. In a previous draft of the paper we used outstanding amounts for the M3 growth rates. See the technical notes in the ECB Monthly Bulletin for details regarding the calculation of growth rates for monetary developments. The use of index of notional stocks also allows to take into account the impact of Greece's euro adoption from 2001 on the overall M3 annual growth rates. A sectoral breakdown based on outstanding amounts does not lead to significant changes with respect to results outlined in this section.

Table 1

SECTORAL BREAKDOWN OF M3 IN THE EURO AREA
(percentage changes; percentage points)

	Annual growth rate of M3	Sectorized deposits and repurchase agreements						Non-sectorized components	
		Households	Non-financial firms	Non-bank financial intermediaries			General government	Currency in circulation	Other items
				Insurance corporations and pension funds	OFIs	Total			
1992	7.5	4.1	-0.1	0.1	0.2	0.3	0.0	0.6	2.8
1993	6.6	4.4	0.7	0.1	0.4	0.5	0.3	0.4	0.4
1994	2.4	1.3	0.7	0.0	0.3	0.3	0.0	0.4	-0.3
1995	5.7	3.7	1.0	0.0	0.6	0.6	0.0	0.3	0.1
1996	4.2	2.3	1.2	0.1	0.6	0.7	0.0	0.3	-0.4
1997	4.2	1.3	1.1	0.1	0.9	1.0	0.2	0.2	0.3
1998	5.0	1.9	0.7	0.1	1.2	1.3	0.3	0.0	0.6
1999	5.7	1.8	0.5	0.2	0.7	0.9	0.4	0.6	1.5
2000	4.1	1.0	2.0	0.3	0.6	0.9	0.3	0.0	0.0
2001	8.0	5.8	1.9	0.2	0.3	0.5	0.2	-2.3	1.6
2002	7.0	2.3	0.5	0.3	0.7	1.0	0.1	1.9	1.3
2003	7.1	2.9	1.1	0.1	0.8	0.9	0.0	1.5	0.8
2004	6.6	2.7	1.2	0.2	0.5	0.7	0.3	1.1	0.5
2005	7.3	3.1	1.5	0.1	1.1	1.3	0.4	1.0	0.0
2006	9.8	3.4	2.0	0.2	1.5	1.6	0.5	0.8	1.5
Average annual growth rates									
92-06	6.1	4.8	7.0	7.8	13.0	11.6	6.8	7.7	8.2
92-00	5.0	4.0	6.0	7.0	13.9	12.0	5.7	4.2	6.9
01-06	7.6	6.1	8.5	9.0	11.6	11.0	8.5	12.9	10.3
Average shares									
92-06		0.58	0.15	0.02	0.06	0.07	0.03	0.07	0.09
92-00		0.60	0.15	0.02	0.05	0.06	0.03	0.07	0.09
01-06		0.55	0.16	0.02	0.07	0.09	0.03	0.06	0.10
Average contributions to the M3 growth rate									
92-06		2.8	1.1	0.1	0.7	0.8	0.2	0.4	0.7
92-00		2.4	0.9	0.1	0.6	0.7	0.2	0.3	0.6
01-06		3.4	1.4	0.2	0.8	1.0	0.3	0.7	1.0

Source: authors' calculations based on ECB data.

Notes: The sectoral breakdown is based on MFIs and central government financial liabilities using indexes of notional stocks. M3 and currency in circulation data are adjusted for seasonal and calendar effects. Average shares are computed on outstanding amounts. - The column labelled "Other items" comprises money market fund shares, debt securities up to two years and the discrepancies between the overall M3 and the sum of the corresponding sectoral aggregates.

In the period 2001-2006 the annual growth rate of M3 was higher by 2.6 percentage points on average with respect to the period 1992-2000. All different sectors positively contributed to the overall increase in the money growth. Among them, households' money holdings accounted by 45 per cent of the overall increase in money growth, mainly reflecting the remarkable acceleration of their short-term deposits in 2001, when they temporary lodged their currency denominated cash into deposits in order to face the euro cash changeover. Non-financial corporations' and non-bank financial intermediaries contributions were respectively about 18 and 13 percent of the overall increase.

Among the non-sectorized components, we notice an increase in the contribution of the currency in circulation. Interestingly, the growth rate of currency in circulation remained sustained also after the cash changeover, maybe suggesting a structural break in the demand for euro denominated banknotes due to the increase of the international role of the euro as well as to a higher demand for euro denominated banknotes from non euro area residents, such as those in accessing countries of East Europe. As far as the implications of a higher growth rate of currency in circulation are regarded, it is worthwhile noticing that half of the growth rate of the value of euro banknotes in circulation, is explained by the increase in the number of high-denomination ones, namely the €500 banknotes, which are likely to be held by economic agents as a store of value and not for transaction purposes.

Marketable instruments different from repurchase agreements significantly contributed to the overall increase in the M3 growth (12 per cent), due, to a large extent, to the strong dynamism of money market fund shares, which are likely to be held by economic agents for portfolio motives, rather than for transactional purposes.

So far we have only analyzed the evolution of M3 (and its sectoral breakdown), but no conclusion can be derived in terms of risks for price stability.

The equation of exchange,

(1) $\qquad M_t \cdot V_t = P_t \cdot Y_t$

(where M denotes the stock of money in circulation, V its velocity, Y real output, and P its price), is commonly used in the quantity theory of money to examine the relationship between money and inflation. According to this identity, the change in the money stock in

the economy equals the change in nominal transactions (approximated by the change in nominal GDP) minus changes in the velocity. Based on this relation, the ECB's reference value for the growth of the broad monetary aggregate M3 embodies the definition of price stability as an increase in the HICP of the euro area "below but close to 2 per cent per annum", a growth of real GDP of 2-2.5 per cent, and a decrease of M3 velocity in the range of 0.5-1 per cent per annum.

Therefore, assuming that the change in the velocity of money and of the real GDP growth rate are constant over time at the levels assumed by the ECB for the computation of the reference value, in the medium term any increase in the amount of money above the reference value should lead to a proportional rise in the risk for price stability.

In Table 2 we report the average gap between money growth and the ECB's reference value, and the corresponding sectoral contributions, which are computed under the assumption that the reference value is the same for all sectors.

Table 2

SECTORAL BREAKDOWN OF THE AVERAGE DEVIATION OF M3 ANNUAL GROWTH RATE FROM THE ECB'S REFERENCE VALUE
(percentage points)

	Deviation of M3 annual growth	Sectorized deposits and repurchase agreements						Non-sectorized components	
		Households	Non-financial firms	Non-bank financial intermediaries			General government	Currency in circulation	Other items
				Insurance corporations and pension funds	OFIs	Total			
92-06	1.6	0.2	0.4	0.1	0.5	0.5	0.1	0.1	0.3
92-00	0.5	-0.3	0.2	0.0	0.4	0.5	0.0	0.0	0.2
01-06	3.1	0.9	0.6	0.1	0.5	0.6	0.1	0.4	0.5

Source: authors' calculations based on ECB data.

Notes: The sectoral breakdown is based on MFIs and central government financial liabilities using indexes of notional stocks. M3 and currency in circulation data are adjusted for seasonal and calendar effects. Average shares are computed on outstanding amounts. - The column labelled "Other items" comprises money market fund shares, debt securities up to two years and the discrepancies between the overall M3 and the sum of the corresponding sectoral aggregates.

