Asset pricing and the Covid-19 deposit glut: an application of Liquidity Preference Theory

Dirk Bezemer, Richard Senner

SNB Working Papers
05/2025

SCHWEIZERISCHE NATIONALBANK
BANQUE NATIONALE SUISSE
BANCA NAZIONALE SVIZZERA
BANCA NAZIUNALA SVIZRA
SWISS NATIONAL BANK

DISCLAIMER

The views expressed in this paper are those of the author(s) and do not necessarily represent those of the Swiss National Bank. Working Papers describe research in progress. Their aim is to elicit comments and to further debate.

ISSN 1660-7716 (printed version)
ISSN 1660-7724 (online version)

Asset pricing and the Covid-19 deposit glut: An application of Liquidity Preference Theory

*Dirk Bezemer and Richard Senner**
March 2025

Strongly rising asset prices after March 2020 in the euro area and the United States are hard to explain using conventional asset pricing approaches. We apply Liquidity Preference Theory to examine the consequences of the unprecedented Covid-related growth of household deposits. Following the shock, deposits were spent, hoarded, or invested depending on liquidity preferences (Keynes, 1936; Tobin 1969). The allocation of the deposit shock was mediated by income distribution, corporate financial dynamics and the price inelastic response of financial and real estate asset markets, combined with the elasticity of the financial system (Borio and Disyatat 2011; Gabaix and Koijen 2022). Stability of liquidity preferences was evidenced by the fact that, just as before the pandemic, every additional Euro or Dollar in monetary wealth during the pandemic came to be reflected in around six Euros or ten Dollars in non-monetary wealth, mainly equities and housing. This suggests portfolio rebalancing is the major explanation of the strong rise in asset prices after the onset of the pandemic.

JEL Codes: E42, E51, G11, G22, G21

Key words: asset pricing, deposits, household savings, macrofinance, liquidity

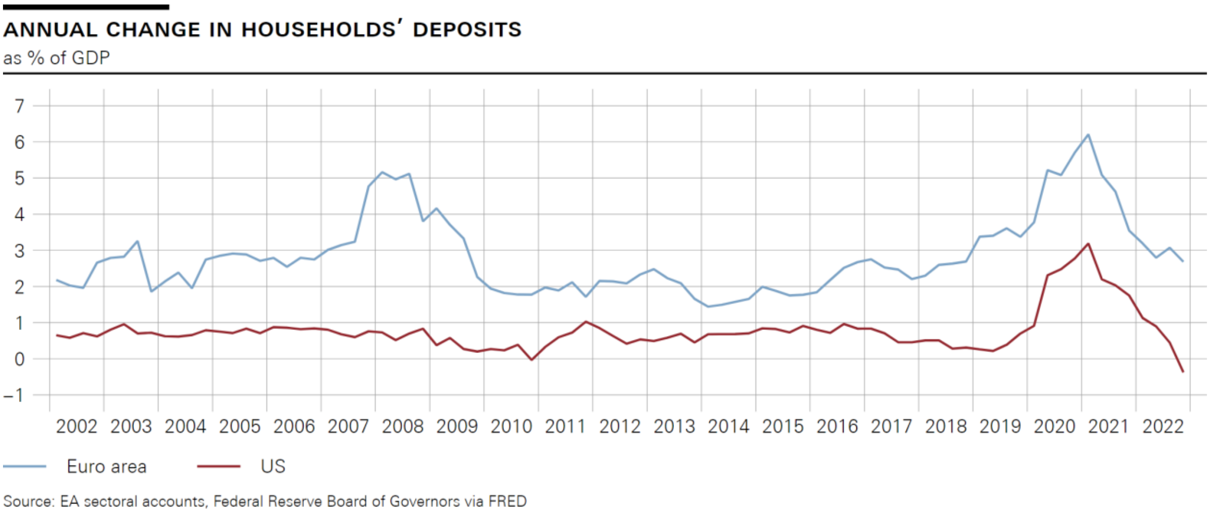
---

*First draft: December 2023. Dirk Bezemer, University of Groningen, Department of Global Economics & Management; Richard Senner, Swiss National Bank, Richard.Senner@snb.ch (corresponding author). We thank Ulrich Bindseil, Florian Böser, Lorenzo Cappiello, Grégory Cerutti, Hans Gersbach, Maciej Grodzicki, Willy Hautle, Lukas Heim, Michael Howell, Benjamin Klaus, Alan Longbon, Chris Marsh, Jan Mischke, Andrea Terzi, Jan Toporowski, Frederik Weber and Bernhard Winkler. We thank the participants of the SNB Brown Bag Seminar.

1. Introduction

Following unprecedented public financial support for firms and households during the Covid pandemic by governments in the US and the euro area, household deposits soared in 2020. Growth rates expressed as a percentage of GDP tripled up to 6% in the euro area and 3% in the US (figure 1). This led to a 'deposit glut' – not in the sense of a loanable-funds 'savings glut' (Bernanke 2005), but simply denoting the large increase in households' deposits relative to GDP, financed by government and central bank balance sheet extension.

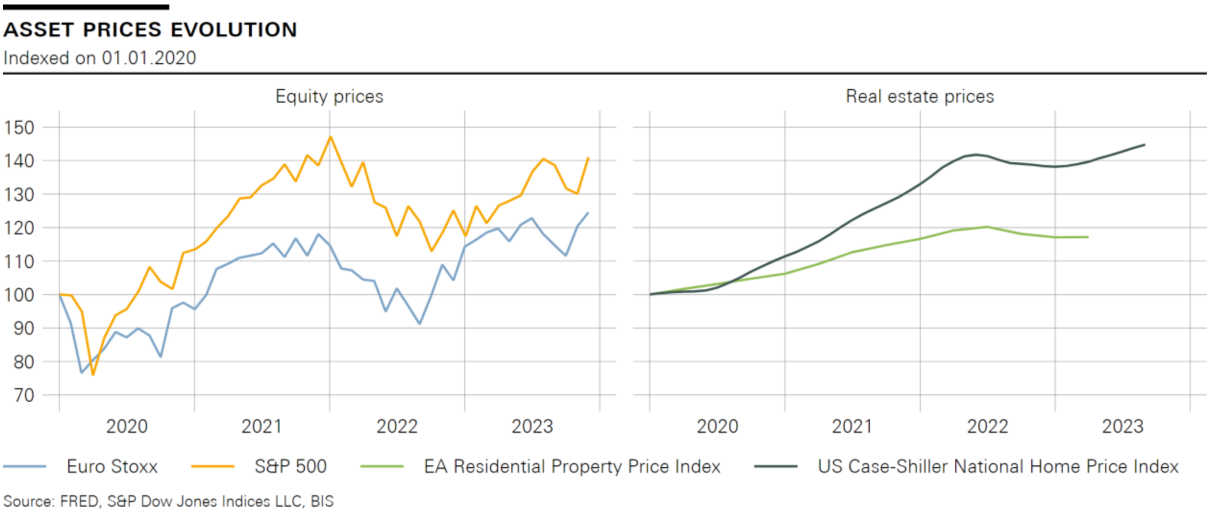
Figure 1



The consequences of this 'deposit glut' in terms of asset prices, inflation, economic activity and distribution have been intensely debated in academia, policy and the press. The support measures, while averting deep recessions, may have increased income inequality (Kohlrausch et al, 2020; Tooze, 2021), decreased housing affordability and fuelled asset prices and consumer goods price inflation.

