

## ARTICLES

# SECTORAL MONEY HOLDING: DETERMINANTS AND RECENT DEVELOPMENTS



*Identifying and understanding the determinants of money demand by the private sector is a central element of monetary analysis. It constitutes an important part of the framework used to extract signals about the risks to price stability over the medium to longer term that stem from monetary developments. However, the analysis of aggregate money holdings may obscure behavioural differences between households and firms. Looking at individual and more homogenous sectors is therefore likely to promote understanding of the dynamics and determinants of overall money demand and thus facilitate the extraction of signals about future price developments that are relevant for monetary policy. As regards the recent evolution of sectoral money demand, while the trend in money growth has varied across sectors in the past, the strengthening of annual M3 growth observed since mid-2004 has been broadly based across sectors.*

### I INTRODUCTION

Monetary analysis constitutes an important part of the ECB's monetary policy strategy. The aim of monetary analysis is to extract, in real time, signals in monetary developments that are relevant for the assessment of risks to price stability over the medium to longer term. In order to extract such signals, a detailed analysis of the developments of the broad monetary aggregate M3 is undertaken, including a thorough assessment of the evolution of its components, counterparts and sectoral composition. This exercise employs both statistical methods and institutional information. This article looks at the sectoral dimension of monetary developments, against the background of historical data on sectoral money holdings that have recently become available.

Understanding the factors underlying the euro area private sector's demand for money is a central element of monetary analysis. Adopting a sectoral perspective is particularly important for understanding money demand, as it helps to identify which sectors of the economy contribute to overall money growth at different points in time and provides a deeper insight into the factors driving these developments. Such an approach can thus enrich the analysis of monetary aggregates by providing additional insights into money-holding behaviour.

Households and firms, with the latter including both financial and non-financial companies,

hold money for a variety of purposes. All sectors hold money as a medium of exchange and a store of value. However, the relative importance of these purposes may vary across sectors, leading to different developments in the sectoral components of money over the course of the business cycle. Moreover, the economic variables which capture the different motives may vary across sectors, reflecting differences in objectives and constraints. Looking at individual sectors may therefore make it possible to formulate fuller explanations of the forces driving monetary developments, leading to a better understanding of the link between monetary and price developments.

This article is structured in four sections. First, it explains the construction of sectoral M3 aggregates for the euro area based on data for short-term deposits that have become available for the period since 1991 and establishes stylised facts regarding the behaviour of these aggregates over longer-term horizons. Second, a number of general conceptual issues concerning the determinants of money demand at an aggregate and a sectoral level are outlined. Third, drawing on these conceptual considerations and empirical evidence, recent developments in the sectoral monetary aggregates are discussed. Finally, some brief concluding remarks are offered, bearing in mind that estimates of sectoral money holdings are inevitably surrounded by some uncertainty.

## 2 SECTORAL MONEY HOLDINGS: SOME STYLISTED FACTS

The ECB's definitions of euro area monetary aggregates are based on a harmonised definition of the money-issuing and money-holding sectors. The former sector consists of Monetary Financial Institutions (MFIs) resident in the euro area.<sup>1</sup> The latter sector includes all non-MFIs resident in the euro area other than the central government. The money-holding sector thus consists of: households; non-financial corporations; financial institutions other than MFIs; state and local governments; and social security funds.

In analysing the various sectors' demand for money, it is necessary to look at developments over a longer horizon in order to derive meaningful economic relationships; the period since the introduction of the euro in 1999 would be too short. 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, which accounts for over 80% of the stock of M3 – have become available for each sector for the period since the first quarter of 1991 (see the box entitled “New euro area historical series on holdings of M3 deposits by sector” in Section 2.1 of this issue of the Monthly Bulletin). These series are labelled as sectoral M3 deposits.

While these data on M3 deposits already provide valuable insights into many aspects of money demand, the assessment of overall monetary developments needs to take into account the sectoral holdings of the remaining components of M3 (i.e. currency in circulation and marketable securities). Looking only at M3 deposits ignores the significant substitution that may take place between these deposits and currency in circulation or marketable securities. For example, in the run-up to the euro cash changeover in January 2002, households increased their holdings of short-term deposits included in M3, as they deposited their holdings of legacy currencies in anticipation of the introduction of the euro banknotes and coins. In that period, the growth rate of household M3 deposits thus overstated the sector's overall demand for M3, as the increase reflected, to a large extent, a shift between currency in circulation and overnight deposits. Therefore, this article is based on an analysis of estimates of sectoral holdings of total M3, which have been constructed using sectoral deposit data as a key building block (see the box entitled “Construction of estimates of sectoral M3 aggregates”).

<sup>1</sup> Even though the central government sector is not considered to be part of the money-issuing sector, central government liabilities of a monetary nature (e.g. deposits held by households with the post office) are included as a special item in the definition of monetary aggregates because they are highly liquid.