During the period 1992-2006, the annual growth rate of M3 was, on average, about 1.6 percentage points higher than the ECB's reference value. Interestingly, households' money

holdings provided only a small contribution to the average gap (one eighth of the overall gap), while non-bank financial intermediaries provided the largest one, accounting for more than 30 per cent of the overall gap.

Restricting our analysis to the period 2001-2006, we observe that the money growth was, on average, 3.1 percentage points higher than the reference value. Even though the contribution of households and non-financial firms substantially increased, excluding non-bank financial intermediaries and other marketable instruments would reduce the average deviation of M3 growth rate from the reference value by about one third.

Figure 2 helps to better understand the annual contribution of non-bank financial intermediaries and of non-sectorized other marketable instruments to the average deviation of money growth from the reference value. It is clear that other marketable instruments contributed substantially to the excess liquidity in 2001, while non-bank financial intermediaries provided a significant contribution in all the four subsequent years.

Figure 2

DEVIATION OF M3 GROWTH RATE FROM THE ECB'S REFERENCE VALUE
(percentage points)
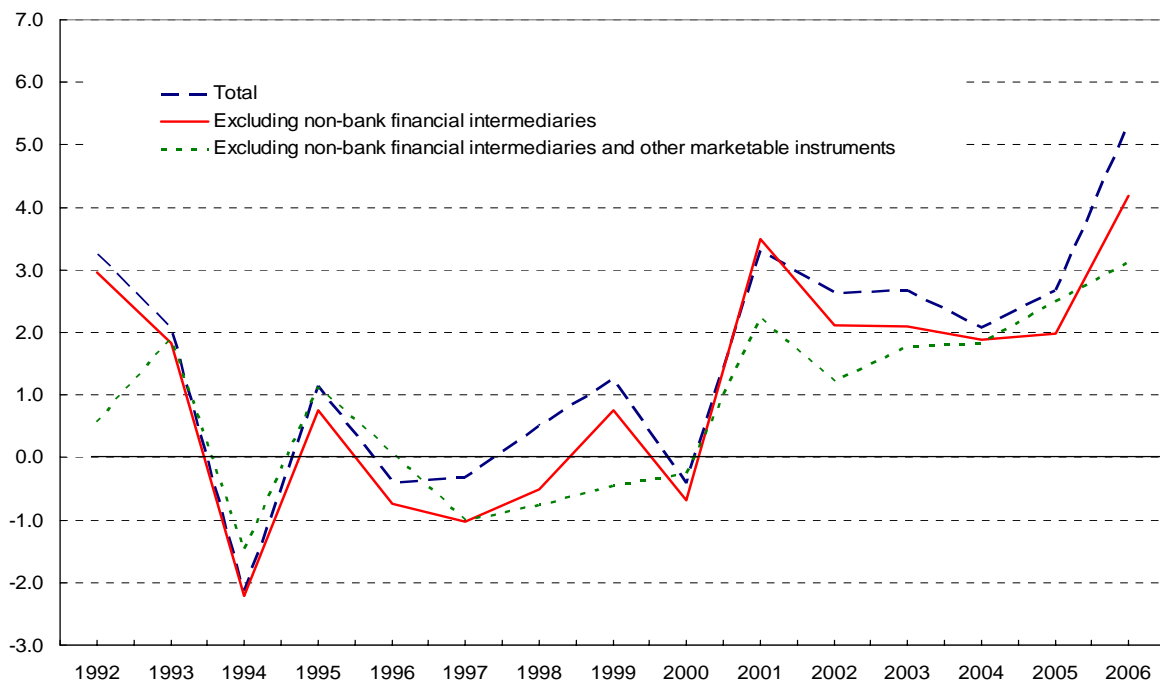
Source: authors' calculations based on ECB data.

Notes: growth rates are computed using indexes of notional stocks.

3. The sectoral distribution of "excess liquidity"

In this section we analyze a measure of excess liquidity that is based on the comparison between the period-by-period velocity of money and its trend estimate.

Equation (1) can be easily rearranged as

$$(2) \qquad \frac{1}{V_t} = \left(\frac{M_t}{P_t \cdot Y_t} \right).$$

If the velocity of money is nearly constant over time and the amount of production set at a fixed level, such as its long-run or full-employment equilibrium level, then any increase in the amount of money would lead to a proportional rise in prices. Therefore, inflation in the long run would only be caused by increases in the quantity of money in circulation. In practice, the money velocity may vary considerably over time, and as a result understanding its movements becomes essential for assessing the inflationary implications of particular patterns of money growth.

In particular, the velocity of money may vary considerably over time for two reasons (Orphanides and Porter, 2001): on one side, improvements in financial services and deeper financial innovation represent structural changes that affect the long-run equilibrium of money velocity; on the other side, fluctuations in the opportunity cost of holding money involve cyclical changes associated with short-run deviations of velocity from its underlying long-run trend and represent the effective "excess liquidity" in the economy (see Figure 3).

Therefore, the "excess liquidity" crucially depends on how we measure the long-run velocity. Let us define v_t^* the equilibrium level of the logarithm of money velocity, namely

$$(3) \qquad v_t = v_t^* + \varepsilon_t = \log P_t + \log Y_t - \log M_t = p_t + y_t - m_t.$$
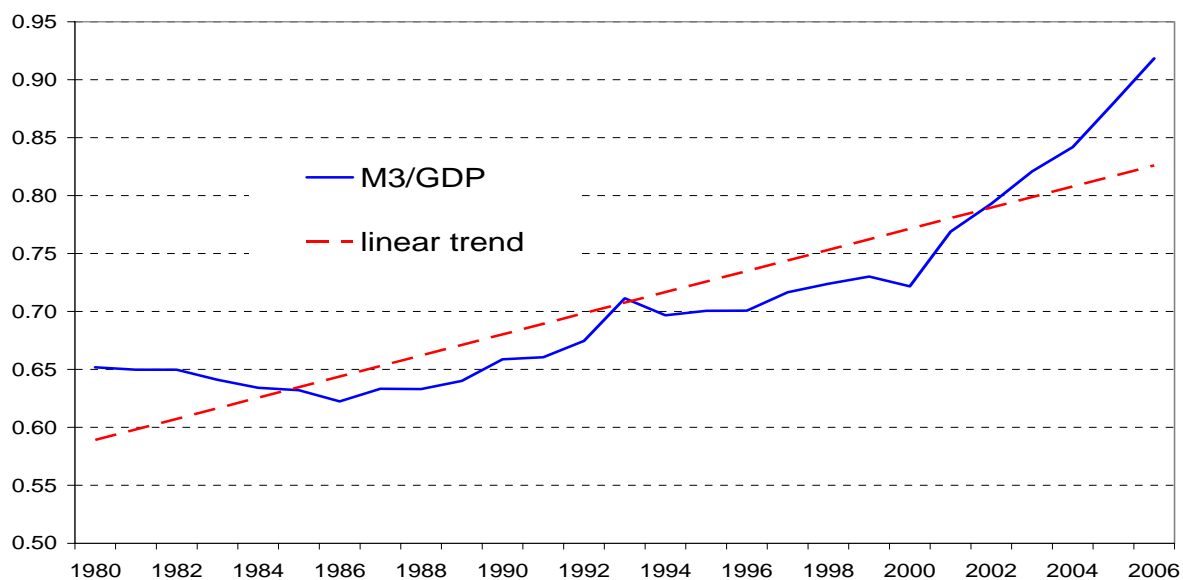
Following Orphanides and Porter (2001) we estimate v_t^* by running a linear regression on annual data covering the period 1991-2006 of the following form

$$(4) \qquad v_t^* = \hat{\alpha} + \hat{\beta} t + \hat{\gamma} OC_t,$$

where t is a linear trend and OC is a measure of the opportunity cost of holding money.