While the causes of inflation after 2020 have been extensively discussed elsewhere (e.g. Borio et al, 2024), the asset market evolution appears literally unprecedented, and hard to explain. After an initial drop at the onset of the global pandemic, equity prices and real estate prices recovered to above pre-Covid levels within a year (figure 2). In the US, equity markets first fell by 34%, but the entire decline and recovery took only 116 trading days. Euro area and US *average* house prices rose by a staggering 22% and 35 %, respectively, between the eve of the Covid crisis in late 2019 and their peak in mid-2022 (figure 2).

Figure 2



These developments are challenging to explain analytically. Traditional asset valuation approaches in the spirit of discounted future cash flows (going back to at least Fisher, 1930) suggest that these real estate and "equity market valuations may be based on overly optimistic expectations for the economy" (ECB, 2023), but struggle to explain the dynamics. Also elevated price-to-income levels in real estate markets (ECB 2023, Chart 1.11) stretch the explanatory power of discounted future cash flows based on changes in risk appetite and expectations. Gormsen and Koijen (2023) review the literature on asset price impacts in the US during the Covid-19 pandemic and conclude that the sharp recovery poses a challenge, even after including behavioral theories of asset pricing:

> *"[w]hile the sharp decline in equity prices can perhaps be explained by an increase in risk aversion or macroeconomic risk, or a decline in investors' sentiment, the rapid recovery poses more of a challenge. After all, for prices to normalize as quickly, one would need an unexpectedly sharp decline in risk appetite or macroeconomic risk, or a large unexpected improvement in investors' sentiment, which is unlikely in standard calibrations."*

Monetary policy tightening since 2022 has further challenged conventional asset pricing theories. The FED started raising rates in March 2022 and the ECB in July 2022 - but while equity prices at first decreased, they have since recovered (until this writing in early 2024). In Germany, for example, equity prices reached record highs amid a recession in 2023.

The aim of this paper is to use the liquidity-preference flow-of-fund approach to account for the consequences of the Covid deposit shock. This offers an elegant, parsimonious explanation of asset price changes in response to liquidity shocks. Given a number of assumptions (or stylized facts) discussed below, Liquidity Preference Theory suggests that asset prices rise by the magnitude of the liquidity shock multiplied by the long- term share of the asset in household portfolios.

For a concrete example, consider the $4 trillion increase in deposits in the US. Given a long-term stable equity-to-deposit ratio of 45:10 in household portfolios, this should lead to an $18 trillion increase in equity value (calculated as 4 × 45/10). At $ 19 trillion, the actual increase was close. The aim of this paper, then, is to present an explanatory account of the evolution of asset prices and the consequences of the Covid deposit shock that is an alternative to explanations in terms of elusive changes in risk appetite, discount factors, or investor sentiment.

In the next section we introduce this liquidity-preference flow-of-fund approach. In section 3 we collect and present long-term time series data to illustrate the stability of portfolio allocations that is a key outcome of this framework. In section 4 we apply this framework to the Covid deposit shock. In sections 5 and 6 we investigate the sources of the deposit shock in public and foreign funding and the different uses of the deposit glut into consumption and real investment, hoarding, investment in financial and real estate assets, and debt repayment. Section 7 concludes with a discussion of policy relevance and avenues for future research.

2. Liquidity preference theory

We will start by briefly describing how Liquidity Preference Theory (LPT) can be understood in a neoclassical full equilibrium model world before diving deeper into how LPT can help understand the monetary economy with fundamental uncertainty we live in.

In a frictionless neoclassical model that is governed by an all-purpose good, there is no representation or need for liquidity in the form of deposits.[1] Into this model we can introduce deposits via the utility functions of agents, or via market frictions in the spirit of new monetarist models. If we shock such a model with an increase in households' deposits, the only result would be that the price level of the all-purpose good changes, but the effects of the Liquidity Preference Theory (LPT) would not be visible.

If we also introduce an additional asset, say equities, then an increase of household deposits increases the prices (measured in deposits) of the good and the asset, leaving relative prices unchanged. Adding yet one more ingredient, namely some sort of friction, then this could generate portfolio reallocations and relative price changes.

The "friction" that is central to LPT is portfolio stability, grounded in the stability of liquidity preferences. An increase in household deposits now affects the price of equities as households rebalance portfolios to achieve portfolio stability, without affecting the demand and price for the all-purpose good.

Moving beyond the neoclassical model world we can summarize LPT more generally as follows:

- (i) Households and other economic actors receive a priori unknown ('fundamental uncertainty') quantities of financial savings, and then allocate them to different assets according to liquidity preferences.
- (ii) The desired or targeted portfolio composition - the ratios of deposits, equity, debt and real estate in the total portfolio - tends to be relatively stable over time.
- (iii) The change in asset prices is given by the desired volume changes and the assets' price elasticity. In turn, price elasticity depends on factors such as asset reproducibility and market liquidity.

Consider these elements in more detail. The income of households and other actors faces fundamental uncertainty. While labour income is somewhat predictable in ordinary times, corporate profits and dividends vary significantly. Households' costs are also fundamentally uncertain, as consumer prices or necessary health care spending can change unexpectedly. As a result, households and other sectors do not know a priori the amount of financial savings. A

[1] We thank an anonymous reviewer for suggesting this presentation. This is pedagogical rather than historical. Later in this section we discuss how Liquidity Preference Theory (LPT) is grounded in monetary macroeconomics rather than the frictionless neoclassical model.

posteriori, say at the end of a day, week, month or year, households can assess their new financial situation and decide on how to allocate these savings.