### Box

#### CONSTRUCTION OF ESTIMATES OF SECTORAL M3 AGGREGATES

The broad monetary aggregate M3 consists of: currency in circulation; short-term deposits (including repurchase agreements) held with MFIs and central government bodies; money market fund shares/units and MFI debt securities with a maturity of up to two years. While MFIs can report a detailed sectoral breakdown of short-term deposits and repurchase agreements, they are unable to report the ownership of the marketable securities they issue, as these instruments are traded and thus the holders are not necessarily known to them. Similarly, the holders of currency in circulation are not easily identified. This box presents an overview of the information and statistical tools available for producing estimates of sectoral currency and

marketable instrument holdings and describes how the sectoral aggregates underlying this article have been constructed.<sup>1</sup>

### Breakdown of currency in circulation

Currency in circulation accounted for 7.4% of the stock of M3 in the first quarter of 2006. In general, currency held outside the euro area banking sector is difficult to track. Indeed, the anonymity of the holder is one of the important features of banknotes and coins, explaining their widespread use despite the availability of a large number of higher-yielding alternatives. Attempts to measure currency holdings by sector directly (e.g. via surveys) have failed in the past, as only a very small part of the stock of currency could be tracked. Therefore, the available studies cannot give direct guidance on this issue.

Anecdotal evidence and estimates suggest that a considerable amount of euro currency circulates outside the euro area, although there is no evidence that the growth rate of foreign holdings of euro banknotes and coins is substantially higher than that of residents' holdings.<sup>2</sup> At the current juncture, estimates suggest that between 10% and 20% of the stock of euro currency is held by non-residents.

The sectoral breakdown of residents' currency holdings can be estimated roughly using information gained during the run-up to the euro cash changeover in January 2002. The sharp decline in currency holdings in 2001 was mirrored by a corresponding increase in overnight deposits. As quarterly data broken down by holding sector are available for the latter, insights into the sectoral breakdown can be gained by comparing extraordinary developments in overall currency and overnight deposits by sector over the last three quarters of 2001. The extraordinary developments at that time are captured by the "irregular component" obtained from a time series decomposition of deposit holdings. This irregular component represents that element of the deposit series that cannot be explained by trend and seasonal patterns. It can thus be interpreted as capturing the substitution out of currency holdings in anticipation of the withdrawal of legacy currencies and their replacement with euro banknotes and coins. In order to distinguish irregular movements from shifts between M1 and broader monetary aggregates, a normative measure for M1 development is needed. For this purpose, a model by Stracca (2003) was taken as a reference.<sup>3</sup>

The chart reveals a strong downward pattern in the irregular component of currency in the run-up to the euro cash changeover in 2001, which is mirrored by opposite developments in overnight deposits of all sectors. For overnight deposits, information is available on the relative magnitudes of the irregular components across sectors. These relative magnitudes in the last three quarters of 2001 are used to derive the corresponding sectoral shares of currency in circulation. This approach yields the following findings.

1 In some cases direct sectoral information is available for part of the sample period. For the remainder of the sample period and in cases where no sectoral information is available, aggregate holdings were broken down with constant shares.

2 For the latest estimates, see the ECB publication entitled "Review of the international role of the euro, December 2005". For a detailed review see B. Fischer, P. Köhler and F. Seitz, (2004), "The demand for euro area currencies: past, present and future", ECB Working Paper No 330.

3 L. Stracca, (2003), "The functional form of the demand for euro area M1", The Manchester School, March, Vol. 71 (2), pp. 172-204.

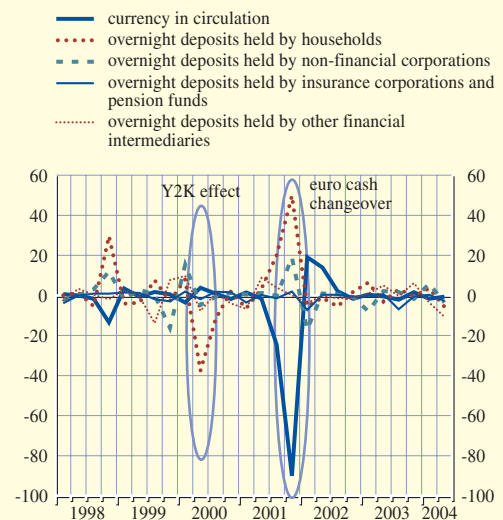
First, with 80%, households appear to have the largest share of residents' currency holdings, reflecting the fact that the spike in their deposit holdings prior to the cash changeover is very significant. In addition, households seem to have started substituting their currency holdings with overnight deposits at a much earlier stage of the run-up to the euro cash changeover.

Second, the smaller spike in their deposits prior to the changeover suggests that non-financial corporations hold 15% of residents' holdings of currency in circulation. Depositing by non-financial corporations of legacy currency holdings appears to have been concentrated in the last quarter of 2001.

Finally, the approach suggests that insurance corporations, pension funds and other non-monetary financial intermediaries do not have large currency holdings (3% altogether).<sup>4</sup> The spike in overnight deposits in the fourth quarter of 2001 and the drop in the first quarter of 2002, which would suggest a considerable substitution effect between currency and overnight deposits, is not observed for these sectors.

### Irregular component of flows in currency in circulation and overnight deposits

(EUR billions)



Source: ECB estimates.

### Sectoral allocation of marketable securities

*Money market fund shares/units* accounted for 8.5% of the stock of M3 in the first quarter of 2006. Since December 1997, Monetary Union Financial Accounts (MUFA) data have identified the money market fund shares/units held by insurance corporations and pension funds. For the period between March 1991 and September 1997, it is assumed that insurance corporations and pension funds accounted for 8% of the money market funds shares/units held by the money-holding sector. On the basis of available data for other non-monetary financial intermediaries (OFIs, which consist of non-monetary financial intermediaries other than insurance corporations and pension funds), it is estimated that OFIs account for 5% of the money market fund shares/units held by the euro area money-holding sector.