Figure 3

RATIO OF M3 TO NOMINAL GDP IN THE EURO AREA
(based on end-of-period outstanding amounts; seasonally adjusted data)

Source: authors' calculations based on ECB data.

Notes: M3 is adjusted for seasonal and calendar effects. GDP is adjusted for seasonal and working days effects

We have considered different proxies for *OC*, namely, the long-term interest rate, the slope of the yield curve, the spread between the short-term interest rate and the own rate of M3, the short-term interest rate and the own rate of M3 separately. These measures have been used in previous literature on estimated money demand equations for the euro area. All the estimated coefficients (γ) are found to be not statistically different from zero, probably reflecting the fact that the use of annual data might smooth short-term effects of interest rates on money velocity. Therefore, our estimated long-run equilibrium level is obtained by including only a constant and a linear trend in equation (4), whose estimated coefficients, α and β are, respectively 11.68 and -1.73. We note that, in our sample, the trend money velocity declined at a faster pace than in the estimates used for the computation of the reference value for monetary growth (in the range of -0.5, -1.0).

The decline over time of trend money velocity can be reconciled with the evidence obtained from estimated money demand equations for the euro area not based on the quantity theory of money. Indeed, let us consider a generic long-run money demand equation

(5) $\qquad m_t - p_t = k + \varphi y_t + \vartheta OC_t + \eta_t \qquad \varphi > 0, \quad \vartheta < 0$

then, the implied long-run money velocity is given by

(6) $\qquad v_t^* = -\hat{k} + (1 - \hat{\varphi}) y_t - \hat{\vartheta} OC_t$

As y is the logarithm of GDP, the money velocity is declining over time if and only if $\hat{\varphi} > 1$, which is consistent with the empirical estimates (Coenen and Vega, 2001, Calza et al., 2001, Brand and Cassola, 2000, and Bruggeman et al., 2003).

Rearranging equation (3) we obtain an excess liquidity measure, defined as the deviation of the inverse of money velocity from its equilibrium level, which can be labelled the "monetary overhang", MO,

(7) $\qquad MO_t = m_t - p_t - y_t + v_t^*.$

The monetary overhang captures the part of the ratio of real money stock to nominal GDP that is not explained by the long-run determinants of money demand and is interpreted as the purely monetary impulse to price developments.[7]

In order to check the reliability of our approach, we present in Figure 4 a visual comparison between the evolution over time of our monetary overhang measure and that derived from previously estimated long-run money demand equations for the euro area.[8]

The specifications differ from each other as to the choice of the opportunity cost, namely, the long-term interest rate (Brand and Cassola, 2000), the spread between the short-term interest rate and the own rate of M3 (Calza et al., 2001), the short-term interest rate and the own rate of M3 separately (Bruggeman et al., 2003). These alternative monetary overhang estimates are computed using long-run coefficient values taken from the original authors' papers.

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[7] In the literature there are also other measures of excess liquidity. For example, the ECB also monitors the "real money gap" defined as the deviation of the observed stock of real money from that which would be implied by a money demand model in which income and opportunity cost of holding money are evaluated at the levels consistent with price stability. See Masuch et al. (2001) and ECB (2001, 2004).

[8] All values are re-scaled to average zero over the entire sample period as in Calza et al. (2001).

Figure 4

MEASURES OF THE MONETARY OVERHANG IN THE EURO AREA
(percentage points)
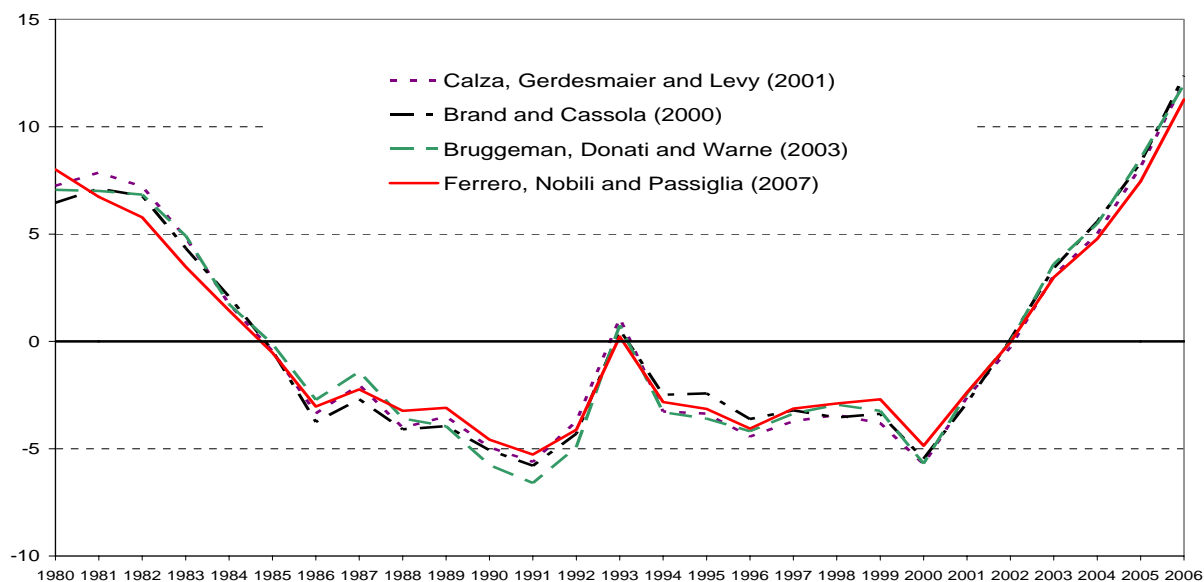
Source: authors' calculations based on ECB data.

Notes: all measures of the monetary overhang are computed using indexes of notional stocks. They might be slightly different from those appearing in the original papers as they were based on outstanding amounts (see for example, Calza et al., 2001).

As their estimates were based on a sample period beginning in the year 1980, we also report in the figure our monetary overhang measure stemming from an equilibrium level for money velocity based on a linear regression over the period 1980-2006. In this case the coefficient values for α and β become, respectively, 11.72 and -0.96 and our monetary overhang presents a correlation of almost 1.0 with all other estimated measures. When the sample 1991-2006 is used, the computed correlations are still close to 1.0, thus confirming the reliability of our approach. It is important to note that in comparing different excess liquidity measures it is better to focus on their evolution over time rather than on their levels, as they crucially depend on the beginning of the sample period.

Overall, the deviations of the stock of M3 from equilibrium were very small in the past, with the main exception of the period 1992-1993 during which a positive overhang emerged. More recently, the years from 1997 to the beginning of 1999 were characterized by

a shortfall in M3. Starting from 2001, the amount of liquidity has increased significantly, leading to a prolonged accumulation of excess liquidity which reached its peak in 2006.

In order to study the implications of the increase in the monetary overhang in terms of risks for price stability, we derive a sectoral breakdown of the monetary overhang, under the assumption that the trend velocity of money during the sample period 1991-2006 is the same among all sectors, as sectoral nominal GDPs are not available (see Figure 5).

