INSIDE THE MONEY CREATION IN THE UNITED STATES

In the wake of the Covid-19 crisis, bank deposits, which represent the main component of broad money, have seen extremely rapid growth in both the eurozone and the USA. The origins of this newly created money have frequently been imperfectly identified, and the same goes for the possible factors for its destruction. The European methodology for monitoring money supply nevertheless offers a valuable basis for analysis. In this article we will apply this to US data. We learn that between them, the amplification of the Federal Reserve's securities purchasing programme and the Treasury-guaranteed loan scheme to companies are sufficient to explain the rapid rise in the rate of growth in bank deposits. We also note that the extra money created will not evaporate suddenly once the pandemic is over or nonconventional monetary policies come to an end.

Since the Covid-19 shock, the exceptional growth in broad money, and more specifically in bank deposits from households and companies, has elicited numerous comments and analyses, some of which have been erroneous. In particular, some observers have associated it with a 'wait-and-see' attitude or with forced savings. This suggests that the creation of precautionary savings in the face of economic uncertainty, or savings "forced" by health protection measures, have contributed to the increase in the volume of bank deposits. Others have suggested that the temporary postponement of certain investment projects has driven the expansion of companies' cash flow. Now that restrictions are gradually being lifted and consumer spending and investment are recovering, no one is predicting that there will be a destruction of the mass of deposits that have been accumulated. Whilst these analyses are not necessarily incorrect from a microeconomic point of view, they most certainly are when it comes to macroeconomics[1].

In reality, "prevented" consumption and additional savings for households as a result did not in and of themselves increase broad money in the economy. At most, they reduced its circulation and skewed its distribution between institutional sectors or, within sectors, between actors. Between households, the growth in deposits, which has been very strong in aggregate, was unevenly spread due to the loss of income or employment for some. Similarly, the cancellation by companies of certain expenditure or investment projects has limited the transfer of wealth between economic sectors. The varying degrees of the pandemic's impact and the uneven take-up of cash flow support measures have also skewed the distribution of deposits between sectors. Difficulties in the circulation of money as a result of the health protection measures designed to control the Covid-19 pandemic are not, however, enough to explain, at the aggregate level, the rapid growth in deposits seen over the last year or more. Quite to the contrary, they hit economic growth and held back lending growth, the traditional channel of money creation. A recovery in consumer spending and investment is not in itself synonymous with the destruction of money as it will support economic activity and demand for credit (and thus money creation).

We propose here to dwell for a moment on the case of the USA. The first point of interest in our approach is that the identification of the sources of money creation and destruction, common practice in the eurozone, is not, as far as we are aware, widely used on the other side of the Atlantic.

In the eurozone, the underlying factors in money supply are identified in detail. The European Central Bank (ECB) publishes statistics on the main counterparts of broad money on a monthly basis (ECB, 2021).

Following this data provides information on the main sources of the creation or destruction of money. Analysis of the figures shows that the amplification of the ECB's programme of purchasing sovereign debt and national government loan guarantee schemes between them explain the exceptional money creation that the eurozone has seen. Granted, the money created over the past year will gradually be destroyed as the central bank reduces its balance sheet, companies repay their government-guaranteed loans and when savers shift into term deposits that do not feed into broad money (see below) or invest in securities issued by the banking system. This partial destruction will result in a deceleration in the growth of money supply. However, continued growth in bank lending will sustain money creation.

In the USA, the concept of money supply is somewhat overlooked at present; most notably it is not included in the minutes of the Federal Reserve's monetary policy committee. This was not always the case. The Great Depression of 1929 marked the Fed's first efforts to monitor growth in broad money, encouraged, most notably, by economist Lauchlin Currie, who was one of the first to propose an empirical definition of money supply (Currie, 1935). The academic interest in monetary aggregates increased in the aftermath of the Second World War. In particular, a substantial body of literature was devoted to the velocity of money and the link between demand for money and inflation (Friedman, 1956 and 1960). Work on the definition and measurement of money supply also continued, with financial innovation and changes in the financial system bringing about the appearance of close substitutes for bank sight accounts in the 1970s and 1980s (Andersen, Bordo and Rockoff, 2003). From 1975, the Federal Reserve defined target ranges for growth in monetary aggregates and bank lending, and elevated growth in broad money to the rank of an intermediate goal of monetary policy. In practice, however, these targets were only rarely met and trends in money supply were not particularly decisive (Anderson and Kavajecz, 1994). Ultimately it was not until 1979 and the introduction of the 'non-borrowed reserves' management process[2] that the Federal Reserve, under the Chairmanship of Paul Volcker, took greater control over the growth of money supply. From 1982 onwards, however, broad money and lending aggregates no longer played a central role in the definition of US monetary policy. For various reasons (financial innovation, changes in payments technologies and practices, the increasing proportion of US currency held abroad), growth in money supply became harder to predict and to link to other macroeconomic measures (Bernanke, 2006). The Fed continues to supply information on the various components of broad money but the monitoring of its trends and the analysis of its counterparts are not included in publications.

1 An even less valid argument has it that the current surplus of deposits results from insufficient demand for credit.

2 Volume of deposits at the central bank in excess of loans by the Fed to depository institutions (reserves for which changes are not linked to Fed loans to banks, but to changes in other items on the Fed's balance sheet)

The second point of interest in our approach is that with the eurozone having not so far experienced the process of withdrawing from a Quantitative Easing process, the US experience gives an opportunity to consider its effects. The trends seen during periods of reductions in central bank liquidity, tightening of monetary policy and the reduction in the size of the Fed's balance sheet between 2015 and 2019 were admittedly in part specific to the details of the Fed's intervention and the nature of the US financial system. However, they remind us that money does not simply evaporate as non-conventional monetary policy comes to an end. Although the purpose of this article is more to inform than to predict, we will consider the main factors likely to boost or hamper money creation in the USA over the next few quarters.

The European analysis of money creation applied to the American situation

We have transposed the methodology developed in the eurozone to US data in order to identify the sources of money creation and destruction in the USA. Completion of this tricky operation required a number of arbitrary assumptions, as US statistics are not designed with this use in mind. The findings require interpretation in the light of the particular features of the US financial system and the financing of the country's economy.

Components of broad money

Money supply corresponds to all assets held by economic actors that can be instantaneously used as a means of payment or immediately converted into cash[3]. In the eurozone, the volume of money in circulation in the economy is measured by the M3 monetary aggregate[4]. In the USA, the monetary measure closest to the M3 aggregate in Europe is the M2 measure[5].

The structure of broad money is identical in the two economies (Table 1). Scriptural money or demand deposits (liabilities on bank balance sheets) make up the majority of money supply (around 85% of both M3 and M2), well ahead of fiduciary money (notes and coins on the liabilities side of the central banks' balance sheets), which accounts for around 10%, and market instruments which only make up a marginal fragment of 5% or so. An element of bank deposits is not included in money supply (20%[6] on average in the two economies): this is the case for term deposits with maturities of more than two years in the eurozone and term deposits of more than USD100,000 in the USA.

The consolidated balance sheet of issuers of money

The European methodology consists of drawing up a consolidated balance sheet for monetary and financial institutions (MFIs), which, in the eurozone, means the Eurosystem, credit institutions and money market funds. This is also known as the "monetary balance sheet". Under the definition of the M2 aggregate, the three sectors in the USA issuing money are: the Fed, depository institutions and retail money market funds[7]. However, we have excluded the contribution of retail money market funds due to the lack of historical depth of available data and the insufficiently detailed breakdown of their investment portfolios[8]. Our analysis therefore focuses on the consolidated balance sheet of US "MFIs", excluding retail money market funds, and on the counterparts of the M2 aggregate reduced by the share of such funds (i.e., 94% of M2). Box 1 sets out our approach.

Counterparts of broad money

Preparing a consolidated balance sheet for MFIs allows the identification of the main counterparts of money supply: credit to the resident private sector (loans by MFIs and debt securities issued by the non-monetary private sector held by MFIs), net claims on the public sector (MFI financing of central government bodies net of their deposits with MFIs), net external assets (MFI credits with non-resident counterparties net of their debts to such counterparties) and longer-term financial liabilities (debt [excluding deposits included in money supply], capital and reserves). The balance (difference between the volume of exposures identified here and money supply) constitutes "other counterparts" of money supply. Box 2 sets out the respective consolidated balance sheets for MFIs in the USA and the eurozone at 31 December 2020 (the latest date for which comparable data is available). From the MFIs' viewpoint, the elements making up broad money represent a resource and are thus included on the liabilities of their consolidated balance sheet. An increase in broad money thus finds a counterpart either in an increase in items on the asset side of the consolidated MFI balance sheet, or a reduction in non-monetary resource on the liabilities side.

MFIS CONSOLIDATED BALANCE SHEET

Assets	Liabilities
Credit to the private sector	Broad money
Credit to central government	Holdings against central government
Net external assets	Longer-term financial liabilities
Other counterparts	Capital and Reserves

Counterparts of broad money

Sources of money creation and destruction and specific features of the US

The first lesson from our comparison is that over a long period, the counterparts of US broad money are similar in nature and proportion to those of the European M3 aggregate (Charts 1 and 2). We will now examine the main mechanisms in play and the specific features of the US economy.

3 The notion of money supply should not be confused with base money. Like broad money, the latter includes notes and coins (liabilities on the central bank balance sheet), but, unlike broad money, also covers bank reserves at the central bank (assets for the banks, liabilities for the central bank). It should be remembered that central bank reserves can not be loaned to non-banking clients. Changes in their aggregate volume depend on movements in the size of the central bank's balance sheet and the structure of its liabilities.

4 It includes notes and coins, overnight deposits, deposits with an agreed maturity of up to two years, deposits redeemable at notice of up to three months (savings accounts), debt securities issued by banks with a maturity of up to two years, money market fund shares, and repurchase agreements.

5 This includes notes and coins, demand deposits, other liquid deposits (savings accounts), term deposits of USD100,000 or less, and retail money market fund shares.

6 Average over past 10 years

7 There are three main types of money market funds in the USA: government funds, prime funds and tax-exempt funds. These funds may be intended for institutional investors (institutional funds) or individual investors (retail funds). The latter represent 30% of the money market fund industry.