National data derived from surveys of private sector financial investors<sup>5</sup> support the assumption that the share of money market fund shares/units held by non-financial corporations might on average be around 30% of the money market fund shares/units held by the non-financial private sector. The remaining 70% is assumed to be held by households.

*MFI debt securities with a maturity of up to two years* accounted for 2.1% of the stock of M3 in the first quarter of 2006. MUFA data identify the short-term debt securities (i.e. with a maturity

4 The remaining share of around 2% is held by the general government excluding central government sector. This sector is not discussed in this article.

5 See, for example, the regular quarterly report entitled "Les placements en valeurs mobilières des agents économiques" in the Bulletin of the Banque de France on the basis of its "Enquête-titre" survey.

of up to one year) held by insurance corporations and pension funds. Although not necessarily issued by MFIs, these securities should be a good proxy for the demand for short-term debt securities relative to demand for money market fund shares/units. On the basis of this information, the ratio between the holdings of money market funds and debt securities is calculated and applied to estimate the holdings of MFI debt securities with a maturity of up to two years.

Since the fourth quarter of 1998, the OFI statistics have identified the share of short-term debt securities with a maturity of up to one year held by investment funds. Although not necessarily issued by MFIs, these securities should be a good proxy for this sector's demand for MFI debt securities with a maturity of up to two years. A constant share of 17% of MFI debt securities with a maturity of up to two years is assumed for the period prior to this date.

On the basis that these securities are a large-denomination structured product, non-financial corporations and households are assumed to hold 62.5% and 37.5% respectively of the share of MFI debt securities with a maturity of up to two years that is not held by non-monetary financial intermediaries.

As described above, a broad range of information has been used in the construction of these sectoral M3 estimates. Nevertheless, developments in these aggregates should be interpreted with caution. In order to investigate the robustness of the estimated sectoral M3 series, the assumptions and estimated shares for the sectoral holdings of currency in circulation and marketable securities were varied widely. The impact on the annual growth rates of the respective sectoral M3 aggregates was, however, marginal and affected the level, but not the pattern, of the growth rates.

The breakdown of M3 by holding sector suggests that households (including non-profit organisations serving households) constitute the largest holder of M3, with approximately two-thirds of the stock. Non-financial corporations hold slightly less than a fifth of the stock of M3, and non-monetary financial intermediaries<sup>2</sup> hold roughly one-tenth, while general government bodies other than central government hold only a very small share.

Several stylised facts can be noted when analysing the annual growth rates of the sectoral M3 series over the available sample period of 1992-2005 (see the table). Non-monetary financial intermediaries' M3 holdings displayed the highest average annual growth rate, at around 11%, while the M3 holdings of non-financial corporations and households grew more moderately, at 6% and 5% respectively.<sup>3</sup>

Looking at different measures of the variability of sectoral money growth (such as the range

between the minimum and maximum annual growth rates or the standard deviation of the growth rates over the period from the first quarter of 1992 to the first quarter of 2006) indicates that non-monetary financial intermediaries experienced the highest variability in monetary dynamics. Non-financial corporations and households exhibited a far more stable pattern of growth, in line with the view that the money demand behaviour of these two sectors is less affected by short-term developments.

2 Although the "other non-monetary financial intermediaries" and "insurance corporations and pension funds" sectors comprise a large variety of entities with different business models, for the purposes of this article they are analysed together as "non-monetary financial intermediaries", as the entities are predominantly involved in asset management for households and financial intermediation.

3 Calculating the annual growth rates over the economic cycle, spanning from the trough in the early 1990s to the trough in the early 2000s, results in notably lower average annual growth rates than shown in the table.

## Sectoral money holdings

(annual growth rate of M3 by sector; percentages; Q1 1992-Q1 2006)

	Non-monetary financial intermediaries	Non-financial corporations	Households
Average	11	6	5
Minimum	3	1	1
Maximum	24	13	9
Standard deviation	5	3	2

Source: ECB calculations.

Reflecting the large share of household holdings in the total stock of M3, in the period since 1992 the annual growth rate of euro area M3 has to a large extent been driven by developments in this sector, in terms of both the level and pattern of growth (see Chart 1).

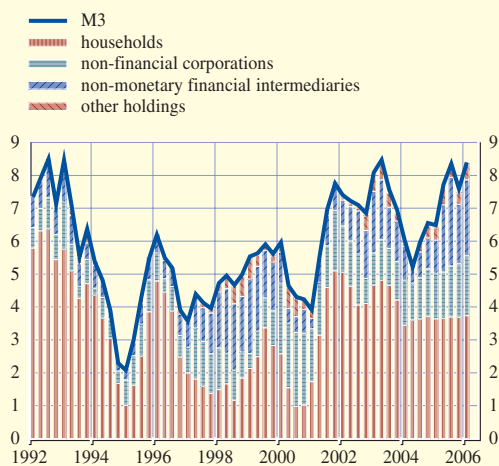
Within the whole period under consideration, several sub-periods can be identified. From the early 1990s until mid-1996, the evolution of M3 growth was primarily driven by households. However, from mid-1996, in an environment characterised by strong equity performance,

declining opportunity costs of holding money and improving economic sentiment, non-financial corporations and non-monetary financial intermediaries increased their contributions to annual M3 growth significantly. At the same time, the contribution of households declined sharply to low levels.