Having financial liquidity allows for moving in and out of different assets in response to unexpected price changes. Since households (and other actors) face fundamental uncertainty, they value financial liquidity as a way to cope with uncertainty. Households also hold non-liquid assets such as equity, debt instruments, and real estate, as these typically offer higher returns.

The liquidity preferences that lead to the asset allocation can be either voluntary or involuntary. With voluntary preferences, individuals are free to choose between a savings or sight deposit account, or between buying an exchange traded fund or real estate. Voluntary preferences depend on factors such as the household's position within the wealth and income distributions and changes in uncertainty. On the macro-level, these are quite stable. Richer households tend to invest more of their financial savings in non-monetary assets, lower-income households need a larger fraction in cash to cope with uncertainty, being uncertain as to whether the relatively little cash buffer might be needed in the next period for consumption expenditures.

Involuntary preferences refer to how regulation and financial market structures constrain the possible investment universe. Households, for example, are typically not allowed to invest in more complex financial products, which are limited to 'qualified investors', or do not have access to certain instruments like digital central bank money. Similarly, investment funds or pension funds typically face internal mandates and regulatory boundaries to their equity or foreign exchange investments. For both reasons, there will be macroeconomic portfolio stability.

Indeed, a central claim in LPT is that portfolio stability is macroeconomic, rather than only a feature of individual professional investment funds due to specific mandates. After a positive deposit shock, for example, the prices of (approximately) non-reproducible assets like land or Bitcoin will increase proportionally with demand increases. The supply of other assets such as equity can increase if demand for them increases, so that the liquidity causes potentially weaker price effects.

Gabaix and Koijen (2021, 2022) consider how stock market investment funds operate under a strict mandate dictating the composition of their asset portfolios – an institutional feature defining a relatively stable liquidity preference of that sector. Consequently, an influx of USD 1 in funds can increase market capitalization by more than USD 1. In figure 3, an adaptation of Gabaix and Koijen (2021), we trace the sequence of balance sheet changes (on the asset side) leading to this result. Due to investment mandates, prices adjust to money flows resulting from the deposit shock.

Figure 3

Stylized example: stable liquidity preferences drive asset price increases via mixed fund inflows

All assets are held by households (HHs) via a bank or mixed funds. HHs allocate 50% to the bank and 50% to mixed funds. Mixed funds have a strict mandate to maintain a 20:80 deposit-to-equity ratio.

Bank
Deposit from HHs EUR 100 +2
Deposits from mixed funds EUR 20

Mixed funds
Deposit EUR 20
Equity EUR 80 = p*80 where p=1 price of equities

Shock: HHs deposit balances rises by +2 (e.g., mortgage boom, Covid stimulus). HHs allocate EUR 1 to mixed funds to maintain their portfolio composition. Mixed funds then trade equities with each other until they restore their 20:80 ratio.

Bank
Deposits from HHs EUR 101
Deposits from mixed funds EUR 21

Mixed funds
Deposits EUR 21
Equity p*80 where p=1.05 [such that the 20:80 ratio is restored 0.8=(p*80)/(21+p*80)]

→ The price of equities must rise by 5% to 1.05 for mixed funds to maintain their 20:80 ratio, and for HHs to preserve their portfolio composition.

Source: authors' own, inspired by Gabaix and Koijen (2021)

Note that LPT is quiet general. Financial savings can be negative if households increase their net liabilities, as for example in the US before 2008 for lower-income households. LPT can be applied not only to households but also non-financial corporations, banks, non-bank financial intermediaries (NBFIs) and governments.

At the heart of the LPT is the connection between the real and financial sides of the macroeconomy that Keynes articulated. In LPT, the flow of funds rather than only "real" economic equilibrium considerations is central to explaining outcomes, including but also going beyond explaining asset prices. In this sense, LPT is a 'macrofinancial' theory (Tooze 2018; Bonizzi and Kaltenbrunner, 2020; Dutta et al, 2020; Gabor, 2020; Brunnermeier, 2024). In particular, LPT should not be reduced to the speculative dimension, as in syntheses of Keynesian and neoclassical theory (Bibow, 2005).

Theories of financial markets may be loosely categorized into (i) real, (ii) behavioral and (iii) macrofinancial approaches. Consider each in turn.

In 'real' theories of financial markets, the real and financial sides of the economy are linked by viewing financial assets as representing productive assets (capital goods) yielding a return based on their productivity. Interest rates are viewed as representing agents' time preference (or discount rate) for real consumption now and in the future. Assuming full information, rational behavior as well as complete and efficient markets, deposit allocation decisions do not add information. They reflect expectations and risk appetite. Rising interest rates, for example, should lead to lower valuations because the discount factor increases. Rising valuations, in turn, can result from changing expectations about future returns of companies. Mischke et al (2023) for example show how the rise in US corporate earnings relative to GDP has fueled equity market value growth since the 90s. Similarly, lower interest rates since 2008 have reduced the discount factor in discounted cash flow models, consistent with higher valuations.

Second, 'behavioral' theories of financial markets stress the financial nature of assets, even though they may also be viewed as representing the dynamics of real-sector production processes. But the financial-asset emphasis opens up conceptual space for behavioral insights into individuals' financial valuations, which might differ from underlying fundamentals, such as profit and interest rates. Irrational behavior and sentiment theories may explain deviations from rational investments (see Barberis and Thaler, 2003, for an overview, often going back to the psychological work of Kahneman et al, 1974). Shocks like the outbreak of the pandemic in 2020 can, for example, lead to fast price movements because investors face higher uncertainty, might be financially illiterate, or engage in fire-sales of assets due to strong loss aversion. Shabani and Toporowski (2015) review the most prominent papers on asset pricing by Fama, Shiller and Hansen, all of which can be classified as either 'real' or 'behavioral' theories.