8 The Investment Company Institute (ICI) has provided data on the total value of assets in retail money market funds since 2007. However, it has only reported on the aggregated portfolio structures of the three main types of fund since 2013, and even then it has done so without distinguishing between institutional and retail funds. Since 2011, the Office of Financial Research (OFR) has provided information on the portfolios of retail prime funds and retail tax-exempt funds, but not on retail government funds (which account for 75% of the assets of the three types of retail funds). The inclusion of retail money market funds in the scope of US MFIs would therefore require a number of ad hoc assumptions.

Credit to the private sector

"Credit creates deposits"

In both economies – the USA and eurozone – and in normal conditions, lending to the private sector represents the main engine of growth in money supply (McLeay, Radia and Thomas, 2014). When a bank lends, it increases the volume of deposits at the same time. In other words, it creates money by crediting its client's account. This ability to create money from nothing is in part tempered by prudential regulation and is influenced by monetary policy. Meanwhile, the repayment of a loan results in the destruction of money. On the scale of the economy as a whole, an increase in credit (when aggregate new production exceeds total repayments) is thus a source of money creation. The deposit balance can "shift" to the current account of a different bank (for example if the borrower buys a car from a client of a competing bank), but at the aggregate level the volume of deposits rises in line with growth in lending to the economy (save for the conversion of deposits into notes and coins or their "leakage" abroad).

The effect of securitisation of credit

Although the snapshot of the consolidated balance sheet of MFIs provides a reliable image of counterparts of broad money at a given moment, it does not take account of the many creative or destructive flows that cancel each other out. The equilibrium of US money supply, in particular, ignores substantial temporary monetary flows due to the intense use of securitisation of loans (Choulet and Quignon, 2021). Money supply is increased by credit originated by the banks (+) but reduced by the share that is securitised (-). In effect, the money created by adding a loan from a bank to its assets is destroyed when the bank in question sells the loan to a non-banking investor (elimination of the deposits used by the investor to acquire the loan). In the case of mortgage lending, monetary destruction occurs, more precisely, at the moment of the placement of Mortgage Backed Securities (MBS): the sale of loans to a mortgage refinancing agency (Government Sponsored Enterprise or GSE) results in a transfer of cash from the GSE's current account with the Fed to that of the originating bank (increasing the bank's reserves at the Fed); the subscription by a non-banking investor in an MBS issued by the GSE reduces the volume of deposits and results in a transfer of holdings at the central bank in the opposite direction, from the bank of the subscribing client to the GSE. However, when the investor is an MFI (for example the central bank as part of its quantitative easing programme), the deposit created at the time of the origination of the loan is preserved[9] as the counterpart, consisting of the loan, is simply transferred from one MFI to another and does not leave the consolidated MFI balance sheet.

MONETARY AGGREGATES

Eurozone				United States			
EUR bn as of 04/30/2021		As a % of M3	As a % of nominal GDP*	USD bn as of 04/30/2021		As a % of M2	As a % of nominal GDP*
M3	**14 775**			**M2**	**20 109**		
M2	**14 034**	**95%**	**124%**	**M1**	**18 935**	**94%**	**90%**
• M1	10 582	72%	93%	• Currency in circulation	2 051	10%	10%
- Currency in circulation	1 402	10%	12%	• Demand deposits	3 772	19%	18%
- Overnight deposits	9 180	62%	81	• Other liquid deposits**	13 113	65%	62%
• Other short-term deposits (M2-M1)	3 451	23%	31%	**M2-M1**	**1 173**	**6%**	**6%**
- Deposits with an agreed maturity of up to two years	966	7%	9%	• Small denomination time deposits	136	1%	1%
- Deposits redeemable at notice of up to three months	2 486	17%	22%	• Retail money market fund shares	1 037	5%	5%
Marketable instruments (M3-M2)	**741**	**5%**	**7%**				
• Debt securities issued with a maturity of up to two years	27	0%	0%				
• Money market fund shares	605	4%	5%				
• Repurchase agreements	109	1%	1%				

*Annualized GDP at current prices as of Q1 2021
**Other checkable deposits and savings deposits. Before May 2020, savings deposits were not included in M1

TABLE 1

SOURCE: EUROPEAN CENTRAL BANK, US FEDERAL RESERVE

9 The GSE's reserves at the Fed, which are reduced by the purchase of the loans, are reconstituted when the MBS is acquired by the Fed. When the investor is non-resident, the negative effect of the reduction in the "credit to the economy" counterpart (sale of loans to the GSE) is offset by the increase in the "net external assets" counterpart (via an increase in the central bank's currency reserves): the money supply created at origination of the loan is preserved.

COUNTERPARTS' CONTRIBUTIONS TO THE ANNUAL GROWTH RATE OF M2* IN THE UNITED STATES

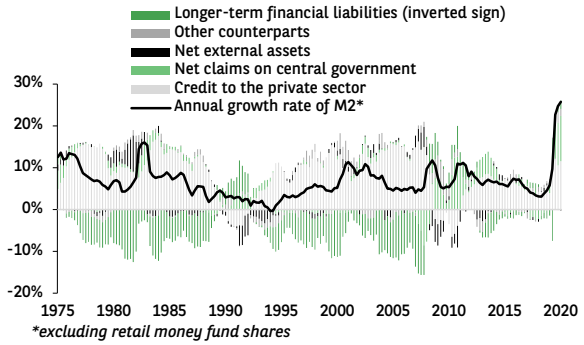


CHART 1 SOURCE: US FEDERAL RESERVE, AUTHOR'S CALCULATIONS

COUNTERPARTS' CONTRIBUTIONS TO THE ANNUAL GROWTH RATE OF M3 IN THE EUROZONE

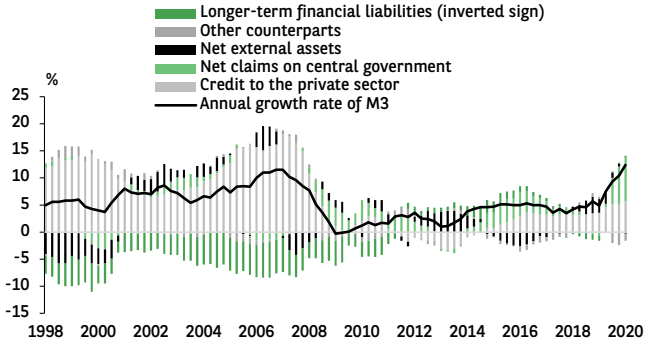


CHART 2 SOURCE: EUROPEAN CENTRAL BANK

Purchase of private sector securities

The purchase and sale of securities (debt securities, equities and non-money market fund shares) made by MFIs themselves are another significant source of money creation or destruction. The purchase or subscription by an MFI of a security issued by a non-monetary resident entity (a non-financial company for example) to another non-monetary resident entity results in an increase in the deposits held by the (resident) entity that sold or issued the security and thus contributes to the creation of money. This 'monetisation' phenomenon depends on the nature of the purchaser of or subscriber to the security. The purchase/subscription of the same security by a non-monetary entity (an insurance company for instance) results in the simple circulation of deposits between economic agents rather than a net creation of deposits (money).

Net claims on the Treasury

Purchase of public sector securities

Net credit to central government is a further significant source of money creation, particularly in a period of quantitative easing (QE). This virtually exclusively comes in the form of the acquisition of sovereign debt (with a view to increasing portfolios of liquid assets in the case of commercial banks, or reducing bond yields in the case of the central bank).

In practice, the government's issuance of debt for the purpose of financing new spending results in several money creation/destruction movements. Ultimately, the overall stock of bank deposits remains unchanged when the final subscriber to the securities is a non-banking resident entity and increases when it is an MFI. When the subscriber in a non-monetary agent, the debt raised by the Treasury, and its use to finance new public spending, results merely in the circulation of existing money. This is the case, for example, when funds move from the deposit account of an investment fund subscribing to a Treasury issue to the account of a non-financial company that carries out the renovation of a school, or to a household receiving direct payment as part of a stimulus programme[10].

However, when a commercial bank or the central bank purchases government securities from a non-monetary entity (e.g., from a pension fund), the value of the transaction is credited to the bank account of that entity, resulting in an increase in the volume of deposits. Money supply thus increases: the purchase of securities by the monetary institution (money creation) offsets the effect of the initial subscription to the securities by the pension fund (money destruction)[11], whilst the completion of the public spending results in additional deposits[12].

Liquidity circulating between agents, who are the final owners of the deposits created by QE, is not directly identifiable from monetary statistics. Moreover, second-order effects can attenuate or offset the direct effects of QE on broad money[13].

Expansion of Treasury holdings

The net money creation resulting from the purchase by MFIs of government debt securities from non-monetary resident entities is counteracted when the increase in the government deficit comes alongside an expansion in Treasury holdings. When the receipts from net issuance of government securities are not immediately used to finance additional spending, but are partly salted away in the Treasury's accounts (with commercial banks or the central bank), the money created by the purchase of these securities by an MFI is 'sterilised'. All other things being equal, there is no net creation of money unless net lending by MFIs to the Treasury increases. In 2020, the effect of QE on the growth in money supply was thus significantly moderated by an increase in the Treasury's deposits at the Fed (these represented some 26% of the Fed's liabilities at the end of July 2020, see below).

10 The transaction also results in the transfer of deposits at the central bank. The placing of securities generates a transfer of cash from the current account of the subscriber's bank at the Fed to the Treasury account; the completion of the public spending results in the transfer of cash from the Treasury's deposit account with the Fed to that of the bank acting for the client receiving the public spending. Ultimately, the volume of bank deposits and banks' reserves at the central bank are unchanged.

11 Subscription by a pension fund to government securities destroys part of its deposits. Sale of the government security by the pension fund to an MFI allows it to rebuild its deposit account.

12 The purchase of a government security by one MFI from another has no effect on money supply, whilst a purchase from a non-resident entity reduces money supply (reduction in the "net external assets" counterpart via a reduction in central bank currency reserves).

13 Attenuate in the case that, for example, a resident hedge fund, having sold securities to the central bank, reinvests the new liquidity generated in securities issued by a non-resident, non-financial company. Offset in the case that, for example, a non-resident, having sold government securities to the central bank, reinvests the proceeds within the economy, by subscribing to debt securities issued by a resident non-financial company.