Figure 5

MONETARY OVERHANG IN THE EURO AREA
(percentage points)
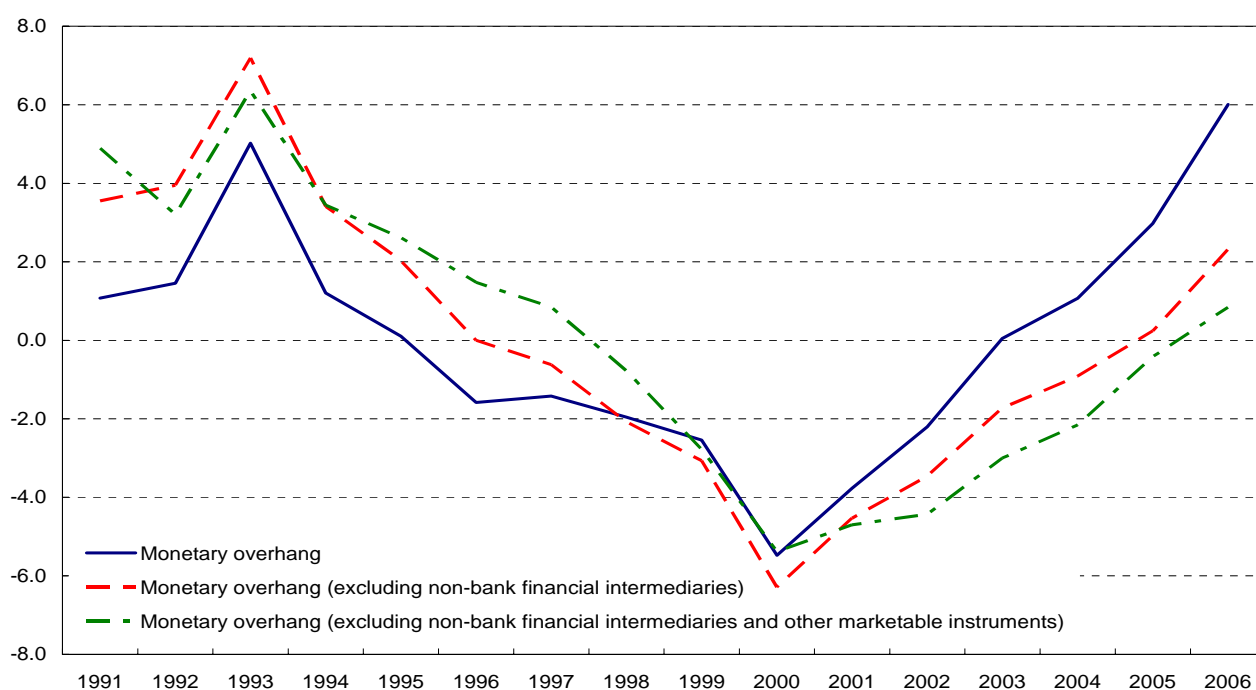
Source: authors' calculations based on ECB data.

We can observe that both non-bank financial intermediaries and non-sectorized other marketable instruments contributed significantly to the overall evolution of the monetary overhang in the sample period. Sectoral contribution to *changes* in the monetary overhang are presented in Table 3.[9]

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[9] Details of the methodology used for the computation of sectoral contributions are in Appendix B.

SECTORAL BREAKDOWN OF THE CHANGE IN THE MONETARY OVERHANG FOR THE EURO AREA
(percentage changes)

| | Change in the Monetary Overhang | Sectoral contributions | | | | | | Non-sectorized components | |
| | | Households | Non-financial firms | Non-bank financial intermediaries | | | General government | Currency in circulation | Other items |
				Insurance corporations and pension funds	OFIs	Total			
1992	0.4	-0.2	-1.1	0.0	0.0	0.0	-0.3	0.1	2.1
1993	3.7	2.7	0.3	0.0	0.3	0.3	0.2	0.1	0.1
1994	-3.8	-2.5	-0.2	-0.1	0.1	0.0	-0.2	-0.1	-0.9
1995	-1.1	-0.5	0.0	-0.1	0.3	0.3	-0.2	-0.2	-0.5
1996	-1.7	-1.3	0.3	0.0	0.4	0.3	-0.1	-0.1	-0.9
1997	0.1	-1.2	0.5	0.0	0.7	0.8	0.1	-0.1	0.0
1998	-0.6	-1.4	-0.1	0.0	0.9	0.9	0.2	-0.4	0.2
1999	-0.6	-1.8	-0.4	0.1	0.3	0.4	0.2	0.1	1.0
2000	-2.9	-3.0	0.9	0.2	0.1	0.3	0.1	-0.5	-0.6
2001	1.8	2.3	0.8	0.1	-0.1	0.0	0.0	-2.6	1.1
2002	1.7	-0.7	-0.3	0.2	0.3	0.5	0.0	1.6	0.8
2003	2.3	0.2	0.3	0.0	0.5	0.5	-0.1	1.2	0.3
2004	1.0	-0.3	0.3	0.1	0.1	0.2	0.1	0.7	0.0
2005	1.9	0.2	0.6	0.0	0.7	0.8	0.2	0.6	-0.6
2006	3.2	-0.1	0.9	0.0	0.9	1.0	0.3	0.3	0.8
Cumulative contributions to the change in the monetary overhang									
92-06	5.6	-7.6	2.9	0.6	5.6	6.2	0.4	0.7	2.8
92-00	-6.3	-9.2	0.3	0.2	3.1	3.3	-0.1	-1.0	0.4
01-06	11.9	1.6	2.7	0.4	2.5	2.9	0.5	1.8	2.4

Source: authors' calculations based on ECB data.

Notes: The sectoral breakdown is based on MFIs and central government financial liabilities using indexes of notional stocks. M3 and currency in circulation data are adjusted for seasonal and calendar effects. - The column labelled "Other items" comprises money market fund shares, debt securities up to two years and the discrepancies between the overall M3 to GDP ratio and the sum of the corresponding sectoral aggregates. - The monetary overhang is computed as the difference between the logarithm of the M3 to nominal GDP ratio and its equilibrium level, estimated by a linear regression on annual data covering the period 1991-2006.

The monetary overhang decreased by more than 6 percentage points during the period 1992-2000 in the euro area. Excluding non-bank financial intermediaries and non sectorized other marketable instruments, the total reduction in the monetary overhang would have been even larger (10.0 percentage points), essentially due to the negative contribution of households' money holdings.

In the period 2001-2006, when it is generally assumed that risks for price stability have increased considerably, the monetary overhang increased substantially, by about 12.0 percentage points. In this period, holdings of non-sectorized money market fund shares and monetary instruments held by non-bank financial intermediaries contributed for about 40 per cent of the overall increase in the monetary overhang. As suggested by the analysis in Section 2, a large contribution also derived from the exceptional growth of the currency in circulation and monetary deposits held by households due to the cash changeover in 2001. Overall, the contribution derived from households and non-financial firms was by 36 per cent.[10]

We note that excluding non-bank financial intermediaries' money holdings, in the euro area there would be excess liquidity conditions (i.e. a positive value for the monetary overhang) only from 2005, which is also the time when the ECB started to raise official interest rates.