Third, macrofinancial approaches to financial markets also start from the financial nature of assets. But they stress the systemic context of the financial system itself, rather than the individual psychology playing out within that system. Macrofinance embraces macroeconomics and finance, focusing on their interlinkages. Keynes (1936) articulated how the combined money values of wages, business investment and government spending, minus leakages through taxes and imports, constitutes the monetary purchasing power (the 'effective demand') that enables consumption, monetizes aggregate profit, and determines macroeconomic saving as a residual. Once the level of savings has so been determined, Keynes (1972, 166) explained, households decide on their financial portfolio allocation:

> *"[T]here is a further decision which awaits him, namely, in what form he will hold the command over future consumption which he has reserved, whether out of his current income or from previous savings. Does he want to hold it in the form of immediate, liquid command (ie. in money or its equivalent)? Or is he prepared to part with immediate command for a specified or indefinite period, leaving it to future market conditions to determine on what terms he can, if necessary, convert deferred command over specific goods into immediate command over goods in general? In other words, what is the degree of his* ***liquidity-preference*** *– …" (emphasize in original)*

Liquidity preference reflects uncertainty and nervousness over the future, translating into preference for liquid assets. Tily (2012, 59) summarizes Keynes' LPT and makes the link to interest rates respectively rates of return of financial assets:

> *"Liquidity preference is the decision about the degree of liquidity at which savings should be held. Furthermore, it is a decision concerning the stock of savings – wealth – at any point in time, rather than any new flow of saving alone. The rate of interest is hence not determined by the supply of and demand for (flows of) saving, but by the supply of and demand for assets into which holdings of (stocks of) wealth can be placed. In the theory of money as a store of value, money is one of these assets."*

Keynes's argument was to switch the emphasis from interest rate adjustments to changes in income as a key macroeconomic adjustment mechanism. In so doing, he argued that the interest rate and asset prices adjust to balance sheets incorporating stocks, not flows, of financial claims.

Regarding liquid assets, Keynes in his Treaties on Money (1930, in the preface to foreign editions) separated inactive and active deposits and introduced a state of bearishness that defines the desired share of liquid assets in the overall portfolio:

> *"My central thesis regarding the determination of the price of non-liquid assets is that, given (a) the quantity of inactive deposits offered by the banking system, and (b) the degree of propensity to hoard or state of bearishness, then the price level of non-liquid assets must be fixed at whatever figure is required to equate the quantity of hoards which the public will desire to hold at that price level with the quantity of hoards which the banking system is creating."*

LPT was most explicitly elaborated in Tobin's (1969) asset allocation framework. Contemporary applications building on LPT include Toporowski (2000) on pension funds and 'capital market inflation', Duca and Muellbauer (2013) on credit and housing market, Bouchaud (2022) on micro structures (such as order book dynamics) in financial markets and Howell (2020)[2] on global liquidity driving global markets. Notably, Godley and Lavoie (2007) is the seminal reference for a now voluminous literature on 'stock-flow consistent' macrofinancial models incorporating (parts of) LPT. Senner and Sornette (2018), for example, present a stock-flow consistent model where deposits are created by banks, and the stock of households' deposits then determines the price of a speculative asset through re-allocation because the desired portfolio composition is stable.

Note that if LPT is the dominant driver behind overall levels of asset prices, then 'real' and behavioral theories still play an important role in determining relative prices between different equities, or across bonds. But the application of fundamental price-earnings-ratios (P/E-ratios) to describing the price evolution of the aggregate stock market can be seen as a fallacy of composition because it ignores changing macro-portfolios including liquidity flows.

A key element of LPT is that portfolio composition consisting of money and other assets is relatively stable over time. This implies that an exogenous increase in deposits initiates reallocations to restore the desired portfolio composition. A growing share of deposits therefore mechanically leads to more demand for equities, bonds and real estate. In line with this, Dillard (1948, 42) argues that of the three motives to hold money outlined by Keynes – the transactions, wealth-holding and speculative motives -, two are proportional to economic activity and therefore stable, while only one fluctuates significantly.

The impact on asset prices within LPT is also consistent with the 'inelastic market hypothesis' work by Gabaix and Koijen (2021, 2022). The authors show that asset prices in the US are sensitive to investment fund inflows. In response to the increased asset demand, asset quantities do not accommodate (enough) so that prices rise. The reason is that the majority of stock market investments funds operate under strict mandates dictating the composition of their stock and asset portfolios

To illustrate the relevance of LPT, it is worthwhile to note that its results contradict traditional asset pricing theories, where prices are exclusively determined by fundamentals or behavioral biases. Gabaix and Koijen (2022) report results from a survey among finance academics who were asked "If a fund buys $1 billion worth of US equities (permanently; it sells bonds to finance that position), slowly over a quarter, how much does the aggregate market value M of equities change?". Gabaix and Koijen (2022, 13) found that

> "… the median answer was M = 0: surveyed economists, logically enough, rely on the traditional asset pricing model in which prices are unperturbed by flows. The median positive answer was M = 0.01. Hence, surveyed economists' views are in line with the traditional model, but far from the estimates reported in the empirical literature."

This has implications for macroeconomics more generally beyond the asset market analysis covered in this paper. Palley (2023), observes that:

> *"[c]urrent policy rests on Keynesian logic whereby a large fall in aggregate demand warrants robust offsetting monetary and fiscal policy actions. That logic neglects potential monetary disorder being bred within the financial circuit in the form of inflated asset prices and leveraged balance sheets. That disorder is likely to develop long before inflation accelerates so that inflation targeting fails to protect against it."*

[2] Howell (2020) uses P=P/L x L to decompose changes in the price P into an allocation term P/L, which is recently stable over time, in line with LPT where portfolio compositions are relatively stable, and a liquidity term L.

3. Portfolio stability empirically explored

We collected long-term household asset allocations data to illustrate the relative stability of portfolio compositions at the macroeconomic level. The longest time series are available for the US economy. In the decades 1951-1990, the share of cash and deposits is around 16 percent on average, declining to around 11 percent from 1990 to today (Table). The shares of real estate and equities appear relatively stable at around 33 percent and 40 percent, respectively, with deposits and bonds complementary.

Table 1

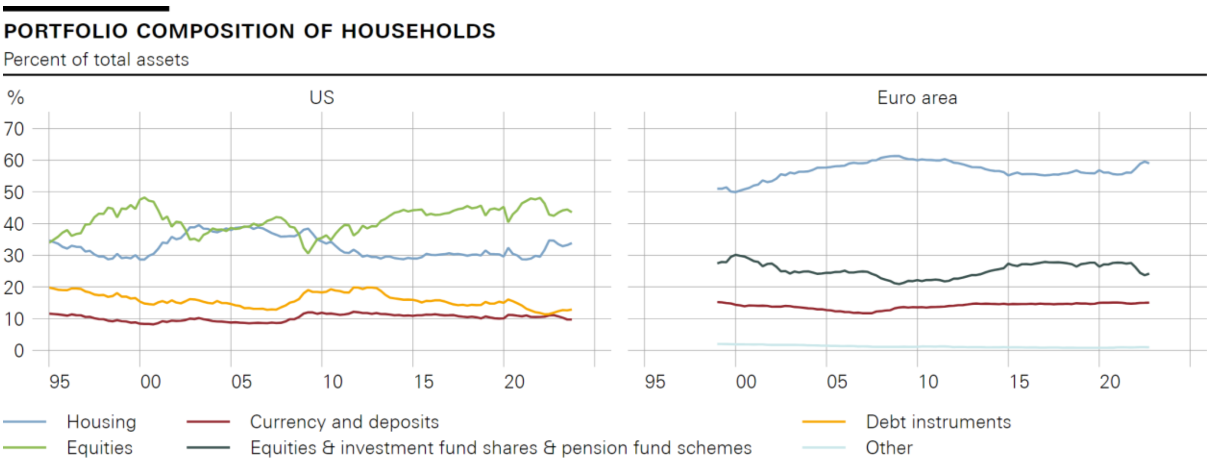
Long-term asset allocation of US households and non-profit organizations (in % of total assets).