Net external assets

The net external counterpart (which results, when positive, in net entries of capital) plays little part in the (net) change in money supply in either the eurozone or the USA. In the case of the USA in particular, the snapshot provided by the consolidated MFI balance sheet obscures significant capital inflows and outflows; the former result from direct or portfolio investments by non-residents, the latter from the USA's current account deficit (Choulet and Quignon, 2021). Where monetary outflows (to pay for imports for example) are not fully offset by capital inflows, 'net external assets' at monetary institutions (which includes most notably the central bank's currency reserves) and broad money both shrink. In the USA, the approximate match-up between capital outflows and inflows (direct and portfolio investments) results if not in neutrality then at most in a modest effect on money supply from net external credit at US MFIs. Despite their size, inflows and outflows largely cancel out, with the result that the "external credit" counterpart plays a negligible role in trends in US broad money.

Longer-term financial liabilities

Subscription by non-monetary agents to term deposits not included in money supply (those with a maturity of more than two years in the eurozone or with unitary values of over USD100,000 in the USA), or to bonds and equities issued by banks, has in the past resulted in significant destruction of money (whilst still preserving the stock of bank deposits in the former case). However, this negative contribution has eased significantly over recent years (the very low interest rate environment has reduced the opportunity cost of holding highly liquid savings, receiving little or no interest, whilst QE has reduced the need for banks to issue debt on the market by improving the coverage of loans by deposits). In 2020, other than in a first quarter marked by extreme liquidity stress[14], the downward trend in these resources even contributed to a net creation of money. In the USA, the central bank maintains close relationships with certain non-monetary financial institutions, due to their central role in the operation of financial markets. At certain times, trends in their deposits at the Fed played a not insignificant role (reverse repos for money market funds[15], deposits from GSEs and clearing houses).

Money does not evaporate

The US experience of quantitative easing and then tightening (reducing the size of the Fed's balance sheet) provides an opportunity to consider the sensitivity of money supply to the non-conventional monetary policies introduced since the financial crisis, and the factors likely to strengthen or attenuate these effects.

Counterparts of money supply since the financial crisis

In Table 2 we summarise trends in the counterparts of M2 since the financial crisis[16]. Columns can not be compared with each other as they cover periods of different lengths. However, they do provide a picture, for each period of expansion, stabilisation and contraction of the Fed's balance sheet, of the relative weight of each of the counterparts in the overall change in money supply. This breakdown can mask the effects, significant in some cases, of certain monetary policy measures or certain portfolio choices. We would therefore also refer to Charts 3, 4 and 5, which provide a more detailed, though less unified, view of the respective contributions.

The three successive waves of quantitative easing between end-2008 and end-2014

Purchase of securities, a substitute for the traditional channel of money creation

Net financing of central government and the purchase of private securities (MBS) were the main vectors of money creation between 2008 and 2014 (green and light-grey hatched bars in Charts 4 and 5). Between September 2008 and January 2015 the Fed's balance sheet grew by USD3,600 billion (and bank reserves at the Fed by USD2,700 billion). As discussed above, through its purchases of Treasuries (forming the "net claims on central government" counterpart) and MBS ("net credit to the private sector"), the Fed created money by 'monetising' long-term debt securities. Made to a large extent from non-monetary entities, these purchases made up for the drying up of the traditional channel of money creation during the major financial crisis of 2008: thus from the end of 2008, when bank lending to the economy contracted temporarily (repayments or write-offs of a part of mortgage lending, fall in new loan production - light grey bar in Chart 5), client deposits continued to grow rapidly[17]. In addition, from the end of 2013, the prospect of the introduction of the Basel Liquidity Coverage Ratio (LCR[18]) into US regulations was accompanied by an expansion of portfolios of Treasuries on bank balance sheets.

The negative effect of growth in net external debt

The dollar liquidity loaned by the Fed under swap deals with other central banks between late 2008 and early 2009 ("external assets", dark grey bar in Chart 4) was, ultimately, used as a substitute for the discount window by US branches of foreign banks (facing the abrupt drying up of short-term dollar debt markets, hatched dark grey bar in Chart 5). Its contribution to growth in the money supply was therefore modest[19].

14 In the first quarter of 2020, the financial stress triggered by the shock of the pandemic led to a sterilisation of liquidity. The increase in Fed deposits from GSEs, clearing houses (margin calls) and money market funds (via the Reverse Repurchase Program) on the one hand and in term deposits and advances on the liability side of bank balance sheets on the other hand, explained the very negative contribution to M2 growth from non-monetary commitments in this period.

15 It should be remembered that retail money market funds (representing 30% of the fund industry) were excluded from the scope of US MFIs due to insufficiently detailed data on the composition of their portfolios.

16 See Choulet (2018) for an analysis of the effects of the distortion and reduction of the Fed's balance sheet on resident banks' reserves at the Fed

17 As the repayment of loans operated by the Fed from 2008 to the benefit of dealers, AIG and special purpose vehicles charged with buying commercial papers and relieving money market funds of some of their assets took place during phase 1, the net contribution of the "credit to the private sector" counterpart on the Fed's balance sheet appears negative in Table 2.

18 This standard requires banks to hold sufficient unencumbered high-quality liquid assets to cover the net outflows of cash over 30 days in the event of a liquidity crisis. The assets considered as the most liquid (those that can be converted into cash on private markets with very little or no loss of value) include reserves with the central bank and loans to, or guaranteed by, sovereign issuers such as Treasury securities or agency securities.

19 A swap deal allows a central bank to obtain dollars from the Fed, which it may then lend to commercial banks within its remit. In practice, this loan results in a transfer of cash from the foreign central bank's deposit account with the Fed to the account of a bank in the USA, which is an affiliate or correspondent of the borrowing foreign bank. Drawing on the swap line thus automatically increases the reserves of resident banks at the Fed and their net cross-border debt. However, when the drawing meets a need for financing or coverage expressed by a client, the disbursement of this liquidity (for example in settling a debt to an American supplier or subscribing for a dollar-denominated security) cancels out the interbank debt created and results in a transfer of reserves between banks established in the USA (i.e. to the Fed account of the supplier's bank). In this case, the swap results in an increase in net external credit at US MFIs and in the creation of money. This effect is offset where the swap is used for the purposes of dollar refinancing by US resident banks (the increase in the Fed's external credit in this case is offset by the increase in external bank debt). On completion of the swap, the exchange of currencies in the reverse direction eliminates the money created in the first case and the reserves and cross-border interbank debt created in the second. In Table 2, the negative contribution from the Fed's "net external credit" in phase 1 is linked to the fact that the Fed's swap deals were largely concentrated at the end of 2008 and were settled at the end of 2009. Therefore if we look at the change over the period 2008 to 2014, net external credit at the Fed appears to have contributed to a net destruction of money in Table 2.

COUNTERPARTS OF THE BROAD MONETARY AGGREGATE M2* SINCE THE 2008 FINANCIAL CRISIS

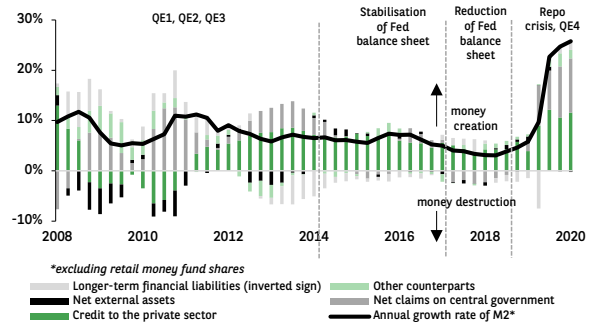


CHART 3 SOURCE: FEDERAL RESERVE, AUTHOR'S CALCULATIONS

COUNTERPARTS OF M2* ON THE FED'S BALANCE SHEET**

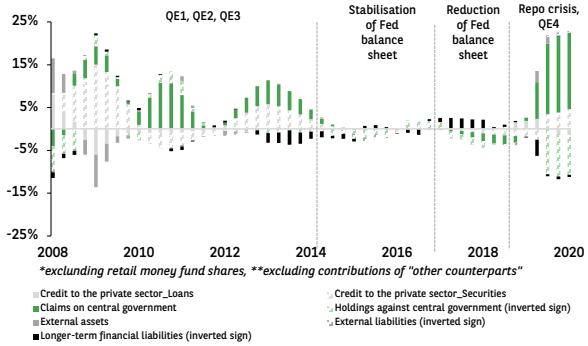


CHART 4 SOURCE: FEDERAL RESERVE, AUTHOR'S CALCULATIONS

COUNTERPARTS OF M2* ON BANKS' BALANCE SHEETS**

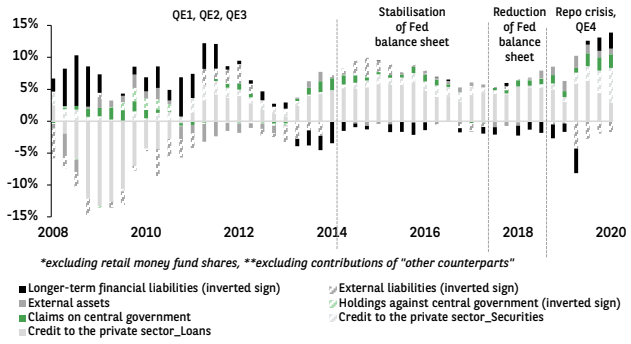


CHART 5 SOURCE: FEDERAL RESERVE, AUTHOR'S CALCULATIONS

NET EXTERNAL DEBT OF US RESIDENT BANKS SINCE 2010

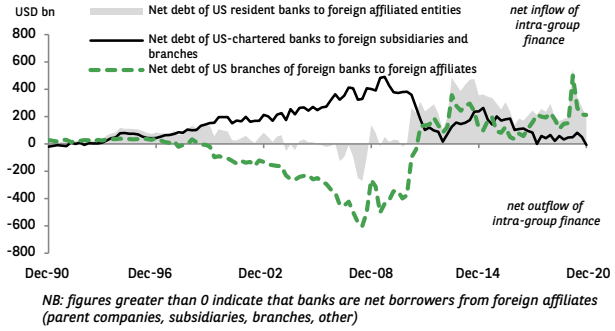


CHART 6 SOURCE: FEDERAL RESERVE, BNP PARIBAS

Thereafter, under the combined effect of QE and the change in the calculation of the FDIC commission, repayment flows of cross-border intra-group loans from parent companies, which were more rapid at foreign banks (foreign parents of US branches) than US banks (with regard to their foreign subsidiaries and branches), served to increase commercial banks' net external debt ("external liabilities", grey area of Chart 6 - see Choulet 2015). The trend was prolonged by net inflows of intra-group financing that all resident banks enjoyed (particularly in 2011 and 2013). The increase in banks' net external debt between 2008 and 2014 therefore contributed to a destruction of money (dark grey hatched bar in Chart 5).