As from the second half of 1998 and reflecting financial market volatility, households again began to increase their contribution to M3 growth. However, the contribution remained below the levels observed in 1994 and 1996, when M3 grew at a similar pace of between 5% and 6% in annual terms. Thus, to a large extent, monetary growth continued to be driven by non-monetary financial intermediaries and, later, by non-financial corporations. This development was particularly visible in the course of 2000, when M3 growth was mainly driven by non-financial corporations, in an environment of strengthening economic activity and strong financial investment. In this period, households and non-monetary financial intermediaries only slowly expanded their holdings of monetary assets (see Chart 2).

### Chart 1 Contributions to annual M3 growth by sector

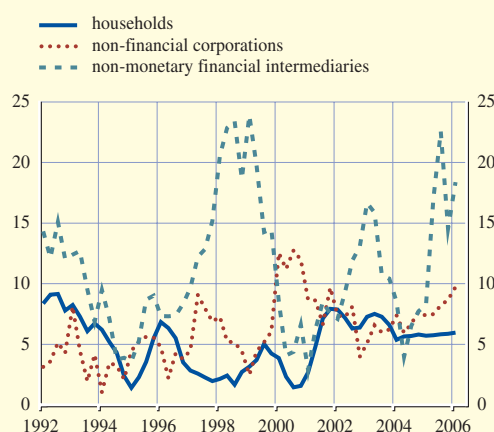
(contributions in percentage points; annual percentage changes in M3)



Source: ECB estimates.  
Note: "Other holdings" refers mainly to deposits and currency held by the general government, excluding the central government sector, and currency held outside the euro area.

### Chart 2 Dynamics of sectoral M3 aggregates

(annual percentage changes)



Source: ECB estimates.



From 2001 until mid-2003, in an environment of heightened financial, economic and geopolitical uncertainty, monetary dynamics were to a large extent influenced by households, as they shifted wealth from equities to safe and liquid monetary assets contained in M3.<sup>4</sup> Non-monetary financial intermediaries also expanded their holdings of M3. At the same time, with economic growth slowing, corporate spreads widening and a need to restructure corporate balance sheets, non-financial corporations slowed their accumulation of money holdings.

Since early 2004 the annual growth rates of all sectoral M3 aggregates have been strong, with particularly significant contributions having been provided by non-monetary financial intermediaries and non-financial corporations. By contrast with previous periods, which saw the contributions of non-financial corporations and households moving in opposite directions, in this period the contributions of all three sectors to aggregate annual M3 growth have increased, although to different extents.

### 3 DETERMINANTS OF MONEY DEMAND FROM A SECTORAL PERSPECTIVE

In order to assess developments in sectoral M3 aggregates, it is useful to review briefly the possible determinants of money demand from a micro and macroeconomic perspective. The microeconomic theory of money demand sets forth three motives for individuals' holdings of money balances. First, the transactions motive, which derives from the need to make payments. Second, the speculative motive, which explains money holdings as being part of a wealth portfolio chosen to achieve a desired combination of risk and return, and thus relates to the opportunity costs of holding money (i.e. the differentials between the expected returns on alternative assets and the rate of return on money).<sup>5</sup> Finally, the precautionary motive, which stems from the need to hold money as a way of managing an uncertain cash flow caused by the unsynchronised and unpredictable nature

of payments and receipts, as well as the price uncertainty of alternative assets. This segmentation by motive for the purposes of analysis does not imply that an individual's demand for money can be combined by mechanical addition. Money balances held for one motive can easily be used to satisfy needs arising from another motive.

Monetary theory provides several conceptual frameworks for understanding individuals' decisions to hold money – for example by relating such decisions to chosen levels of consumption. Similarly, finance theory offers some explanations as to why non-financial firms hold liquid assets – for example, as a buffer to absorb cash-flow variability or as part of the decision to hold a portfolio of assets (including real assets). Each of these theories takes as its starting point the motives underlying an individual's demand for money as described in the preceding paragraph. By contrast, the theoretical background to non-monetary financial intermediaries' decisions to hold money constitutes uncharted territory in that it has not been studied extensively. It is typically thought that portfolio considerations rather than the transactions motive play an important role.

At the macroeconomic level, the demand for money is typically modelled in the form of a money demand equation, which portrays money holdings as a function of a limited set of economic variables. In order to capture the transactions motive for holding money, the level of income is used as a proxy for both the scale and the variability of transactions. In general, speculative demand is captured by including the opportunity cost of holding money. Further explanatory factors, such as measures of uncertainty, may be included on empirical grounds and can be seen as capturing precautionary demand. Finally, on account of

4 See the article entitled "Money demand and uncertainty" in the October 2005 issue of the ECB's Monthly Bulletin.

5 C. A. E. Goodhart, *Money, Information and Uncertainty*, second edition, 1989, MacMillan, p. 51.

portfolio considerations total wealth is a further determinant of money demand.