	Residential real estate	Cash and deposits	Bonds	Equities
31.12.1951 – 30.09.2023	32.86	13.54	13.67	39.93
31.12.1951 - 31.12.1990	32.69	15.94	11.59	39.78
31.12.1990 - 30.09.2023	33.10	10.70	16.18	40.03

Source: IMA, Flow of Funds, FED, Hautle.

In figure 4 we extend the comparison to the euro area. We compare US and euro area (EA) households' portfolio composition in more detail over 1998-2023. Again, average portfolio compositions appear relatively stable. US households kept a third of their wealth in real estate, 11% in cash, 16% in bonds and 40% in equities (figure 4). Household portfolios in the EA showed similar stability (figure 4).[3]

Figure 4



Sources: IMA, Flow of Funds, FED, Euro Area Quarterly Sectoral Accounts. Notes: For the US, equities held directly or through investment funds are grouped under "equities". Until end-2023.

[3] For the EA, data availability does not allow for a 'fund of funds' perspective as in the case of the US in figure 4. If households hold shares of funds that in turn hold bonds or equities, these bonds and equities cannot be attributed directly to households but are kept separately.

4. Liquidity preference theory applied to the Covid deposit glut

The analytical sequence in LPT is that following any shock (such as the Covid deposit shock), liquidity preferences will lead to (re-)allocation of the new assets and liabilities to alternative uses as well as lead to creation and destruction of financial assets and liabilities. The resulting flows (or retractions) of financial liquidity drive asset prices.

Before discussing the sources of the Covid-related deposit glut and how households used them, we highlight our key finding. Portfolio stability held up also after the Covid shock. In the US, the portfolio share of deposit holdings increased by only around 1 percentage points from end-2019 to end-2020, and in the EA by a mere 0.1 percentage point over the same period. This suggests that the reallocation was rapid, in line with the observation that US equities needed less than 4 months to recover. Consequently, the strong increase in monthly growth rates of deposits did not result in comparable changes in portfolio composition data, i.e. in a higher deposit share in the overall portfolio, but in price changes.

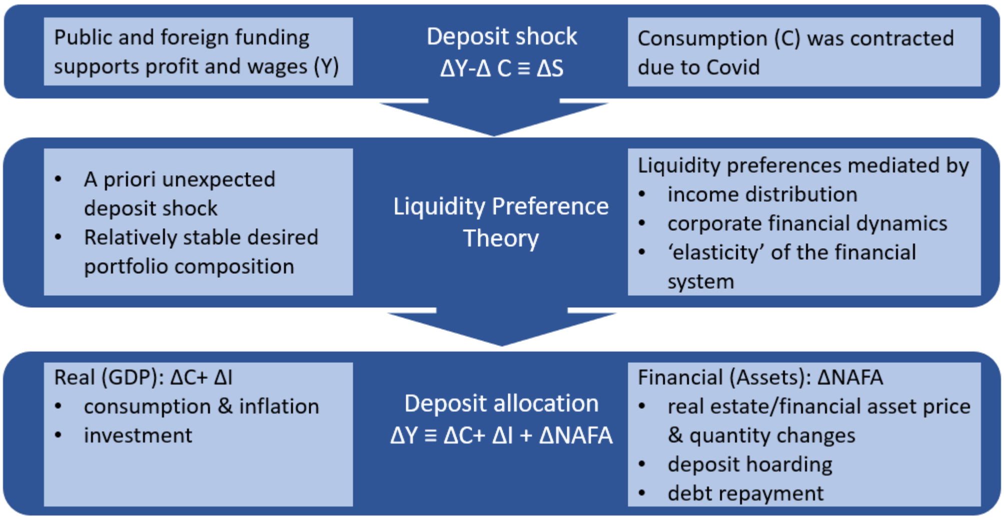
We illustrate the mechanism in more detail for the US case. Our data indicate the following (see previous section for the historical numbers): US households keep around 33% in real estate, 11% in deposits, 16% in bonds and 40% in equities over longer-term averages. If we look at end-Q4 2019 data, so just before Covid, US households held 29.6% in housing, 10.1% in deposits, 15.0% in bonds, 45.3% in equities. Hence, US households had a desired deposit-to-equity ratio of 10.1 to 45.3. If we now look at the deposit increase at US households, then these deposits increased by around 4 trillion from Q4 2019 to Q4 2021. Liquidity Preference Theory in its simplest form, with stable portfolio ratios as of Q4 2019, would predict additional equity holdings amounting to 45.3/10.1*4=17.9 trillion. Indeed, that was the approximate increase in the value of the equity holdings of households (in fact the increase was somewhat more, by 19.5 trillion).

While available data do not allow for a clear identification of causal relationships, these numbers tally with LPT implications. In the remainder of the paper, we will discuss the underlying flow of fund mechanisms, macroeconomic data and information supporting the hypothesis that LPT explains a significant part of the fast asset prices recovery after the Covid shock.

In applying LPT to the Covid deposit shock, it is helpful to start from the national-accounts macroeconomic framework illustrated in figure 5. In the appendix we also provide a balance-sheet representation of the process.

Figure 5

Deposit shock causes and consequences: conceptual scheme



Source: authors' own.

The top row in figure 5 shows that the Covid policy shock was two things at once: strongly contracting consumption (C) due to lockdowns, while profit and wages (jointly, incomes Y) held up better due to government support. Since macroeconomic saving (S) is defined as non-consumed income ($Y\text{-}C \equiv S$), both government support and contracted consumption resulted in soaring levels of households' (and firms') macroeconomic saving, initially in the form of deposits.