This effect was partly offset by a reduction in longer-term resources

The Fed's Reverse Repo Program (RRP) for money market funds between late 2013 and 2015 had a negative effect on the volume of deposits (see below - Table 2 and black bar in Chart 4). The first three episodes of QE nevertheless favoured an even more significant contraction in banks' non-monetary liabilities: deposits not included in M2, secured debt (repo, Federal Home Loan Bank advances) and unsecured debt (Fed Funds - see Table 2 and the black bar in Chart 5). On a consolidated basis, the contribution of the "longer-term financial liabilities" counterpart for MFIs was thus positive between 2008 and 2014 (Table 2).

Periods of stabilisation and then reduction in the Fed's balance sheet

Over these two phases, base money (bank reserves with the Fed and fiduciary money, recorded as a liability on the Fed's balance sheet) contracted, whilst growth in M2 merely slowed.

Between October 2014 and October 2017, the Fed stabilised the size of its balance sheet, by reinvesting, in full, maturing debt in its securities portfolio[20]. All other things being equal, its purchases of government and private sector securities, which were nil when netted against redemptions, will thus have had no effect on money supply. Over this period, money creation stemmed from a resumption of bank lending and banks' subscription to Treasuries and MBS (responding to the LCR constraint, light grey bars of Charts 3 and 5). Other counterparts had

20 Its portfolio of Treasuries was renewed by the exchange of maturing securities against newly issued securities, and its MBS portfolio by the reinvestment of repayments of mortgage loans in subscriptions for new MBS.

THE TREASURY'S ACCOUNT AT THE FED

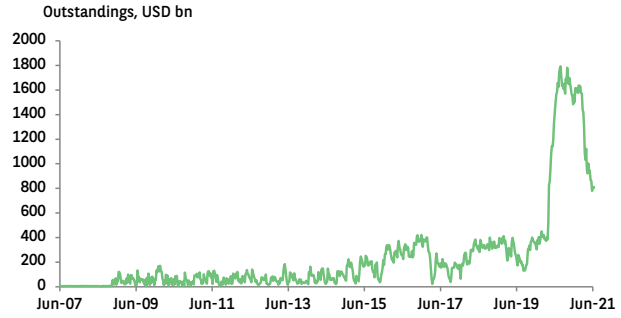


CHART 7 SOURCE: FEDERAL RESERVE

BREAKDOWN OF TREASURIES BY HOLDER SECTOR

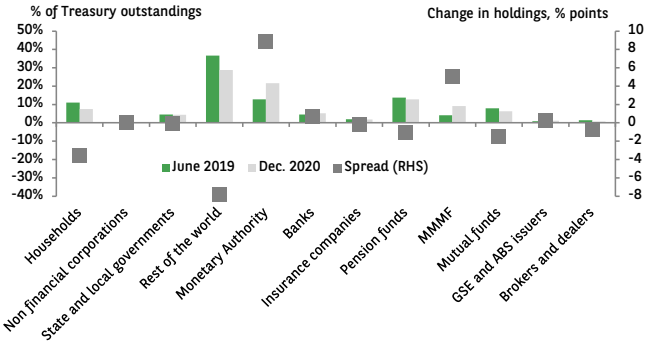


CHART 8 SOURCE: FEDERAL RESERVE, BNP PARIBAS

BREAKDOWN OF AGENCY MBS BY HOLDER SECTOR

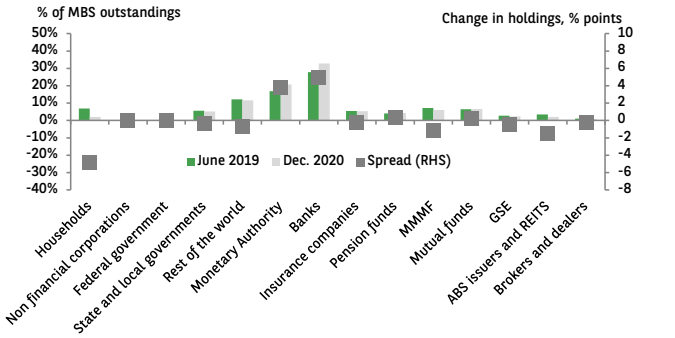


CHART 9 SOURCE: FEDERAL RESERVE, BNP PARIBAS

A CLEAR IMPROVEMENT IN THE LOAN TO DEPOSIT RATIO OF US COMMERCIAL BANKS

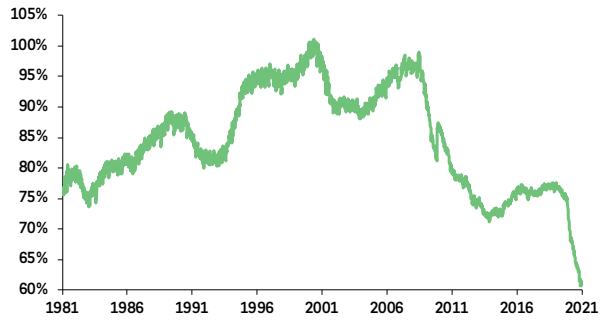


CHART 10 SOURCE: FEDERAL RESERVE (H.8), BNP PARIBAS

little impact on trends in M2 over this period[21]. From October 2017, the Fed undertook a programme to reduce the size of its balance sheet, by limiting the amount of reinvestment on maturity. Within the space of less than two years (from October 2017 to August 2019), its balance sheet was reduced by USD700 billion (destruction of USD750 billion in central bank reserves). This policy, which can be considered as the net disposal of securities, resulted in the destruction of deposits (green and light grey hatched bars of Chart 4). In addition, some non-banking entities acquired newly issued Treasuries and MBS, thus reducing their deposits. Growth in bank loans, repurchase arrangements for securities 'stuck' on the balance sheets of primary dealers (Choulet, 2019) and purchases of Treasuries and MBS by banks nevertheless offset these effects (light grey and light grey hatched bars of Chart 5). The negative effect on M2 of the increase in longer-term financial liabilities at banks (subscription of term deposits against a background of rising interest rates from the end of 2015, black bar in Chart 5) was, amongst other things, largely attenuated by the reduction in the Fed's non-monetary commitments (ending of the overnight renewal of repo arrangements with money market funds, black bar in Chart 4).

The latest phase of expansion in the Fed's balance sheet and the injection of central bank liquidity

Against the background of the Covid-19 pandemic, purchases of securities by the Fed (and by banks) once again represented the main vector of money creation[22] (green and light grey hatched bars in Charts 4 and 5). Within the space of just eighteen months (August 2019 to end-December 2020), compared to six years in earlier QE phases, the Fed's balance sheet grew by USD 3,600 billion (increase of USD1,600 billion in central bank reserves). Although over this period the Treasury sharply increased its deposits with the Fed (up by USD1,400 billion between September 2019 and December 2020, Chart 7), thus sterilising part of the newly created money (green hatched bar in Chart 4), and although

21 The negative effect of the Fed's RRP only came into play at the beginning of this 2nd phase.

22 The positive effect on money supply of the Fed's repo transactions with primary dealers from the autumn of 2019 to March 2020 (designed to help ease pressure on money market rates caused by regulatory changes) is obscured by the contraction in its MBS portfolio, which is also an element of the "credit to the private sector" counterpart on the Fed's balance sheet.

TRENDS IN COUNTERPARTS OF BROAD MONEY				
Change - USD billion	**Phase 1** Expansion of Fed balance sheet (QE1, QE2, QE3) Q4 2008-Q4 2014	**Phase 2** Stabilisation of Fed balance sheet Q4 2014-Q4 2017	**Phase 3** Reduction of Fed balance sheet Q4 2017-Q2 2019	**Phase 4** Fresh expansion of Fed balance sheet (repo crisis, QE4) Q2 2019-Q4 2020
Credit to the private sector	**+1 460**	**+2 212**	**+777**	**+1 974**
in the form of loans				
• from the Fed	-571	0	0	+52
• from banks	-243	+1 707	+973	+571
through purchases of debt securities and equity				
• from the Fed	+ 1795	-7	-244	+535
• from banks	+479	+512	+48	+816
+ Net claims on central government	**+2 516**	**+46**	**-282**	**+1 738**
• from the Fed	+2 186	-53	-447	+1 356
• from banks	+330	+99	+165	+382
+ Net external credit	**-715**	**-9**	**+29**	**+26**
• from the Fed	-580	-121	-59	+86
• from banks	-135	+112	+88	-60
+ Other counterparts	**+511**	**-55**	**+246**	**+211**
- Longer-term financial liabilities	**-259**	**+93**	**+25**	**-298**
• from the Fed	+353	-40	-298	+110
• from banks	-612	+133	+323	-408
of which term deposits > USD100,000*	-319	-270	+282	-370
- Capital and reserves	**+142**	**+6**	**-5**	**+111**
= M2**	**+3 889**	**+2 095**	**+750**	**+4 136**
• notes and coins	+437	+272	+133	+313
• liquid bank deposits	+3 452	+1 823	+617	+3 823
*Total bank deposits****	***+3 495***	***+1 616***	***+900***	***+3 885***
Central bank reserves	***+1 579***	***-402***	***-533***	***+1 601***

*savings accounts and term deposits (excluding central government and non-resident deposits) from which the savings accounts and term deposits of USD100,000 or less included in M2 are deducted ** excluding retail money market fund shares *** total deposits on the balance sheets of US depository institutions (FoF, L.110) which include 'liquid' bank deposits, forming part of broad money, and other deposits.

TABLE 2

SOURCE: FEDERAL RESERVE, BNP PARIBAS

non-residents reduced their holdings of Treasuries, the resulting growth in deposits was strong, particularly as part of these purchases were, as in previous phases of QE, made by households[23] and US pension and investment funds[24] (Charts 8 and 9).

In 2020, bank lending, the traditional engine of money creation (light grey bar in Chart 5), was also protected, temporarily, by clients drawing on lines of credit and then by the Treasury's introduction of a programme of guaranteed loans to small and medium-sized enterprises (Paycheck Protection Program, PPP).