4. Sectoral money demand and the transmission mechanism: a survey of the literature

The results outlined in the previous section provide evidence that non-bank financial intermediaries' money holdings were one of the main driving forces of the increase in excess liquidity observed in recent years. Nevertheless, in order to better assess what implications the sectoral breakdown of the excess liquidity has in terms of risks to price stability, it is now important to consider the role of different sectors in the transmission mechanism. Indeed, there is broad agreement that money demand equations differ from one sector to another (Fisher and Vega, 1993; Fujiki and Mulligan, 1996; Thomas, 1997a, 1997b) and it is

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[10] Results based on outstanding amounts of the overall M3 and indexes of notional stocks for the sectoral deposits are substantially unchanged. The contribution of households and non-financial firms to the overall increase in the monetary overhang during the period 2001-2006 was around 40 per cent and that of other marketable instruments and non bank financial intermediaries about 45 per cent. Neither a sectoral breakdown were both overall M3 and sectoral deposits growth rates are based on outstanding amounts leads to significant changes with respect to results outlined in this section (see Appendix A). Finally, in order to check the robustness of our conclusions to the choice of the sample period used for the computation of the long-run money velocity, we also assessed the corresponding sectoral breakdown obtained from an estimated money velocity using the linear trend over the period 1980-2006. In this case, the contribution from households and non-financial firms is about 45 per cent, while that of non-bank financial intermediaries and other marketable instruments is about 35 per cent.

widely recognized that different sectors are likely to hold money for different motives and not necessarily for transaction purposes.

Empirical evidence on the role of financial firms in the transmission mechanism of monetary policy in the euro area is not yet available neither at aggregate nor at single-country level, mainly because of the lack of more comprehensive and harmonized statistics regarding sectoral balance sheet data. Some lessons can be learnt from past evidence in the United Kingdom, with the important caveat that differences in the financial structure of the economy might imply significant differences in the transmission mechanism.

Thomas (1997a, 1997b) estimated different money demand equations for households and firms, distinguishing, among the latter, between industrial and commercial companies on the one side and non-bank financial intermediaries on the other. Since money is held by non-financial firms for transaction motives and partly as a store of value, their money demand is increasing in the relative return on short-term deposits and declining in the real cost of capital (which is the alternative rate of return on real assets). Regarding the transmission mechanism, the deviation of money holdings from their long-run desired level is found to have a positive impact on investment expenditure and a negative effect on the real cost of capital (Ireland and Wren-Lewis,1992; Chrystal and Drake, 1994; Mizen, 1996). Therefore, the increase in investment spending might imply a positive effect on inflation by means of a significant wealth effect on domestic demand.

Regarding non-bank financial firms, such as insurance firms and pension funds and other financial intermediaries (OFIs), they hold money primarily for speculative purposes, as they distribute their total assets among risky assets and liquidity. Therefore, their money demand is largely driven by portfolio considerations and is expected to depend on the relative rates of return in the money market, equity and bond markets and on real assets, such as physical capital, commodities and land. As they represent the main counterparties to banks' liability management activity, their demand for money should interact strongly with banks' deposit rate setting decisions. In particular, in the long run the deposit rate depends positively on OFIs' money demand, which might play an important role in the transmission mechanism, to the extent that higher deposit rates lead to a significant wealth effect on disposable income. The small size of the coefficient estimated by Thomas (1997a, 1997b) seems to be indicative of no particular role of OFIs' deposits in the transmission mechanism.

Chrystal and Mizen (2005) suggest that financial firms might have effects on real spending and investment decisions of the private sector (households and non-financial firms), and finally on inflation, through both direct and indirect channels. For example, pension funds, insurance corporations and investment funds mainly manage long-term private saving, securities dealers typically take short-term financial positions, leasing companies buy capital equipment directly to lease to non-financial firms, and many financial firms also invest in real estate. Therefore, they might directly generate income and other components of value added in the economy (positive wealth effects). In addition, they affect real economic activity through indirect financial linkages with other sectors that enable firms or households to change their spending patterns, such as by lowering the cost of external finance.

Using an encompassing VAR approach, Chrystal and Mizen (2005) estimate a simultaneous system for the UK comprising an aggregate money demand for non-financial firms, a borrowing equation and a domestic demand equation, based on the assumption that both sides of financial firms' balance sheets may affect real economic activity. Both real lending and money balances are explained by a common set of variables. The estimated relationships suggest that financial firms' borrowing influences aggregate investment in the long run, and through this effect they alter the short-term dynamics of investment spending. In interpreting this link it is difficult to assess whether the effect stems solely from the investment behaviour of leasing companies or whether there are other indirect effects on non-financial firms' investment from the financial services received from financial firms. By contrast, financial firms have little impact on the long-run behaviour of the household sector, and therefore on the short-term pattern of consumption. [11]

Congdon (2000a, 2000b, 2005) argues that insurance corporations and pension funds played a role in the UK "boom-bust cycles" of the 1970s and 1980s. Recently, Benati et al. (2006) have pointed out that the build up in financial firms' money holdings might not be

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[11] The level of real lending is positively affected by real GDP, with an elasticity close to unity. Real gross financial wealth has a more muted effect on money and borrowing, even if positive. The coefficient of the real short-term interest rate in the lending equation is negative, as expected, but not statistically different from zero. The equation for real money balances is also positively affected by the variable measuring the return on financial intermediation services and by the spread of long gilts over equity returns, suggesting that money balances are regarded as a safe asset in the portfolio when dividend yields on equities are falling relative to the yield on gilts.

driven by changes in underlying fundamental determinants, as money might be held as a buffer to allow for unpredictable shifts in the flow of funds. The resulting excess liquidity is likely to be spent on purchasing assets, putting upward pressure on asset prices and then on inflation. Nevertheless, using a time-varying parameter VAR they find that broad money holdings by total financial firms have no information content for inflation, while money held by insurance corporations and pension funds is positively but not significantly related to asset prices.

5. Why do OFIs hold more money?

The previous section suggests that assessing the effects of financial firms' money demand on inflation is a difficult task because of the complex interactions among economic agents to be modelled. Another way to derive policy implications from OFIs' money holdings is to assess whether the large increase in the amounts of their deposits was due to a rise in their degree of liquidity or their growth in the economy, thus reflecting a permanent change in its financial structure.

The OFI sector comprises a number of different entities, namely, investment funds (IF); financial vehicle corporations created to be holders of securitised assets (FVC); financial corporations engaged in lending (FCL), which comprise firms providing financial leasing, factoring, mortgage lending and consumer lending; financial holding corporations (FHC), which are entities principally engaged in venture capital and development capital; and securities and derivatives dealers (SDD), which consist of all investment firms providing investment services for third parties by investing in securities on own account as their main business.

The ECB regularly collects statistics following the so-called "short-term approach", namely, quarterly balance sheet statistics on OFIs from euro-area NCBs on the basis of data available at the national level. The available statistics are collected separately for four sub-sectors, namely, IFs, FCLs, SDDs and a residual category. However, NCB compilers might in practice deviate from these definitions depending on national circumstances. Therefore, at

euro-area level, the lack of harmonized statistics regarding all entities does not allow us to conduce an exhaustive analysis.[12]

Notwithstanding the limited data availability and quality, some conclusions can be inferred looking at the balance sheet data regarding IFs, currently published by the ECB; their deposit amounts represent by far the largest part of overall ones of OFIs (80 per cent in the euro area). In Figure 6 we report the pattern of total deposits (which also include longer-term ones) and total financial assets held by investment funds in the period 1999-2006Q3 for the main European countries, as well as for the euro area as a whole.