Given the level of aggregation of the sectors considered, the explanations for the level of money balances held by individual sectors resemble the simpler approach taken at the macroeconomic level. At the same time, looking at individual sectors may allow richer and more consistent explanations of the forces driving monetary developments to be elaborated. In particular, the forces driving the money demand of the various sectors may be quite different.

Empirical results for a number of countries and time periods support the finding that sectoral money holdings respond in different magnitudes to different measures of transactions and opportunity costs.<sup>6</sup> In general, differences in money demand behaviour across sectors could be attributable to two factors.

First, the sectors may have different sets of alternative, non-monetary investment opportunities and thus different opportunity costs of holding money, in particular when the respective tax considerations are accounted for. Furthermore, although all the sectors hold money for transactions purposes, the level of transactions depends on the relevant economic scale variables (e.g. for households: consumption; for corporations: working capital and/or production).

Second, the constraints surrounding the money-holding decision process can vary widely across sectors. For example, while households typically have few restrictions apart from budget constraints to take into account in their money-holding decisions, non-monetary financial intermediaries, such as investment funds, are subject to a binding regulatory framework and corporate governance rules. This could lead to different elasticities of money demand with respect to the same determinants. Similarly, the need to carry out transactions in goods and services will vary between economic sectors, leading to differing income elasticities of money demand.

#### 4 RECENT DEVELOPMENTS IN SECTORAL MONETARY AGGREGATES

On the basis of the general conceptual money demand framework presented above, this section presents empirical evidence linking the evolution of estimated sectoral M3 to developments in financial markets and aggregate demand.

##### HOUSEHOLDS

In the long run, the transactions motive for holding money suggests that real consumption and household real money holdings should move together. Moreover, one would expect that a similar set of economic determinants would simultaneously affect households' money-holding and consumption decisions.

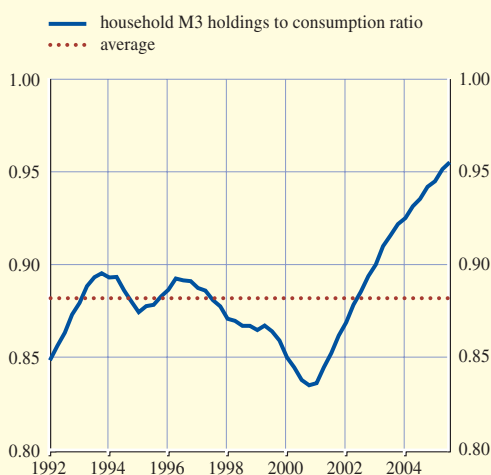
A very simple measure of this long-run relationship – the ratio of household money to consumption – can indicate whether household money holding behaviour is in line with past developments. Chart 3 indicates that for a large part of the 1990s consumption and money holdings did indeed evolve in a broadly parallel manner. However, in 1999 and 2000, a decline in this ratio is observable, as the rise in consumption was not matched by an increase in money holdings. Since 2001 this development has reversed and households now appear to hold more money than is needed to finance the current level of consumption, at least on the basis of a comparison with historical averages. It should, however, be borne in mind that the level of this ratio may be affected over time by financial innovations and/or a structural shift in the level of interest rates. In the absence of such changes, the ratio would be expected to return to its longer-term level. This would necessitate either a reduction in M3 holdings or a pick-up in consumption.

6 J. Butkiewicz, M. M. McConnell (1995), "The stability of the demand for money and M1 velocity: evidence from the sectoral data", *The Quarterly Review of Economics and Finance*, Vol. 35, No 3, pp. 233-243; P. Jain, C.-G. Moon (1994), "Sectoral money demand: a cointegration approach", *Review of Economics and Statistics*, pp. 196-202; and A. Brigden, A. Chrystal, P. Mizen "Money, lending and spending: a study of the UK non-financial corporate sector and households", Bank of England *Quarterly Bulletin*, May 2000, pp. 159-167.



**Chart 3 Ratio of household M3 holdings to consumption**

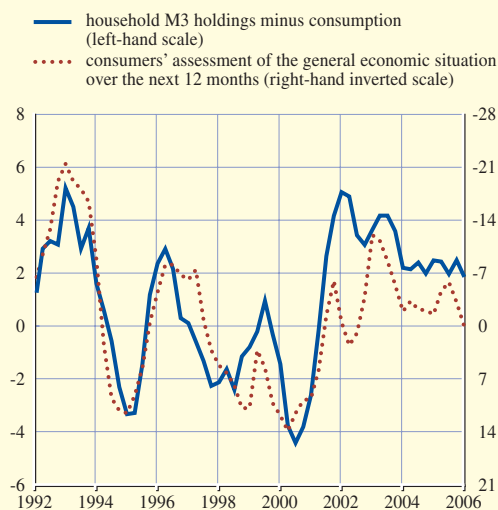
(centred five-quarter moving average)



Source: ECB estimates.

**Chart 4 Household M3 holdings, consumption and economic prospects**

(annual percentage changes; normalised balances)



Sources: ECB estimates, Eurostat, EU Commission.