After the first three phases of QE, the average ratio of loans to deposits at commercial banks had improved by 26 points in the space of six years, from 99% at end-October 2008 to 73% at end-October 2014, close to its record low. The latest round of QE brought about an improvement on a similar scale in just one year: the ratio dropped from 75% at the end of March 2020 to 61% a year later (Chart 10), a level not seen since the mid-1950s.

Towards more modest growth in broad money

In the first half of 2021, growth in money supply slowed significantly (Chart 11). Whilst over the medium term, the continuation of an accommodating monetary policy and the expected recovery in demand for credit will bolster M2 growth, in the shorter term, banks' strategies of reducing balance sheets could slow this growth.

Continuation of the QE4 programme, even at a slower pace, will support money creation

Over the first half of 2021, the Fed's net claims on the Treasury, via the continuation of QE4 and the reduction in the Treasury's account at the Fed (down by USD800 billion between end-2020 and early June 2021, Chart 7) have provided a powerful vector of money creation[25]. Their impact is likely to remain significant over the next few quarters. It is certain that drawing down of the Treasury's deposits will slow[26]; to our knowledge, however, there is no factor that would warrant the rebuilding of deposits on the scale seen in 2020 (Cecchetti and Schoenholtz, 2020). Moreover, the Fed's monetary policy committee is unlikely to shift from its accommodating stance for a number of quarters (until a return to full employment[27]). For the time being, analysts are suggesting an announcement in the second half of 2021, with tapering of net purchases starting between 9 and 12 months later. It is worth bearing in mind that three years elapsed after the end of QE3 before the Fed began to shrink its balance sheet (synonymous with money destruction).

The credit channel is temporarily weakened

In the first quarter of 2021, for the first time since the third quarter of 2011, bank loans to households and business contracted (down 2%, Chart 12). However, this contraction reflected a significant negative comparison effect: in March 2020, drawing on lines of credit and the introduction of PPP (Paycheck Protection Program) for small and medium-sized enterprises resulted in exceptional growth in lending to business, whilst the introduction of mortgage repayment forbearance artificially maintened households' stock of debt (and reduced the likelihood of payment defaults). New production of PPP loans in 2021 (USD190 billion issued by banks in the first quarter, USD220 billion over the first five months of 2021) did not fully offset the elimination of guaranteed loans in 2020. Thus in the first quarter of 2021, 40% of outstanding PPP loans issued in 2020, for a total of USD210 billion, were eliminated (54% and USD280 billion respectively over the first five months). At the end of March 2021, only one third of households still benefited from mortgage payment forbearance (Haughwout, Lee, Scally and van der Klaauw, 2021). Lastly, nearly one third of the value of the 'stimulus checks' distributed to households was used to repay existing loans (see below). Banks surveyed by the Fed between 22 March and 2 April 2021[28] indicated that they had relaxed lending criteria on a large range of loans (commercial and industrial loans, mortgages, consumer loans) and had observed an increase in demand for credit, at least amongst consumers (mortgages, credit cards, car loans) in the first quarter. Over the next few quarters, growth in outstanding loans will remain closely linked with the outlook for the economy. In comparison with the aftermath of the financial crisis, the less damaged financial position of households (lower indebtedness rate, increased savings rate, greater real estate wealth[29], more modest increase in the unemployment rate) should help support lending growth. However, the possible emergence of credit risk could slow the process and require fresh allowances to provisions.

Monetary tightening would result in switching between deposits

In general terms, changes in money supply (M2 in the USA) and its principal counterpart (credit) are closely linked to movements in interest rates (Chart 13). An increase in interest rates is not only liable to hold back money creation (by slowing demand for credit) but, by increasing the opportunity cost of holding liquid savings, can also lead certain investors to switch to more lucrative deposits (Dreschler, Savov and Schnabel, 2017). The average interest rate paid on bank deposits is sensitive to changes in the effective Fed Funds rate (Chart 14). We can also see that the share of interest-bearing deposits in total deposits tends to rise (fall) in a period of monetary tightening (loosening). This said, the scale of the transmission of monetary policy to the interest rates paid on deposits, and the resulting arbitrage, varies according to the periods in question and the phase of the process (a reduction in Fed Funds rates is generally more widely passed on than an increase, Box 3). Moreover, at this stage it seems unlikely that the target range for Fed funds will be raised before 2023.

The Biden stimulus packages will encourage money creation

With all other things being equal, the direct impact of the Biden administration's stimulus plans on broad money and bank deposits will depend on how they are financed and allocated. The USD1,900 billion American Rescue Plan (Proutat, 2021a), approved in March 2021 and financed mainly from the Treasury's deposits with the Fed and an increase in the deficit (part of which will be 'absorbed' by the Fed

23 Most elements of the financial account of US households in the Fed's Flow of Funds are deducted by difference and can include assets in resident hedge funds, private equity funds and personal trusts.

24 Holdings of Treasuries by households, the central bank, pension funds, insurance companies, investment funds and non-residents are expressed at market value in the financial accounts drawn up by the Fed such that, for these institutional sectors, changes in the holdings recorded include valuation effects.

25 These rose to USD1,435 billion in the first five months of 2021, from USD1,220 billion in 2020.

26 The Treasury could reduce its deposits to USD450 billion by the end of July (from USD810 billion in early June): Treasury Announces Marketable Borrowing Estimates | U.S. Department of the Treasury

27 fomcminutes20210428.pdf (federalreserve.gov)

28 The Fed - April 2021 Senior Loan Officer Opinion Survey on Bank Lending Practices (federalreserve.gov)

29 An increase in interest rates would, however, eliminate part of the valuation effect.

SLOWDOWN IN THE MONETARY GROWTH SINCE MARCH 2021

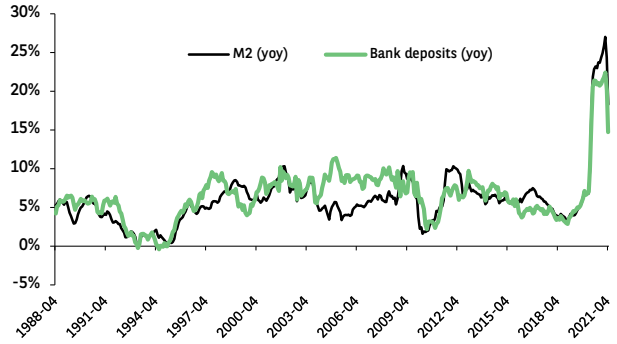


CHART 11 SOURCE: FEDERAL RESERVE (H.6, H.8)

FIRST ANNUAL CONTRACTION IN OUTSTANDING BANK LOANS TO HOUSEHOLDS AND BUSINESSES SINCE 2011

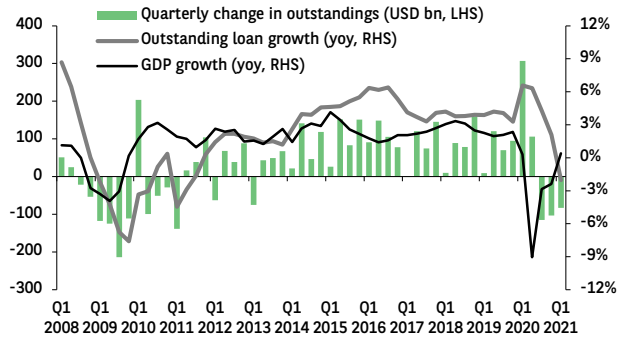
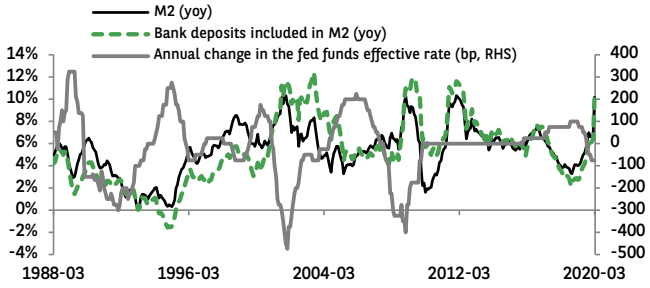


CHART 12 SOURCE: FDIC, MACROBOND

THE MONETARY AGGREGATE M2 AND THE FED FUNDS RATE



** the post-Covid 19 period is not shown for a better readability*

CHART 13 SOURCE: FEDERAL RESERVE, MACROBOND

SENSITIVITY OF THE INTEREST RATE PAID ON DEPOSITS TO THE FED FUNDS RATE

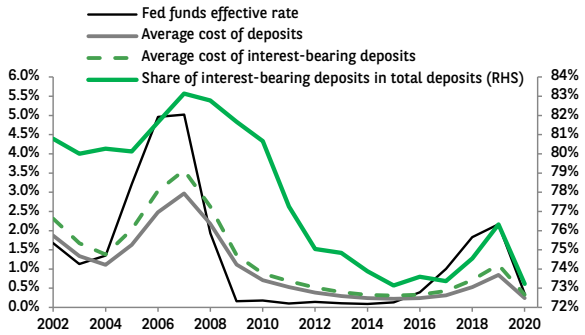


CHART 14 SOURCE: FDIC, MACROBOND

under QE and potentially by the banks), is likely to boost growth in M2 (increase in the "net claims on central government" counterpart). Increased appetite for issues of Treasuries amongst foreign investors will also contribute. However, second-order effects could affect the final impact. For instance, a survey conducted in January by the Federal Reserve of New York showed that US households that had received 'stimulus checks' under the stimulus packages approved in 2020 (the CARES Act and then the CRRSA Act) indicated that they had allocated – or planned to allocate – a substantial share of the money to the repayment of outstanding loans (34.5% of the initial payments in June 2020 and 37.4% for the second in January 2021 - Armentier, Goldman, Kosar and van der Klaauw, 2021)[30]. The planned allocation of sums distributed under the American Rescue Plan (cheques from the Treasury, additional unemployment benefits, tax credits) also suggest a 'destruction' of around one-third of the amount paid out to households (33.7% will be used to repay a debt, 24.7% will be consumed and 41.6% will be saved). The Biden administration, however, plans to finance its American Jobs Plan investment programme out of tax revenues over eight years (still under discussion in Congress, Proutat, 2021b). Thus its positive (direct) effect on M2 will in part be offset.