Figure 6

**RATIO OF DEPOSITS TO TOTAL FINANCIAL ASSETS
(INVESTMENT FUNDS IN MAIN EUROPEAN COUNTRIES)**
(percentage points; 1999-2006Q3)
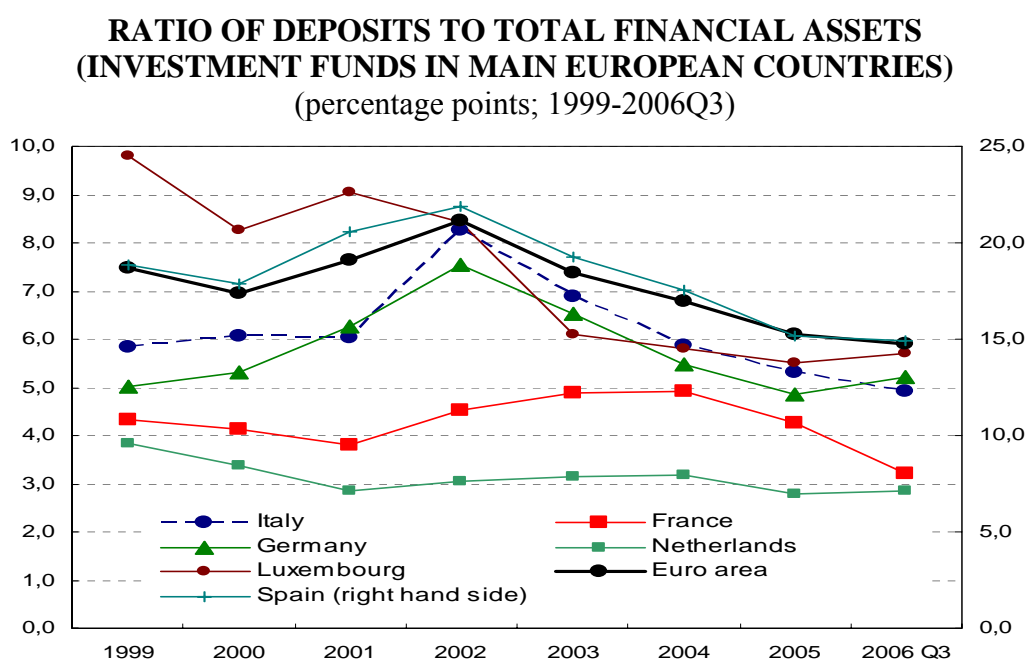
Source: authors' calculations based on ECB data.

We argue that in the euro area the substantial increase in the volume of deposits held by investment funds mainly reflected the growth in their total assets, and only to a lesser extent an increase in their degree of liquidity. The evolution of deposits held by investment funds in the euro area as a whole reflected a similar behaviour at country level, with the

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[12] The ESCB statistical function is currently working towards some improvements, in order to provide more accurate data regarding both IFs and FCVs. See Moutot et al. (2007) for more details.

exception of Italy. Deposits held by investment funds increased significantly in Germany, France and Spain, but the degree of liquidity in these countries did not change substantially. At the same time, in Italy the decrease in total deposits was due to the decrease in total financial assets. The pattern of the ratio of deposits to total financial assets basically remained unchanged throughout the period.

6. Monetary developments in Italy: a special case

In Table 4 we report outstanding amounts of short-term deposits and repurchase agreements included in M3 and their percentage changes for Italy and the euro area as a whole over the period 2001-2006. The basic picture is that, starting from 2001, total short-term deposits and repurchase agreements held by OFIs increased significantly in the euro area, although to a less extent in Italy.

The recent development of OFI's money holdings in euro area countries is discussed and analyzed at length in Moutot et al. (2007), from which it emerges that modifications in the financial structure of the main European countries, as well as changes in their regulatory environment, seem to provide the basic explanation for the exceptional increase in OFIs' money holdings in recent years.

Table 4

DEPOSITS HELD BY OFIs IN ITALY AND IN THE EURO AREA
(millions of euros; percentage changes)

	Years	Overnight deposits	Deposits with agreed maturity up to 2 years	Deposits redeemable at notice up to 3 months	Repurchase agreements	Total short-term deposits
Italy	2001	37479	*1309*	67	19810	58665
	2002	38504	*2835*	132	29998	71469
	2003	34552	*1614*	131	20941	57238
	2004	31466	*3410*	222	18160	53258
	2005	35557	5202	153	18769	59681
	2006	40871	6141	119	21895	69026
	2001-2006	*9.1%*	*369.1%*	*77.6%*	*10.5%*	*17.7%*
Euro Area	2001	156544	*40212*	5155	85340	282503
	2002	152654	*130186*	6481	97144	386465
	2003	180895	*130832*	6088	104389	422204
	2004	180281	*138988*	10050	119798	449117
	2005	233943	*184960*	10497	121064	550464
	2006	276583	*251607*	10633	117053	655876
	2001-2006	*76.7%*	*525.7%*	*106.3%*	*37.2%*	*132.2%*

Source: authors' calculations based on ECB data.

In the remaining part of this section we focus on the sectoral breakdown of excess liquidity in Italy. Our analysis is based on notional stocks for the period 1997-2006 and outstanding amounts for the period 1991-1996 taken from disaggregated balance sheet data on both MFIs and post office. Table 5 shows that, in the period 1991-2006, the annual growth rate of the Italian contribution to M3 has been on average by 5.6 per cent. Among the sectors, households provided the largest contribution to the overall increase in the monetary aggregate (about 50 per cent). The contributions of non-financial firms' and non-bank financial intermediaries' money holdings were, respectively, 20 and 15 per cent.

When we assess the corresponding breakdown of the change in the monetary overhang (see Table A2 in Appendix A), we argue that the overall accumulation of excess liquidity has been higher than in the euro area (11.0 percentage points in 1991-2006), mainly because the trend growth velocity of money has a smaller slope.[13] If we focus the analysis on the period 2001-2006 we note that the picture is very different from that for the euro area as a whole. The overall increase in the monetary overhang is more than 25 percentage points. Households and non-financial firms accounted, respectively, by 42 and 17 per cent. Non-sectorized other marketable instruments' contribution was 25 per cent, while that from non-bank financial intermediaries was only by 8 per cent of the overall increase in the monetary overhang.

For Italy available statistics on investment funds are based only on balance sheet data for open-end investment funds, while SSD data mainly represent data on SIMs (Società d'intermediazione mobiliare). Nevertheless, in first quarter 2006 outstanding amounts of IFs represented 69 per cent of overall OFIs' financial assets but 96 per cent of their overall deposits (80 per cent in 1999).

In the case of Italy the reduction in deposits held by Italian open-end investment funds was due in large part to banks' supply strategies, designed to sell customers investment funds operated by management companies that they themselves had set up in foreign financial centres where the taxation of business income is lower (Ireland and Luxembourg). Figure 7 shows the pattern over time of the end-of-period outstanding amounts of Italian

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[13] For Italy the estimated coefficients of the trend in money velocity are, respectively, -0.54 for the slope and 0.38 for the constant term.

open-end investment funds, allowing a comparison with those held by foreign funds controlled by Italian intermediaries.