The possible uses of this glut can be traced using the macroeconomic equality that for each sector in any period, saving (S) is also identically equal to capital goods investment (I) plus net acquisition of financial assets (NAFA), or $S \equiv I + NAFA$. (e.g. Howells and Bain, 2014). Therefore, the increased savings of households (and firms) $\Delta S \equiv \Delta Y\text{-}\Delta C$ was allocated to changes in capital goods investment and changes in net acquisition of financial assets.

Combining these two equalities, it is implied that the government-supported income shock $\Delta Y \equiv \Delta C + \Delta I + \Delta NAFA$. This delineates the uses of deposits as (1) uses in the real sector in spending on consumption and investment ($\Delta C + \Delta I$), or (2) $\Delta NAFA$ occurring as hoarding, investment in financial and real estate assets, and debt repayment. Table 2 illustrates these general deposit use cases, where liquidity preferences determine the share that is hoarded, used to buy other assets, or used to repay debt.

Table 2

Different deposit destinations for households

Case	Household deposit use case
(1)	**ΔC + ΔI** **Consumption** or **investment** goods
(2)	**ΔNAFA** • **Hoarding** (precautionary savings, uncertainty…) • **Investment in (inelastic) assets**: financial (equities, bonds) or non-financial (housing, BTC) • **Debt repayment**

The resulting changes in deposits and other consequences for asset markets, inflation and activity are all driven by the allocation of the deposit glut. This allocation in turn is determined by liquidity preference, partly institutionalized in investment fund mandates. The impact is also mediated by income distribution, corporate financial dynamics and the 'elasticity 'of the financial system (Borio and Disyatat 2011), which implies positive feedbacks between asset prices on one hand and fresh borrowing plus capital inflows on the other hand. Like the macroeconomic multiplier which magnifies the growth impact of a euro or dollar of government spending, so a given inflow of savings into asset markets can elicit lending and liquidity creation by banks (and shadow banks), leading to further asset price changes.

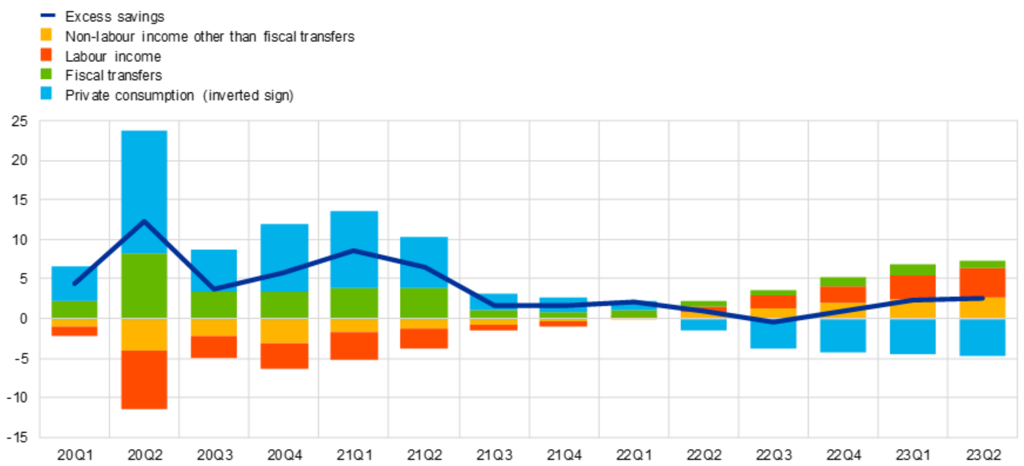
In the next sections, we investigate the sources of the deposit shock and the different uses of the deposit glut.

5. Sources of the deposit shock

Figure 6 shows excess savings of euro area households defined as the difference between the actual saving flows in each quarter and the pre-pandemic trend. The contribution of both government support and the relative reduction in private consumption to these excessive savings was pronounced in both 2020 and 2021. At the same time, year-on-year changes in labour incomes as well as other household incomes were negative. In other words, positive fiscal transfers to households and a reduction in consumption spending far outweighed the reductions in (non-)labour income, so that households' financial savings increased.

Figure 6

Quarterly excess savings in the euro area by source (% of household disposable income)

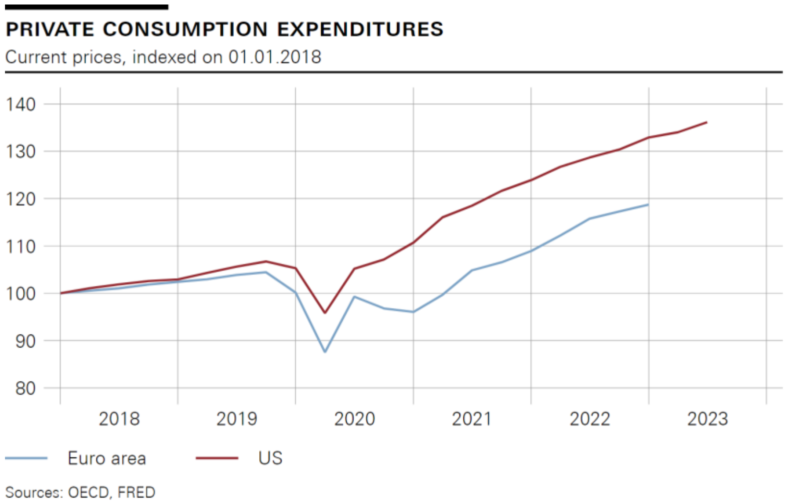


Source: Reprint from Battistini and Gareis (2023), based on Eurostat quarterly sectoral accounts.

Figure 7 shows that private consumption expenditures in the EA and US fell rapidly in early 2020. While the recovery in the EA was relatively slow and lasted more than a year, consumption expenditures in the US picked up more quickly and consumption growth was larger thereafter. Below we address possible reasons, including larger government support in the US compared to the EA and distributional aspects.