Over and above the details of their financing and the nature of the initial use of the funds paid, the additional economic growth and the knock-on effect on new loan production will mean that the Biden plans will favour M2 growth.

Reduction in bank balance sheets liable to hold back growth in deposits

The money created by quantitative easing has also resulted in a marked expansion of bank balance sheets. This in turn has tightened regulatory capital constraints on the very largest banks (leverage ratios[31], systemic surcharge, total loss absorbing capacity[32]) and caused smaller banks to worry that their regulatory framework might be tightened up[33]. Various

30 A significant share was saved (36.4% and 37.1% respectively for the first two distributions of checks) with a less substantial share consumed (29.2% and 25.5%).

31 The Supplementary Leverage Ratio in the Basel rules was relaxed temporarily between 1 April 2020 and 31 March 2021.

32 Total Loss Absorbing Capacity (TLAC) includes Tier One Capital and unsecured long-term debt, which can be used to absorb losses in the event of the bank's resolution.

33 In the USA, the application of regulatory capital and liquidity ratios is governed by thresholds: the more likely a bank is to present a systemic risk (because of its size, the scale of its cross-border exposures, its non-banking assets, its short-term market debt or its off balance sheet exposures) the greater the requirements placed upon it.

US G-SIBS BUILT HIGHER CAPITAL BUFFERS SINCE 1 YEAR

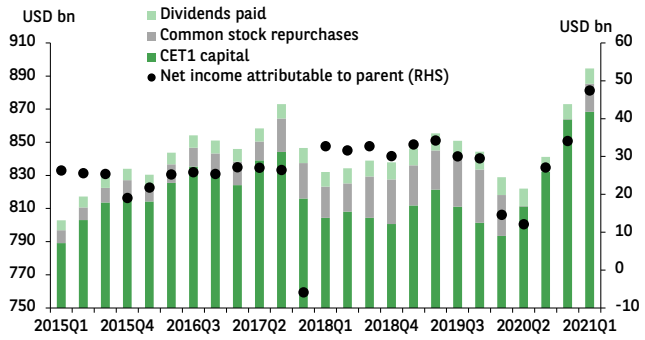


CHART 15 SOURCE: S&P GLOBAL MARKET INTELLIGENCE

SUPPLEMENTARY LEVERAGE RATIOS AS OF Q1 2021

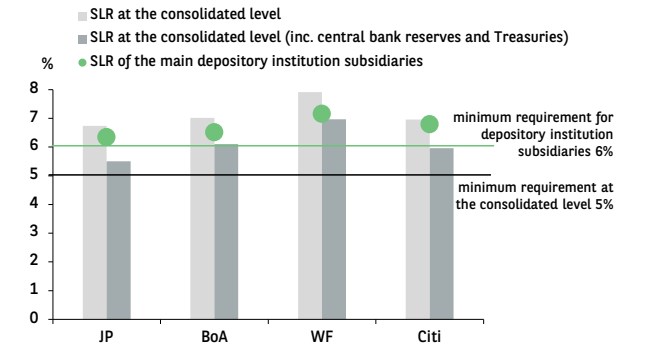


CHART 16 SOURCE: SEC 10Q REPORTS, BNP PARIBAS

options have been cited by banks[34]: adjusting their dividend payout plans, issuing long-term debt (eligible for the Total Loss Absorbing Capacity calculation) and/or seeking balance sheet reduction solutions. These strategies would all affect the trend in deposits[35].

Strengthening Total Loss Absorbing Capacity (TLAC)

The ambitious payout plans announced by the Global Systemically Important Banks (G-SIBs) in early 2021, after a lean year for shareholders in 2020 (Chart 15), will help boost money creation (reduction in the "longer-term financial liabilities" counterpart). Cash paid out at the time of share repurchases or dividend payments by banks may be stashed away by shareholders in the form of bank deposits or could be reinvested in securities issued by other resident companies, whether financial or not[36]. However, the overall effect of these plans needs to be seen in context: 1/ they remain subject to the results of the 2021 CCAR stress tests; 2/ the sums paid out, although significant at the level of the banks, will probably be negligible relative to the contribution from other M2 counterparts[37]; 3/ leverage requirements for the main depository institution subsidiaries (Chart 16) and the increase in their systemicity scores (Chart 17) could force G-SIBs to reconsider these plans or take measures to shrink balance sheets (see below); 4/ G-SIBs could be required to rebuild their Total Loss Absorbing Capacity.

In 2020, the profits made and the ban on major banks buying back their own shares resulted in a temporary strengthening of the G-SIBs' capital amounts and risk-weighted capital ratios. In the first quarter of 2021, the TLAC and Long-Term Debt (LTD) ratios, expressed as a proportion of average risk-weighted assets also remained comfortable relative to the minimum requirements[38]. However ratios expressed as a proportion of leverage exposure deteriorated for some banks, and appear close to the minimum required levels after taking account of the expiry on 31 March of the April 2020 rule (which allowed banks to deduct their reserves with the Fed and Treasuries portfolios from their leverage exposure, Chart 18).

Penalising non-operating deposits

An easing of balance sheet constraints could also take the form of a penalty for non-operating deposits, which grew by 35% between December 2019 and March 2021 on the balance sheets of the 8 G-SIBs (Charts 19 and 20). Granted, taken alone, a penalty on deposits from institutional clients would not be enough to reduce the volume of deposits on a macroeconomic scale. Only if it were coupled with a re-activation of the Fed's RRP would it drive this liquidity towards money market funds, and thence to the Fed, and thus contribute, as it did in 2014-2017[39], to a destruction of deposits (on at least a temporary basis).

Although its main aim was to establish a floor for short-term market rates[40] by draining off excess liquidity from the repo and Fed Funds markets, the RRP[41] provides a form of sterilisation of the broad money. A reverse repo transaction can be considered as a secured loan: the Fed lodges securities held on its balance sheet with a money market fund which, in return, 'lends' it central bank money. In practice, these transactions result in a destruction of base money (reserves on the asset side of bank balance sheets) as they are conducted via bank balance sheets, but also a destruction of money supply (client deposits, in this case money market funds' deposits, shown as liabilities on bank balance sheets). The central bank recognises a debt to the money market fund on its balance sheet and debits the same amount from the current account (reserves with the Fed) of the commercial bank acting as an intermediary in the transaction. This bank in turn debits the account of the money market fund which has accepted securities

34 During presentations to investors and the Fed survey

35 The reduction in secured loans (advances) to banks from the FHLBs, which is also likely, will have little effect on M2 (possibly on bank deposits and the size of banks) as it will result in an increase in FHLB deposits with the Fed or with banks.

36 Investment of cash in shares issued by another bank or by a non-resident entity would instantly destroy the money created by the initial repurchase.

37 Similarly, despite their exceptional total value, the share repurchases made in 2018-2019 had only a marginal effect on M2 growth.

38 The final rule of 2016 (bcreg20161215a1.pdf (federalreserve.gov)) set four requirements: a TLAC of at least 20.5% of risk-weighted average assets plus the G-SIB surcharge set by the Financial Stability Board, a TLAC leverage ratio of at least 9.5%, an LTD ratio of at least 6% of risk-weighted assets plus the G-SIB surcharge defined by the Fed, and an LTD leverage ratio of at least 4.5%.

39 Introduced in the autumn of 2013, one year before the ending of QE3 and two years before the beginning of the post-crisis monetary tightening, this facility saw high levels of participation by money market funds (with interest rates of between 0.01% and 0.07% up to the end of 2015 and then up to 2.25% before the next round of monetary easing in August 2019). Uptake of the facility was boosted by JP Morgan's introduction, in 2015, of a penalty on deposits that resulted in an outflow of around USD200 billion in non-operating deposits from its balance sheet and helped reduce the regulatory capital surcharge arising from its position as a global systemically important bank (G-SIB).

40 Against a background of abundant central bank liquidity, the programme has the effect of reducing downward pressure on short-term rates by encouraging money market funds and GSEs to "lend" part of their cash to the Fed rather than on markets (repo, Fed Funds) where demand has dried up.

41 In practice, the list of counterparties eligible for the programme includes 16 banks, 15 Government-Sponsored Enterprises and 92 money market funds. Similar repo transactions with foreign central banks (Foreign Reverse Repo Facility, FRRP) have the same effects.