An explanation of the high level of money holdings relative to consumption is offered by Chart 4. It demonstrates that there is a notable co-movement in the short run between excess growth in households' M3 holdings, as measured by the difference between money growth and consumption growth, and economic confidence indicators. This may be considered to capture precautionary demand for money on the part of the household sector. Excess money growth is closely, but inversely, related to consumers' assessment of the general economic outlook. Households' M3 holdings are currently growing at a rate beyond that suggested by consumers' expectations regarding the economic situation over the next twelve months. Therefore, as consumer confidence improves, the gap between consumption growth and money growth may be expected to narrow.

Money is part of the wealth portfolio of households, which also includes bonds, equities and residential property. Increases in total wealth will typically induce households to hold a larger stock of money. However, the magnitude and pace of the increase may not be indifferent to whether the wealth increase emanates from

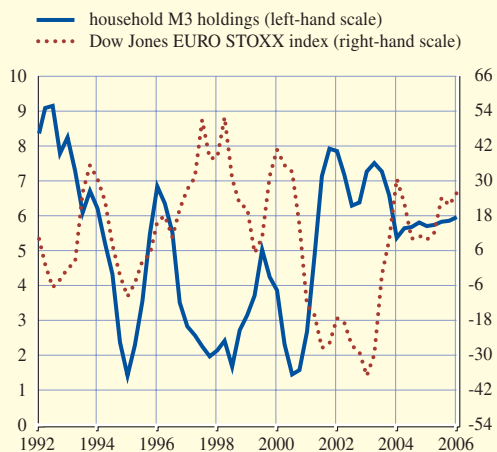
financial or from non-financial assets. Against this background, the speculative demand for money will depend on a broad set of returns on financial and non-financial assets, such as interest rates, bond yields and housing rents, as well as on the respective risk measures.

Over the past few years stock market developments appear to have had a particularly important impact on monetary dynamics. Chart 5 displays the annual growth rate of households' M3 holdings and the euro area stock market performance, as measured by the Dow Jones EURO STOXX index. Strong stock market performance may lead to an increase or a decrease in households' money holdings. On the one hand, strong stock price rises will increase household wealth and some of the capital gains may be saved in the form of money. On the other hand, strong stock returns may encourage substitution out of money and into the equity market.<sup>7</sup> In the

7 For a detailed description of the relationship between money and stock prices see, for instance, M. Friedman (1988), "Money and the stock market", *The Journal of Political Economy*, Vol. 96, No 2, pp. 221-245, and the article entitled "Money demand and uncertainty", in the October 2005 issue of the ECB's Monthly Bulletin.

**Chart 5 Household M3 holdings and stock market performance**

(annual percentage changes)



Source: ECB data and estimates.

exceptional stock market boom and bust period in the late 1990s and early 2000s an inverse relationship between money growth and stock price changes can be observed. This suggests that the strong performance of the euro area stock market brought about a slowdown in the growth of households' M3 holdings, implying that money and equity holdings were substitutes for one another.

In the period 1996-2000, stock market developments exerted a significant dampening effect on the growth of households' money holdings, while in the period of heightened economic and financial uncertainty between 2001 and 2003 portfolio shifts from equities into money significantly fuelled money growth. However, Chart 5 illustrates that between early 2004 and early 2006 the improved stock market performance in the euro area did not slow the annual growth rate of household M3 holdings to the extent that would have been anticipated on the basis of a substitutive relationship. This supports the view that the dampening effect of the normalisation of portfolio allocation behaviour on monetary growth has been offset by other, stimulative effects.

## NON-FINANCIAL CORPORATIONS

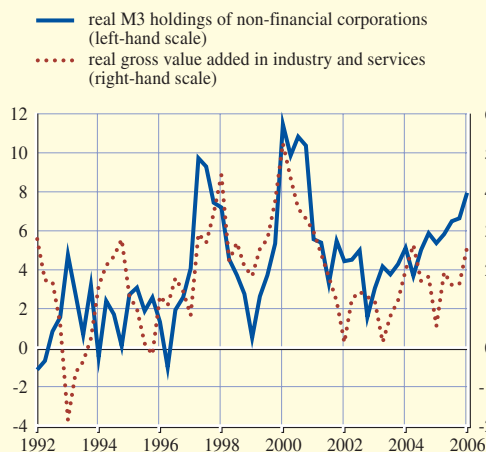
Non-financial corporations are the second largest money-holding sector. Modern finance literature provides two alternative explanations for firms' money demand. According to the passive adjustment view, non-financial corporations let their money balances absorb shocks to their income and spending, and only rebalance their holdings in the longer term. By contrast, the active view of money demand states that non-financial corporations try to minimise the opportunity cost of holding liquid assets (e.g. the spread between deposit interest rates and longer-term market interest rates). Yet non-financial corporations need to hold some money to execute transactions and in order to avoid incurring the costs of illiquidity, i.e. missed investment or production opportunities caused by a lack of immediately available funds.<sup>8</sup>

Non-financial corporations' transactions demand for money stems from the need to finance transactions such as wage payments and the purchase of inputs for production. Chart 6 displays the annual growth rate of non-financial corporations' real M3 holdings, together with developments in real gross value added in industry and services as a proxy for economic activity in the non-financial corporate sector. The chart suggests that the cyclical pattern of the two series is similar, implying that a significant part of the growth in firms' money balances is related to transaction developments. At present, however, the increase in non-financial corporations' money holdings may be somewhat stronger than suggested by the pace of economic activity alone.