Table 5

SECTORAL BREAKDOWN OF THE ITALIAN COMPONENT OF M3
(percentage changes; percentage points)

| | Growth rate of Italian component of M3 | Sectorized deposits and repurchase agreements | | | | | | Non-sectorized components | |
| | | Households | Non-financial firms | Non-bank financial intermediaries | | | General government | Currency in circulation | Other items |
				Insurance corporations and pension funds	OFIs	Total			
1992	9.4	7.0	0.1	0.1	-0.1	0.0	0.3	0.9	1.3
1993	6.3	3.1	1.0	-0.1	0.8	0.7	0.4	0.4	0.8
1994	1.8	0.6	1.1	-0.1	0.3	0.2	0.0	0.5	-0.6
1995	4.8	1.2	0.3	0.2	0.5	0.7	0.4	0.2	2.0
1996	2.4	1.3	0.0	0.0	0.6	0.6	0.2	0.1	0.1
1997	-0.4	1.2	0.6	0.0	1.3	1.2	0.0	0.5	-3.9
1998	2.1	2.4	2.7	-0.2	2.1	1.9	-0.2	0.6	-5.2
1999	3.6	-0.8	0.8	0.1	1.4	1.6	0.4	1.1	0.6
2000	4.8	2.1	1.9	0.3	0.2	0.5	0.3	0.5	-0.5
2001	8.3	6.0	1.3	0.1	0.1	0.3	0.4	-1.6	2.0
2002	10.5	3.9	0.8	0.5	1.6	2.1	0.2	0.5	2.9
2003	10.1	3.2	0.7	-0.1	-0.6	-0.6	0.0	1.3	5.5
2004	5.9	4.0	1.9	0.2	-0.1	0.1	0.2	1.2	-1.4
2005	6.9	3.9	1.2	0.6	0.6	1.2	0.3	1.1	-0.8
2006	8.0	4.4	1.5	0.0	0.8	0.8	0.2	0.9	0.2
Average annual growth rates									
92-06	5.6	4.5	10.4	10.3	16.8	14.0	9.4	7.4	9.2
92-00	3.9	2.9	10.8	5.3	23.6	17.9	10.1	6.8	-6.5
01-06	8.3	6.9	9.8	17.7	6.5	14.3	8.4	8.2	32.7
Average shares									
92-06		0.65	0.11	0.01	0.05	0.06	0.02	0.08	0.08
92-00		0.67	0.09	0.01	0.04	0.05	0.02	0.08	0.09
01-06		0.61	0.13	0.01	0.07	0.08	0.03	0.08	0.08
Average contributions to the Italian contribution to M3 growth rate									
92-06		2.9	1.1	0.1	0.6	0.7	0.2	0.5	0.2
92-00		2.0	0.9	0.0	0.8	0.8	0.2	0.5	-0.6
01-06		4.2	1.2	0.2	0.4	0.6	0.2	0.6	1.4

Source: calculations based on Bank of Italy data.

Notes: The sectoral breakdown is based on MFIs and central government financial liabilities using outstanding amounts until 1996 and notional stocks afterwards. - The column labelled "Other items" comprises money market fund shares, debt securities up to two years and the discrepancies between the overall Italian contribution to M3 and the sum of the corresponding sectoral aggregates.

Figure 7

TOTAL FINANCIAL ASSETS HELD BY ITALIAN INVESTMENT FUNDS
(end-of-period outstanding amounts)
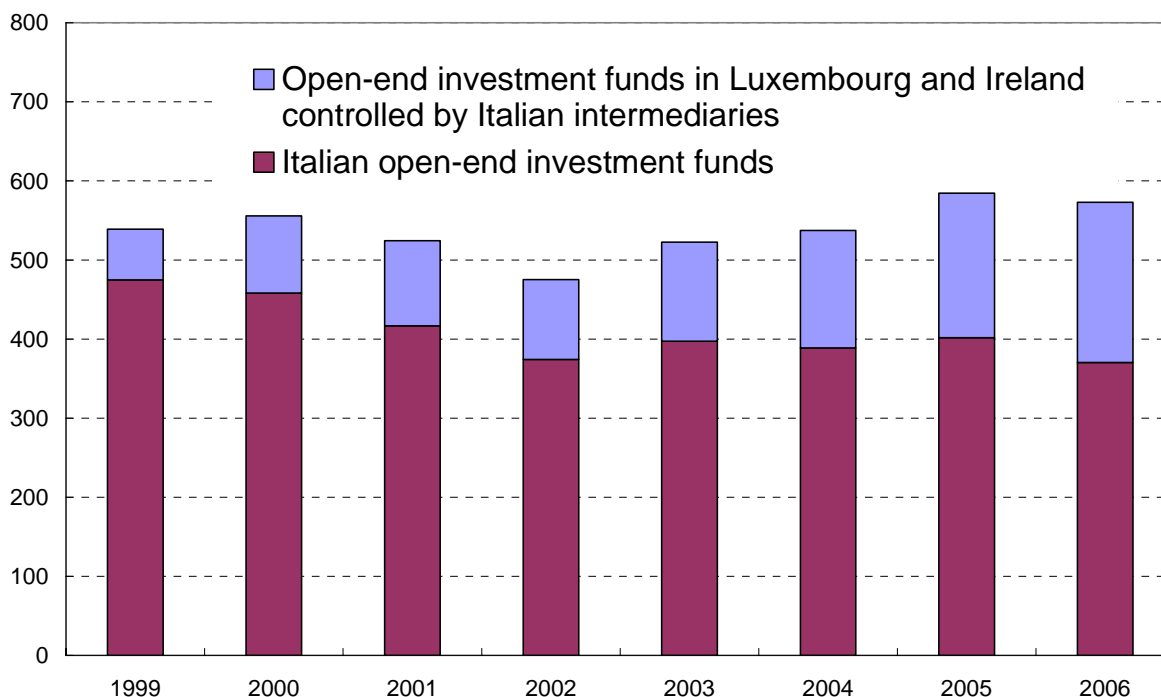
Source: authors' calculations based on Assogestioni data.

7. Conclusions

In this paper we provide evidence that current excess liquidity in the euro area may imply smaller upside risks to price stability over the medium term than usually argued. Our claim is based on a sectoral breakdown of the monetary overhang, which shows that the largest contribution to the increase in excess liquidity in the period 2001-2006 stemmed from non-bank financial intermediaries' money holdings, as well as from a large accumulation of marketable instruments. Such increases are likely to be related more to portfolio choices than to transaction motives.

The lack of comprehensive statistics for the euro area did not allow us to gain a deeper understanding of the role of financial firms in the transmission mechanism of monetary policy. Nonetheless, we derived some policy implications using available balance sheet data on investment funds. In particular, we found that the substantial increase in deposits held by

these intermediaries in the euro area reflected an increase in their total financial assets and not in their degree of liquidity. Our overall picture is that current excess liquidity mainly reflects permanent changes in the financial structure of the economy. Interestingly, our sectoral analysis suggests that excess liquidity did not appear before the end of 2005, which is also the time when the ECB started to raise the official interest rates.

For monetary analysis purposes we think that additional investigations on these topics are necessary, especially using the new and longer ECB dataset on sectoral money holdings. First, the estimation of sectoral money demands is strongly advocated in order to understand better the role of each money holding sector in the transmission of monetary policy. Second, our sectoral distribution of the monetary overhang may offer a natural explanation of the breakdown of estimated money demand equations for the euro area in recent years. Indeed, permanent changes in the financial system produced by the increasing role of non-bank financial intermediaries in the economy can lead to changes in the long-run equilibrium level of real money holdings and offset the leading indicator properties of excess liquidity measures for future inflation.