THE RISE IN G-SIB SCORES COULD TRANSLATE INTO A RISE IN SURCHARGES

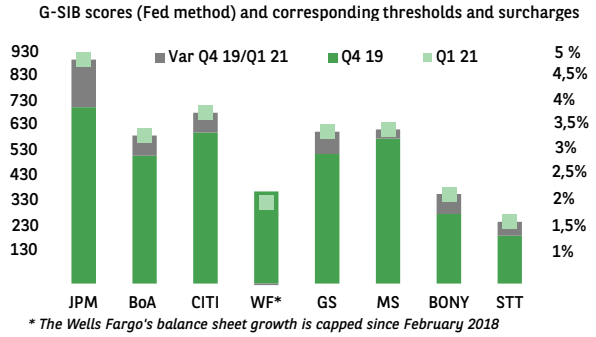


CHART 17 SOURCE: FEDERAL RESERVE (Y-15), BNP PARIBAS

8 G-SIBS' NON-OPERATING DEPOSITS INCREASED BY MORE THAN USD 380 BN BETWEEN Q4 2019 AND Q1 2021

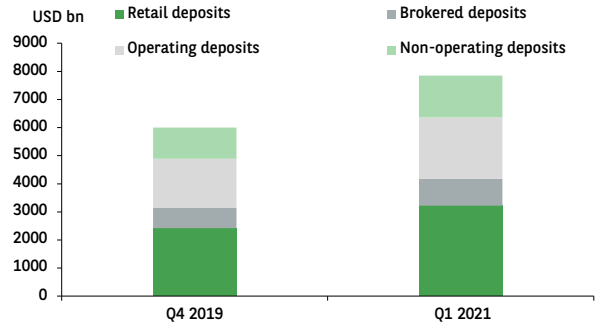


CHART 19 SOURCE: LCR DISCLOSURES

LONG-TERM DEBT AS A % OF THE LEVERAGE EXPOSURE AS OF Q1 2021

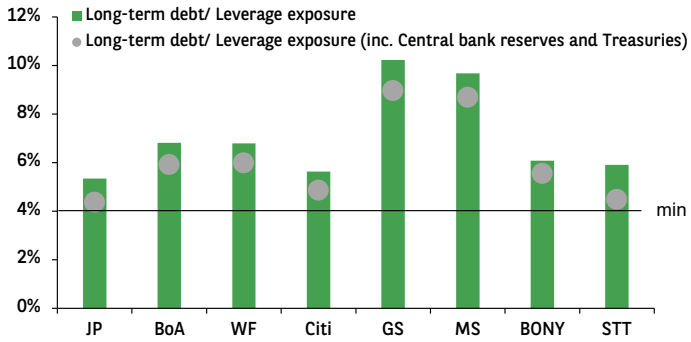


CHART 18 SOURCE: SEC 10Q REPORTS, BNP PARIBAS

JP MORGAN, BANK OF AMERICA AND CITIGROUP HELD AROUND USD 1000 BN OF NON-OPERATING DEPOSITS AS OF Q1 2021

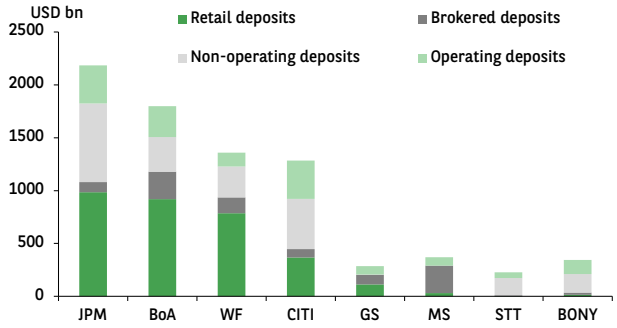


CHART 20 SOURCE: LCR DISCLOSURES

from the Fed. The 'deposit' made by the money market fund 'with the Fed' under the RRP transaction reduces the volume of cash that the fund invests in debt securities in the traditional fashion, or that it lends to other financial institutions on the repo markets or places on deposit with banks[42]. Stopping the renewal of these transactions (generally from one day to the next) results in the reinjection to the economy of deposits which had previously been sterilised. Thus these transactions only temporarily reduce broad money.

Although the current excess of liquidity, leverage constraints and the drying up of the market for short-term Treasuries[43] are also contributing, the rapid growth in liquidity lodged with the Fed under RRP since the end of March (even though the Fed is still offering only a zero interest rate) suggests that these transfers of deposits are already under way (Chart 21).

****

Our exercise of reconstituting a consolidated balance sheet for American monetary and financial institutions shows that although the methods of financing the two economies are very different, the sources of money creation in the eurozone and the USA are quite similar. Since 2008, in particular, quantitative easing (QE) policies have become a key tool in crisis management and an important factor for creation of base money and broad money. In the aftermath of the 2008 financial crisis, the impact of the Fed's programme of purchasing government debt on money growth was mitigated by the debt reduction efforts of the private sector and the increase in banks' net debt to non-residents. In 2020, the effects of the exceptional measures taken by the US authorities to bolster the liquidity of companies and markets in response to the

42 Similarly, a 'deposit' made by a foreign central bank 'with' the Fed, for a transaction under the FRRP, reduces the volume of cash that it will invest in public sector securities in the traditional manner (Treasuries or agency securities) or deposit with a bank.

43 Primary dealers, which are mostly subsidiaries of banking groups, have reduced their holdings of Treasuries (due notably to leverage constraints), thus reducing their need for repo refinancing from money market funds. With the market for short-term Treasuries having dried up, these companies are now placing record amounts of cash with the Fed, even though it does not earn interest.

Covid-19 crisis have in their turn been partially mitigated by the expansion of the Treasury's deposits at the Fed. The rapid growth in money supply that has resulted has nevertheless been unprecedented, and at a level liable to feed fears of inflation (Mandelman, 2021). Granted, strategies to shrink bank balance sheets, which are probably already under way, will continue to slow this growth. Even so, continued QE (albeit at a reduced pace), the expected economic recovery and the compression of long-term interest rates as a result of QE will all help boost money creation. A further area of research would be to look at the way in which monetary policy, changes in the regulatory and accounting framework, economic support measures and health protection measures have affected the distribution of deposits between sectors (households against non-financial companies) and how planned stimulus packages, adaptation strategies and the gradual normalisation of the health and economic situations could affect this distribution.

Completed on 7 June 2021

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THE STERILISATION OF NON-OPERATING DEPOSITS MAY ALREADY BE IN PROGRESS

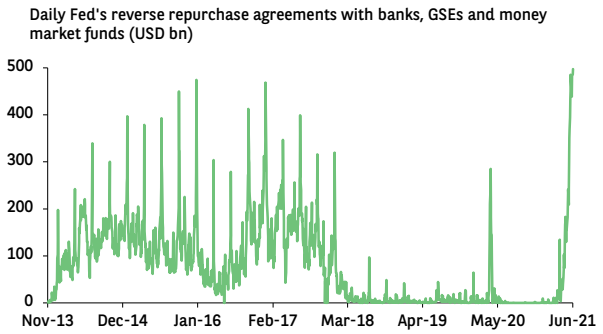

CHART 21

SOURCE: FEDERAL RESERVE OF NEW YORK

PREPARING A CONSOLIDATED BALANCE SHEET FOR US MFIS

Our consolidated balance sheet of US MFIs has been drawn up using data published by the Federal Reserve (Flow of Funds and the H.6 report on Money Stock Measures). In the Flow of Funds (FoF) report, data relating to transaction flows have been favoured over data on stock levels, in order to eliminate changes relating to valuation effects or other volume changes. The consolidation of the balance sheets of the Fed and depository institutions requires the cancellation of their reciprocal exposures (banks' deposits with the Fed are excluded from the consolidated MFI balance sheet as they represent a credit against the Fed for banks and a debt to the banks for the Fed).

Credit to resident agents (excluding central government)[1]

Loans from the Fed to resident entities (which in practice are limited to non-bank financial institutions[2]) pare largely the result of emergency measures taken to address periods of financial stress[3] such as during the major financial crisis of 2007-2008, the repo market crisis in September 2019 and since the onset of the Covid-19 crisis (FoF F.109). They have included most notably loans to dealers as part of various liquidity support operations (repurchase agreements, Primary Dealer Credit Facility in 2008-2009 and 2020, Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility in 2008-2010, and Money Market Mutual Fund Liquidity Facility in 2020) and loans to Special Purpose Vehicles (SPVs) created to acquire non-financial company debt, exchange-traded fund shares, local government debt and securitisation issues (Commercial Paper Funding Facility in 2008-2009 and 2020, Corporate Credit Facilities in 2020, Main Street Lending Program in 2020, Term Asset-backed Securities Lending Facility in 2020 and Municipal Liquidity Facility in 2020). However, lending to depository institutions (via the discount window or exceptional programmes) is not included.

We also include in the Fed's financing of resident agents securitised loans (Residential Mortgage-Backed Securities, RMBS) and agency and Government-Sponsored Enterprise (GSE) debt purchased as part of quantitative easing (QE). Although securitisations issued by GSEs enjoy the effective guarantee of the US Treasury, these groups have retained the status of private companies, placed under the supervision of a federal agency since they were rescued in October 2008. An alternative approach (albeit with no effect on the lessons learned from the exercise) would be to treat the Fed's purchases of securitisations issued by agencies and GSEs as financing of the public sector (and symmetrically to treat their deposits with the Fed as a debt to central government rather than a longer-term financial liability).

Bank financing of resident agents (excluding central government) includes securities repo transactions[4] (FoF, F.110) and loans (excluding repos) to the resident private sector (FoF, F.110, F.215 and F.216). Bank financing also covers holdings of agency and GSE debt securities and RMBS, municipal securities, non-monetary mutual fund shares, and open market papers, bonds and equities issued by resident companies[5] (FoF, F.110, L.209, L.213, L.223).

Net claims on central government

Financing of central government corresponds to net purchases of Treasuries by the Fed[6] (QE) and banks (FoF, F.109, F.110). The Treasury General Account at the Fed and the Treasury's contribution to the Money Market Mutual Fund Liquidity Facility represent the bulk of its deposits with the Fed (FoF, F.109). The Treasury's credits with banks cover banks' net taxes payable (FoF, F.110) and Treasury deposits at banks, which have been virtually nil since end-2008 (FoF, L.204, L.205).

Net external assets

The Fed's net external assets consist mainly of transactions with other central banks. Credits include the Fed's official reserve assets (changes in which reflect portfolio and direct investments[7] by resident agents) and central bank liquidity swaps. The Fed's external debts include deposits it holds from foreign central banks and securities repo transactions it has entered into with such banks (FoF, F.109). US banks' net credits against non-residents include their foreign portfolio investments (acquisitions of open market papers and bonds – FoF, F.110, L.209, L.213 – and equities, FoF, F.110, L.223), loans (net of deposits) to non residents (FoF, F.215, F.216, L.204, L.205), net direct investment abroad by US banks (FoF, F.110) and net credit of US banks against non-resident banks (whether affiliated or not – FoF, F.203).

Longer-term financial liabilities

The Fed's longer-term financial liabilities include the deposits it holds from GSEs, clearing houses and special receivables funds as well as its repo transactions with private financial counterparties other than banks (primary dealers, GSE, money market funds, FoF, F.109). For banks, longer-term financial liabilities include deposits (other than from central government and non-residents) not included in the definition of money supply. To this end we have excluded from the "time and savings deposits" recognised as liabilities at banks the old H.6 series relating to "savings deposits" and "small-denomination time deposits" which are included in M2 (FoF, F.110, L.205, H.6). Non-monetary commitments for banks also include direct investment made by financial institutions (holding companies or others), secured loans from Federal Home Loan Banks (advances), repo transactions, loans of Fed Funds from GSEs and issues of debt securities (FoF, F.110, L.209, L.213).

Capital and reserves

In the USA, capital in the regional Federal Reserve Banks are held by commercial banks in their respective regions and are thus excluded from the consolidated balance sheet of US MFIs. The stock of bank capital, excluding valuation effects, has been reconstituted from table F.223 in the Flow of Funds. We are not in a position to identify from the Flow of Funds the provisions made to cover credit risk (which are included in the "capital and reserves" heading on the liabilities side of the MFI balance sheet for the eurozone). We have used the allowances on commercial banks' balance sheets (Fed table H.8) as a proxy.