<sup>8</sup> W. Bruinshoofd, C. Kool (2004), "Dutch corporate liquidity management – new evidence on aggregation", Staff Report, No 124, De Nederlandsche Bank.

**Chart 6 Non-financial corporations' M3 holdings and gross value added**

(annual percentage changes)

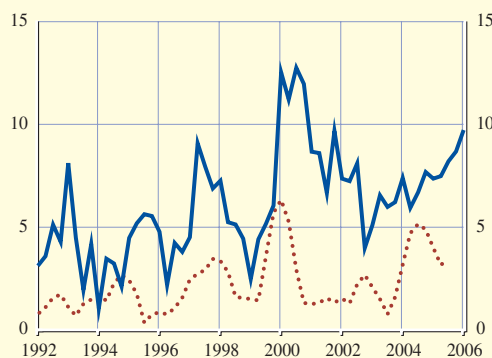


Sources: ECB estimates and Eurostat.

Note: Non-financial corporations' M3 holdings were deflated using the implicit gross added value deflator for industry and services sectors.

**Chart 7 Non-financial corporations' M3 holdings and earnings volatility**

— non-financial corporations' M3 holdings, annual percentage change (left-hand scale)  
 ..... earnings volatility (right-hand scale)



Sources: ECB estimates and Thomson Financial Datastream.

Note: The volatility measure is constructed as the centred standard deviation over 13 months of a corporate earnings index.

In this context, it should be borne in mind that while non-financial corporations may be able to forecast expenditure relatively well, the uncertainty regarding the pattern of receipts forces them to hold liquid deposits. This precautionary demand for money arises in order to avoid the opportunity costs related to missed investment opportunities and/or the costs of obtaining external finance in the event of unanticipated cash needs. It may be exacerbated by informational asymmetries between non-financial corporations and capital market participants, as these asymmetries increase the cost of external finance. Non-financial corporations with a large stock of short-term debt that needs to be rolled over frequently may hold liquid assets as a “buffer” to avoid being forced to borrow on the markets at a time when information imperfections make the external finance premium especially large. Moreover, agency costs of debt may make refinancing particularly difficult for highly leveraged non-financial corporations, implying that such firms will hold higher levels of liquid assets. One would therefore expect that non-financial corporations' demand for money would increase with the volatility of earnings. Chart 7 suggests

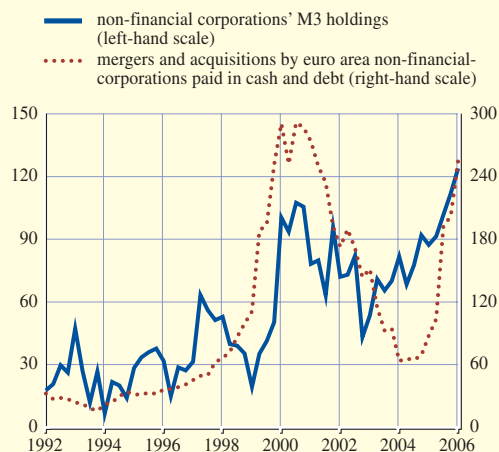
that the precautionary motive goes some way to explaining the growth of firms' money holdings over the period under consideration, while not explaining the most recent developments.<sup>9</sup>

Demand for deposits is likely to be heightened by debt restructuring and mergers and acquisitions (M&A) activity. These activities can be financed both from internal sources, such as through the retention of profits, and from external sources, through loans or the issuing of equity. All of these forms of financing will in one way or another be associated, at least temporarily, with larger holdings of short-term deposits by non-financial corporations. Indeed, Chart 8 shows the annual M&A activity that is settled by cash transactions, indicating that periods of strong M&A activity have indeed been accompanied by robust expansion of non-financial corporations' money balances.

<sup>9</sup> O. Bover, N. Watson (2000), “Are there economies of scale in the demand for money by firms? Some panel data estimates”, Documento de Trabajo, No 0008, Banco de España.

**Chart 8 M3 holdings and M&A activity of non-financial corporations**

(annual flows; EUR billions)



Sources: ECB estimates, Thomson Financial Deals and Bureau van Dijk (Zephyr Database).  
Note: Figures refer to completed deals.

Money holdings also allow a firm's management greater discretion in their corporate decisions and strategy. While, from the shareholders' perspective, money holdings can be seen simply as "negative debt", a firm's management views them differently. In particular, management can spend money on projects that the financial markets may be reluctant to finance immediately.

Overall, the level of non-financial corporations' money holdings seems to be determined as part of a broader set of financial and balance sheet decisions, driven by concerns related to possible imbalances between cash inflow and outflow, or to the costs of external financing. The positive and coincident cyclical pattern of the behaviour of money and real gross added value suggests that growth in non-financial corporations' money balances, inter alia, provides information on the strength of economic activity in the euro area.

### NON-MONETARY FINANCIAL INTERMEDIARIES

Financial deregulation and liberalisation, and the associated development of deeper and more liquid securities markets, appear to have increased the importance of non-monetary

financial intermediaries for monetary developments in the period since 1992. The sector comprises widely differing entities, such as: investment funds; corporations engaged in leasing and factoring; securities and derivatives dealers; and insurance corporations and pension funds. This heterogeneity has implications for their relationship with MFIs. For instance, while leasing corporations are more likely to be net borrowers from the MFI sector, investment funds are typically net depositors.