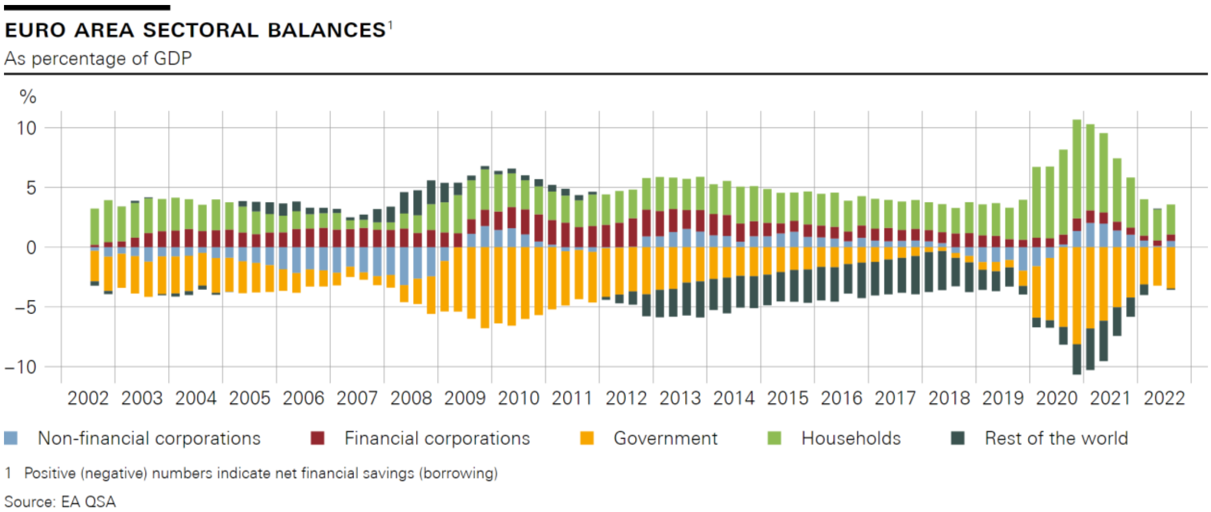
Note that in real terms, the divergence between US and EA is even larger than in nominal terms, in line with the more persistent inflation in the EA (see figure A2 in appendix). EA real consumption did not recover to the pre-pandemic level until summer 2022, then it stagnated at the 2019 level. US consumption caught up to the pre-pandemic level in the summer of 2021. By mid-2021 it had also returned to the pre-pandemic growth trend, reaching a 2023 level ten percent above the 2019 level.

Figure 7



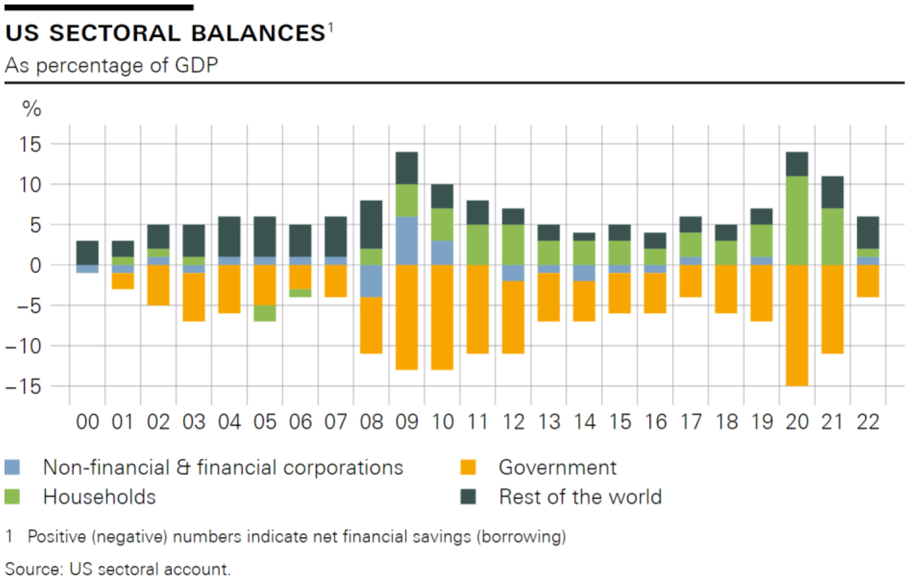
If a decline in consumption expenditures funded parts of the deposit glut, what else did? Figure 8 shows the extent of households' savings in the EA and its funding sources (see Koo, 2013, for a background on such sectoral balances). Both firms' and households' excess savings in the pandemic depended on public as well as foreign borrowing. Public borrowing, in turn, was to a significant part monetized by the central banks' asset purchase programs. Note that public borrowing in the EA reached not even 7 percent at its peak during the pandemic, only half of what the US government spent relative to GDP.

Figure 8



Indeed, figure 9 shows that, in 2020, the US government had a deficit of almost 15 percent of GDP, higher than the 13 percent in 2008. Part of this borrowing also supported EA private sector savings because the US was running a current account deficit and the EA a surplus. The government borrowing directly supported the pronounced increase in household saving of 11 percent of GDP. Klein (2023) reports that from January 2020 to January 2021, Americans saved 2.1 trillion dollars more than would have been expected based on pre-pandemic trends, due to lower consumption and government support.

Figure 9



Overall, households in the US could save more relative to GDP than those in the EA because public spending was relatively large, even outweighing the current account deficit. This unprecedented public support appears crucial in explaining the faster and larger consumption recovery in the US relative to the EA even while US households were *also* saving more. Their total income increase was larger, allowing for both more saving growth and more consumption growth.

However, when it comes to explaining the growth of deposits, what matters is government debt that has been monetized via the central bank, in addition to deposit growth resulting from commercial banks' balance sheet extension.[4] Here the EA leads. The faster growth in deposits relative to GDP in the EA can be explained by both (i) more public debt that has been monetized by the ECB, and (ii) banks' balance sheets increased more than in the US.

The ECB's balance sheet increased more relative to the increase in public borrowing than the balance sheet of the FED. In other words, while the US government borrowed and spent more, relatively less was monetized by the FED. The ECB balance sheet increased by EUR 4.9 trillion to EUR 8.6 trillion from 2019 to 2021, while EA government debt increased by only EUR 1.7 trillion. In the US, the FED's balance sheet increased by less than USD 3 trillion to USD 7 trillion at end-2021, while US public debt increased by more than USD 4 trillion.[5]

Moreover, US banks' aggregate balance sheets increase by only around USD 2 trillion, while EA banks' balance sheets grew by almost EUR 5 trillion from 2019 to 2021.

6. Uses of the deposit glut

We now consider the financial uses of the deposit glut (ΔNAFA in figure 5): (i) deposit hoarding, (ii) debt repayment, and (iii) real estate and financial investments leading to asset price and asset quantity changes.