1 Financing of the resident private sector (financial and non-financial) and governmental bodies other than central government

2 The recipients of these refinancing lines may be part of banking groups (primary dealers, in particular, are generally subsidiaries of banks). As financial statements for institutional sectors are prepared on a company rather than a consolidated basis, the financial accounts of these institutions are separate from those of any parent company and, in the present case, excluded from the scope of MFIs.

3 Fed financing also includes open market papers (nil since 1978) and holdings in the two vehicles responsible for purchasing ordinary shares in two AIG subsidiaries (nil since Q4 2010)..

4 In financial statements, repo and reverse repo transactions entered into by depository institutions are not netted against intra-sector transactions; moreover, they are presented without details on the nature of the counterparty (banking sector or not). In the absence of more detailed information, we have considered all reverse repo transactions, irrespective of the nature of the counterparty, as forming part of the "credit to the private sector" counterpart and all repo transactions, irrespective of the nature of the counterparty, as forming part of the "longer-term financial liabilities" counterpart. These assumptions result in an overestimate of the respective weight of these two counterparts of money supply.

5 The stock of securities issued by non-residents and held by resident banks is considered as proportional to the weight of banks amongst other institutional sectors holding securities issued by companies (whether resident or not).

6 They also include special drawing rights certificates and Treasury currency.

7 A direct investment exists when the investing entity acquires or holds at least 10% of the capital or voting rights in the investee company. Below this threshold, the investment is considered a portfolio investment.

MONETARY COUNTERPARTS AT 31 DECEMBER 2020

We set out here the results of our exercise in identifying the counterparts of broad money in the USA prepared using the methodology set out in Box 1 (counterparts at 31 December 2020 and respective changes over the past year). The ECB publishes a consolidated MFI balance sheet, the counterparts and components of eurozone money supply on a monthly basis. The breakdown of monetary counterparts by type of monetary institution (Eurosystem, credit institutions and money market funds) has been prepared on the basis of aggregated balance sheets, also published monthly by the ECB[1].

[1] See Monetary Developments in the Euro Area (europa.eu) and The balance sheets of monetary financial institutions (MFIs) (europa.eu)

US "MFIS*" CONSOLIDATED BALANCE SHEET

Assets			Liabilities		
USD bn	**As of 12/31/20**	**Change since 1 year**	**USD bn**	**As of 12/31/20**	**Change since 1 year**
Credit to the private sector	**18 563**		**Broad money M2****	**18 017**	
in the form of loans			- Currency in circulation	1 971	+260
- from the Fed	52	-203	- Liquid bank deposits	16 046	+3 431
- from banks	12 016	+418			
through purchases of debt securities and equity		1 823	**Holdings against central government**	**1 823**	
- from the Fed	2 099	+663	- on the Fed's balance sheet	**1 726**	**+1 326**
- from banks	4 396	+782	- on banks' balance sheets	97	-12
Credit to central government	**6 088**		**External liabilities**	**2 742**	
- from the Fed	4 896	+2 553	- on the Fed's balance sheet	228	-49
- from banks	1 191	+304	- on banks' balance sheets	2 515	+228
External assets	**2 197**		**Longer-term financial liabilities**	**5 312**	
- on the Fed's balance sheet	20	+14	- on the Fed's balance sheet	215	+77
- on banks' balance sheets	2 177	+128	- on banks' balance sheets	5 097	-468
Other counterparts	**1 423**	**+244**	**Capital and reserves**	**376**	**+109**
TOTAL	**28 270**		**TOTAL**	**28 270**	

Counterparts of broad money

* excluding retail money market funds, ** excluding retail money market fund shares

SOURCE: FED, BNP PARIBAS

EUROZONE MFIS CONSOLIDATED BALANCE SHEET

Assets			Liabilities		
EUR bn	**As of 12/31/20**	**Change since 1 year**	**EUR bn**	**As of 12/31/20**	**Change since 1 year**
Credit to the private sector	14 341		**Broad money M3**	**14 525**	
in the form of loans			- Currency in circulation	1 359	+138
- from the Eurosystem	5	+3	- Liquid bank deposits	12 385	+1 223
- from banks and money funds	11 922	+472	- Marketable instruments	781	+154
through purchases of debt securities and equity			**Holdings against central government**	**749**	
- from the Eurosystem	416	+0	- on the Eurosystem's balance sheet	**458**	**+296**
- from banks and money funds	1 998	+1	-on banks' and money funds' balance sheets	291	+89
Credit to central government	**5 925**		**External liabilities**	**4 663**	
- from the Eurosystem	3 131	+984	- on the Eurosystem's balance sheet	646	+156
- from banks and money funds	2 794	+280	- on banks' and money funds' balance sheets	4 017	+32
External assets	**6 113**		**Longer-term financial liabilities**	**3 952**	
- from the Eurosystem	1 179	+127	- on the Eurosystem's balance sheet	108	-21
- from banks and money funds	4 934	+55	- on banks' and money funds' balance sheets	3 844	-179
Other counterparts	**524**	**+72**	**Capital & reserves**	**3 013**	**+107**
TOTAL	**26 903**		**TOTAL**	**26 903**	

Counterparts of broad money

SOURCE: ECB, BNP PARIBAS

BOX 2

THE MONETARY POLICY TRANSMISSION TO THE AVERAGE INTEREST RATE PAID ON BANK DEPOSITS

During the last two phases of monetary easing (Q1 2001 to Q3 2003, Q3 2007 to Q1 2009), the cumulative fall over three years in the average cost of deposits represented respectively 58% (Q2 2001 to Q1 2004) and 47% (Q4 2007 to Q3 2010) of the cumulative fall in the effective Fed Funds rate (Chart 22). Automatically, the transmission of monetary policy to the average cost of interest-bearing deposits alone was greater (69% and 55% respectively). During the phase of monetary tightening between Q3 2004 and Q3 2006, the cumulative rise (over 11 quarters) of the average cost of deposits represents 50% (Q4 2004 to Q2 2007) of the cumulative increase in the effective Fed Funds rate (60% when considering interest-bearing deposits alone). However, banks passed on less of the interest rate increase during the most recent period of monetary tightening (Q4 2015 to Q1 2019) to the average cost of deposits (28% after 13 quarters; 36% for interest-bearing deposits alone).

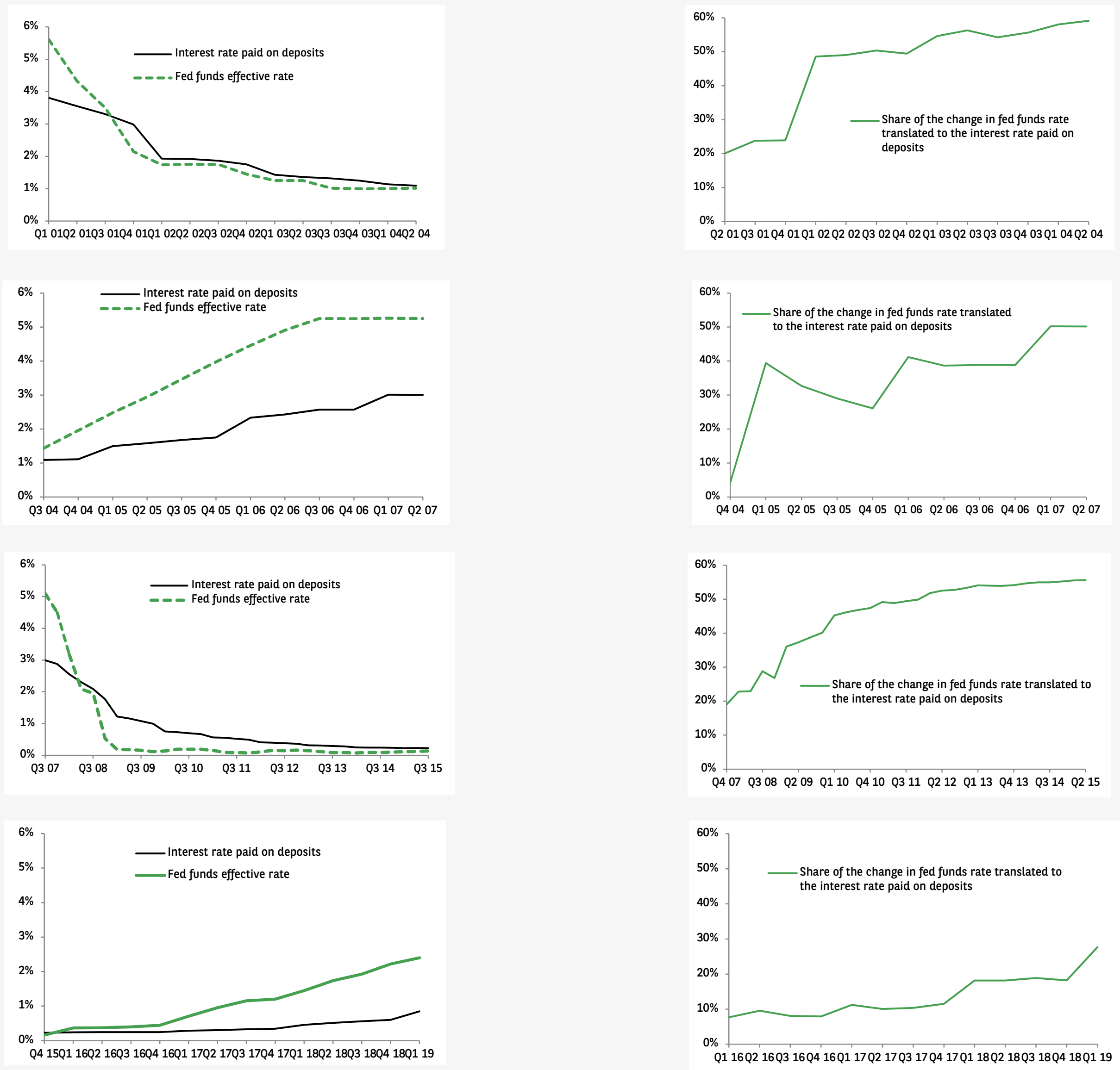

CHART 22

SOURCE: FFIEC CALL REPORTS, MACROBOND, BNP PARIBAS

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