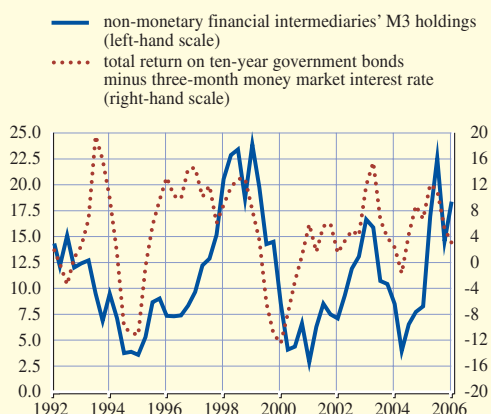
The business of non-monetary financial intermediaries is to provide financial services to households and non-financial corporations and/or to trade in financial markets on their own behalf.<sup>10</sup> Their transactions demand for money should therefore not be strongly related to developments in real economic activity, but be more closely linked to the need to settle financial transactions. However, the growth in non-monetary financial intermediaries' money holdings may nonetheless be related to inflation and economic activity insofar as, through their financial linkages with other sectors, they enable firms or households to modify their spending and saving patterns. Hence, rapid growth in non-monetary financial intermediaries' money balances may reflect developments in asset markets, and thus private sector wealth, which could in turn lead to higher inflation over time via demand effects.

To a greater extent, non-monetary financial intermediaries' money holdings seem to reflect a speculative demand for assets, determined by the relative rates of return in the money market and the equity and bond markets, and on real assets, such as physical capital, commodities and land. Portfolio considerations are therefore likely to lead to shifts into and out of money in response to changes in the international environment and exchange rates. Chart 9 illustrates the rather close cyclical movement of returns on longer-term bond investment (minus

<sup>10</sup> A. Chrystal, P. Mizen (2005), "Other financial corporations: Cinderella or ugly sister of empirical monetary economics?", *International Journal of Finance and Economics*, Vol. 10, pp. 63-80.

**Chart 9 Non-monetary financial intermediaries' M3 holdings and the return on longer-term bond investment**

(annual percentage changes)



Source: ECB estimates.

the short-term costs of financing the positions), as a proxy for the attractiveness of longer-term financial investment in the euro area, and non-monetary financial intermediaries' money holdings. It would seem that the recent strength of non-monetary financial intermediaries' money demand has to a certain extent been driven by interest rate developments.

Non-monetary financial intermediaries may increase the level of their money holdings through financial innovation and their sophisticated risk management capabilities, which households following the same investment policy cannot imitate. For example, bond funds may hold larger shares of their assets in deposits than households which wish to invest directly in bonds, because non-monetary financial intermediaries can use financial derivatives such as swaps or futures contracts to take positions, while holding their underlying assets in the form of deposits.

Overall, non-monetary financial intermediaries hold money mainly on the basis of portfolio considerations and their activities create relatively little direct final demand for goods and services, certainly as compared with the activity of households and non-financial corporations.

## 5 CONCLUSION

Understanding the role played by sectoral money holdings in the development of monetary aggregates is an important aspect of monetary analysis. The sectoral perspective on money demand behaviour adds a dimension to the analysis of the components and counterparts of M3, thereby providing additional information on the forces driving the demand for money.

This article uses newly available data on sectoral deposit holdings to construct estimates of sectoral M3 aggregates for the period since the early 1990s and reviews the developments in these sectoral aggregates against the background of possible macroeconomic determinants.

This analysis demonstrates that in the period since 1992 aggregate monetary developments can mainly be accounted for by the behaviour of euro area households. The strength and dynamics of their contribution have been strongly influenced by factors related to transactions demand and speculative demand for money. However, non-financial corporations and non-monetary financial intermediaries have also had a marked impact on monetary developments at times. Non-financial corporations' demand for money should be seen as being strongly related to transactions demand, reflecting the strongly cyclical and coincident nature of money holding in this sector, while non-monetary financial intermediaries' demand for money seems to be driven mainly by portfolio considerations.

Overall, the article shows that developments in sectoral money growth can be related to the standard money demand framework, but also suggests that the relative importance of the different forces driving M3 growth varies across sectors. However, in order to analyse these findings in more depth and quantify the relative importance of the forces underlying M3 growth, the data will have to be analysed in formal econometric models.

Additional investigation also needs to be undertaken in two further respects. First, it will be useful to examine the implications of differing sectoral behaviour for the stability of aggregate money demand relationships. Indeed, variations at the aggregate level in the relationship between money and income, for example, could be a symptom of an “aggregation bias” resulting from the composition of the sectors and not from the money demand behaviour.

Second, it is worthwhile investigating whether the strong empirical link between the longer-term developments in money and prices that is observed with regard to aggregate M3 can still be discerned when looking at sectoral aggregates. A priori, one might, for instance, anticipate that – given the closer connection between household money holdings and consumption spending decisions – the relationship between households’ money balances and consumer price inflation may be closer than for other sectors. However, it may also be that by aggregating over different sectors, idiosyncratic elements are averaged out and the information content of money for inflation comes to the fore. These issues are the subject of ongoing research.