SECTORAL BREAKDOWN OF THE CHANGE IN THE MONETARY OVERHANG FOR THE EURO AREA
(percentage changes)

	Change in the Monetary Overhang	Sectoral contributions						Non-sectorized components	
		Households	Non-financial firms	Non-bank financial intermediaries			General government	Currency in circulation	Other items
				Insurance corporations and pension funds	OFIs	Total			
1992	-0.4	-0.6	-1.1	0.0	-0.1	0.0	-0.3	0.1	1.5
1993	1.9	1.7	0.1	0.0	0.3	0.3	0.1	0.0	-0.3
1994	-4.4	-2.7	-0.2	-0.1	0.0	-0.1	-0.2	-0.1	-1.1
1995	-1.3	-0.6	0.0	-0.1	0.4	0.3	-0.2	-0.2	-0.5
1996	-1.2	-0.7	0.4	0.0	0.4	0.4	-0.1	-0.1	-1.1
1997	-1.3	-2.0	0.4	0.0	0.7	0.8	0.1	-0.2	-0.3
1998	-1.3	-1.4	-0.1	0.0	1.0	1.0	0.1	-0.4	-0.5
1999	-0.3	-1.3	-0.3	0.1	0.3	0.4	0.2	0.2	0.5
2000	-2.6	-3.0	0.9	0.2	0.1	0.3	0.1	-0.5	-0.3
2001	4.7	4.0	1.3	0.1	0.1	0.2	0.1	-2.5	1.6
2002	1.4	-0.5	-0.5	0.2	0.2	0.4	0.0	1.6	0.5
2003	1.8	0.3	0.1	0.0	0.3	0.3	-0.4	1.1	0.4
2004	0.7	-0.3	0.1	0.1	0.0	0.1	0.1	0.7	-0.1
2005	3.3	0.5	0.8	0.0	1.2	1.2	0.2	0.6	0.0
2006	3.6	0.5	1.0	0.1	1.0	1.1	0.4	0.1	0.7
Cumulative contributions to the change in the monetary overhang									
92-06	4.7	-6.2	2.9	0.5	6.0	6.6	0.2	0.2	0.9
92-00	-10.9	-10.7	0.1	0.1	3.2	3.3	-0.2	-1.3	-2.2
01-06	15.5	4.5	2.8	0.4	2.8	3.2	0.4	1.5	3.1

Source: calculations based on ECB data.

Notes: The sectoral breakdown is based on MFIs and central government financial liabilities using outstanding amounts. - The column labelled "Other items" comprises money market fund shares, debt securities up to two years and the discrepancies between the overall M3 to GDP ratio and the sum of the corresponding sectoral aggregates. - The monetary overhang is computed as the difference between the logarithm of the M3 to nominal GDP ratio and its equilibrium level, estimated by a linear regression on annual data covering the period 1991-2006

SECTORAL BREAKDOWN OF THE CHANGE IN THE
MONETARY OVERHANG FOR ITALY
(percentage changes)

| | Change in the Monetary Overhang | *Sectoral contributions* | | | | | | *Non-sectorized components* | |
| | | Households | Non-financial firms | Non-bank financial intermediaries | | | General government | Currency in circulation | Other items |
				Insurance corporations and pension funds	OFIs	Total			
1992	3.5	2.9	-0.4	0.1	-0.2	-0.2	0.2	0.4	0.6
1993	2.7	0.6	0.7	-0.2	0.8	0.6	0.3	0.1	0.4
1994	-4.3	-3.6	0.6	-0.1	0.1	0.0	-0.1	0.1	-1.3
1995	-3.5	-4.2	-0.3	0.1	0.3	0.4	0.2	-0.4	0.9
1996	-3.9	-2.8	-0.5	0.0	0.4	0.4	0.1	-0.3	-0.7
1997	-5.2	-2.1	0.2	-0.1	1.0	1.0	-0.1	0.2	-4.3
1998	-2.5	-0.7	2.2	-0.2	1.8	1.6	-0.3	0.2	-5.4
1999	-0.2	-3.3	0.4	0.1	1.1	1.2	0.3	0.7	0.4
2000	-1.4	-1.8	1.1	0.3	-0.3	-0.1	0.1	-0.1	-0.7
2001	2.8	2.5	0.6	0.1	-0.3	-0.2	0.2	-2.0	1.7
2002	5.9	1.1	0.3	0.4	1.3	1.7	0.1	0.2	2.6
2003	6.3	0.9	0.3	-0.1	-0.8	-1.0	-0.1	1.0	5.1
2004	1.3	1.2	1.3	0.1	-0.4	-0.2	0.1	0.8	-1.9
2005	4.3	2.3	0.9	0.5	0.4	1.0	0.2	0.9	-1.1
2006	5.1	2.7	1.1	-0.1	0.7	0.6	0.2	0.6	0.0
Cumulative contributions to the change in the monetary overhang									
92-06	10.9	-4.4	8.3	0.8	5.9	6.7	1.3	2.4	-3.4
92-00	-14.8	-15.2	4.0	-0.1	5.0	4.9	0.7	0.8	-10.0
01-06	25.7	10.7	4.3	1.0	0.9	1.8	0.7	1.6	6.5

Source: calculations based on Bank of Italy data.

Notes: The sectoral breakdown is based on MFIs and central government financial liabilities using outstanding amounts until 1996 and adjusted notional flows afterwards. - The column labelled "Other items" comprises money market fund shares, debt securities up to two years and the discrepancies between the overall Italian contribution to M3 to GDP ratio and the sum of the corresponding sectoral aggregates. - The monetary overhang is computed as the difference between the M3 to nominal GDP ratio and its equilibrium level, estimated by a linear regression on annual data covering the period 1991-2006

Appendix B. Methodology

The monetary overhang for the whole economy in the year t is defined as

$$MO_t = \left(m_t - p_t - y_t - v_t^*\right) \tag{B1}$$

The trend growth velocity of money is estimated with a linear interpolation on annual data

$$v_t^* = \hat{\alpha} + \hat{\beta} \cdot t \tag{B2}$$

The overall change in the monetary overhang between time t and $T>t$ is

$$MO_T - MO_t = \left(m_T - p_T - y_T\right) - \left(m_t - p_t - y_t\right) - \hat{\beta}(T - t) \tag{B3}$$

The change in the monetary overhang in the sector i is

$$MO_T^i - MO_t^i = \left[\left(m_T^i - p_T - y_T\right) - \left(m_t^i - p_t - y_t\right)\right] - \hat{\beta}^i(T - t) \tag{B4}$$

The contribution of the sector i to the overall change in the monetary overhang is[14]

$$Z_T^{(i)} \cong \left[\left\{\frac{(M/PY)_T^i - (M/PY)_t^i}{(M/PY)_t^i}\right\} - \hat{\beta}^i(T-t)\right] \cdot \frac{M_t^i}{M_t} \tag{B5}$$

If the trend growth velocity of money is assumed to be the same among all sectors, namely

$$\beta^i = \beta \quad \forall i \tag{B6}$$

we obtain

$$Z_T^{(i)} \cong \left[\left\{\frac{(M/PY)_T^i - (M/PY)_t^i}{(M/PY)_t^i}\right\} - \hat{\beta}(T-t)\right] \cdot \frac{M_t^i}{M_t} \tag{B7}$$

We note that, by definition $\sum_{i=1}^{n} M_t^i = M_t$, therefore,

$$\sum_{i=1}^{n} Z_T^{(i)} = \sum_{i=1}^{n}\left[\left\{\frac{(M/PY)_T^i - (M/PY)_t^i}{(M/PY)_t^i}\right\}\right] \cdot \frac{M_t^i}{M_t} - \sum_{i=1}^{n} \hat{\beta}(T-t) \cdot \frac{M_t^i}{M_t} = MO_T - MO_t \tag{B8}$$

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[14] In deriving the sectoral breakdown of the monetary overhang in table 3, the sectoral weights M_t^i/M_t are computed using outstanding amounts, while the changes in $(M/PY)_t^i$ are computed using indexes of notional stocks.

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