As to **deposit hoarding**, figure 1 showed that the post 2019 excess deposit growth relative to GDP until this writing had not been fully balanced by below-trend growth. In the US, rebalancing started as deposit growth turned negative in 2022. However, hoarding would probably best me

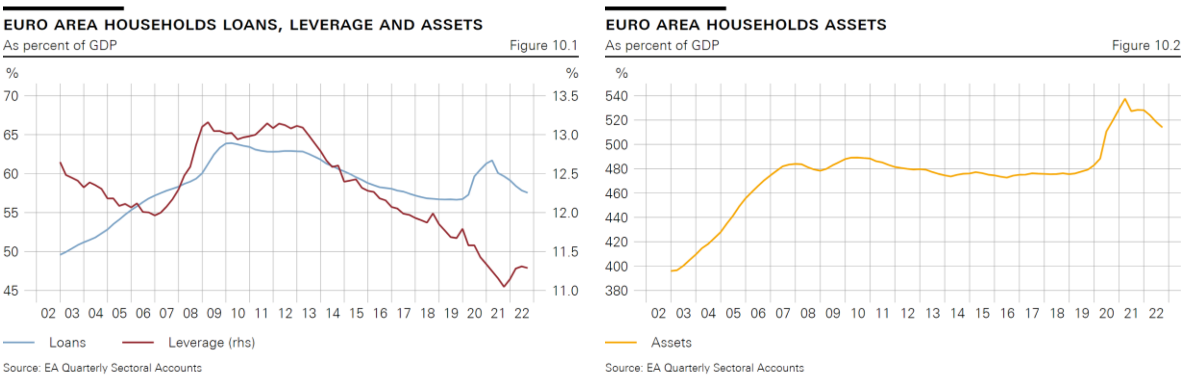
[4] Deficit spending does not automatically create new deposits.

[5] Data sources: FED, ECB, national accounting, via tradingeconomics.com.

measured by an increase in the share of deposits in total assets. This does not appear to be the case – respectively our data is not high frequent enough to measure such effects. Over 2020, the share of deposits in the US increased by 1 percentage point, and in the EA by 0.1 percentage points. So, either households were hoarding only temporarily, and then re-allocated their deposits, which we cannot measure, or they were not significantly hoarding at all.

Another use of the deposit glut consistent with liquidity preference is 'reflux' (Lavoie 1999; Lavoie 2014, 184; Cottin-Euziol et al 2022), i.e. the **repayment of debt** - or more generally, a reduction in the rate of borrowing. This is portfolio reallocation whereby debt is reduced at the expense of deposits. Figure 10 shows how after the great financial crisis 2007-2009, the pre-crisis asset market rally turned into a decade of decline and then stagnation in household asset values (figure 10.2) as household reduced their debt and borrowing both relative to their income and their assets (figure 10.1).

Figure 10



The Covid shock marked an abrupt break to this decade-long trend. EA household loans relative to GDP increased in the beginning of the pandemic due to the denominator effect of the V-shaped GDP collapse. Leverage decreased again from mid-2021.

Meanwhile household (deposit and other) assets soared steeply over 2020-2021, peaked in mid-2021 and did not fall back to previous levels (right-hand panel). The resulting decrease in household leverage was mostly driven by more assets and higher asset valuations, rather than less debt (Battistini and Gareis 2023).

Besides hoarding and debt repayment, a third possible use of the deposit glut is to **invest in asset markets**. This was the major way in which stability of liquidity preference held up during the Covid lockdowns and their aftermath. We used EA Quarterly Sectoral Accounts data and US flow of funds data to compute that over 2019Q4-2021Q4, one Euro or Dollar of additional monetary wealth was associated with non-monetary wealth worth six Euros or ten Dollars (see also Marsh 2023). In other words, in both jurisdictions, the share of money in total wealth was roughly stable, at 14% and 10% respectively, which is just their long-term value, even while there was an initial deposit shock of quite astonishing proportions. In the EA, for example, over this time horizon, deposits were up EUR 1 217 billion, equity and investment fund shares EUR 1 954 billion, pension fund schemes EUR 56 billion, other EUR 158 billion and housing EUR 5 086 billion.

As figure 1 shows, the strong rise in deposit growth was followed by an equally strong fall. Partly deposits were allocated to spending on consumption and investment on the bottom left in figure 5, which are GDP-components, so that GDP veered back and deposit growth relative to GDP came down. But deposits also and importantly went into asset markets, illustrated on the bottom right of the figure 5.

Indeed, the asset market inflow due to deposit reallocation appears notable in housing markets. After the post-crisis stagnation in house prices until 2014, the euro area house price index (2015=100) had increased by 20 per cent over 2014-2020 before the Covid support measures. This growth accelerated as another 20 percent growth was added from Q1 2020 to the peak at 146 in Q3 2022.

Why did households allocate deposits into asset markets rather than only to GDP-related spending (figure 5)? Low consumption spending relative to available deposits of the household sector has often been attributed to heightened uncertainty and lower product availability due to supply-chain and production bottlenecks. This could theoretically be the case for the lockdown years 2020 and 2021, but also afterward consumption growth remained notably smaller than asset price growth.

The degrees of income and wealth inequality matter to these allocation decisions. An increase in deposits to the upper income brackets and high-wealth individuals can lead to higher asset prices, given their lower propensity to consume out of additional income. In the US the support was more geared towards larger firms and therefore, towards their wealthy shareholders. The stock market boom was not a broad-based recovery but it was led by a few very large tech firms. And given its more unequal wealth distribution, the US asset market impact led to more capital income to the "affluent 10 percent" (Tooze 2021:151) that would not be spent on consumption, nor capital-goods investment.

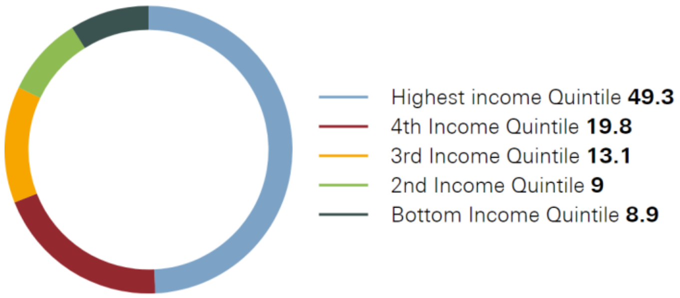
Conversely, an increase of deposits to non-asset owning households will result in more consumption, since lower-income households have higher marginal propensities to consume. The US, with *both* more high-wealth and more low-income households, saw a larger reallocation of deposits to assets and to consumption, and therefore less hoarding. This might also explain part of the figure 1 divergence in deposit holdings relative to GDP between the EA and the US (while the main factor, as discussed above, appears to be more fiscal spending in the US, leading to a faster recovery in consumption and GDP, while the EA spent less but, at the same time, so a relatively larger increase in (central) bank balance sheets, leading to higher deposit growth relative to GDP than in the US).

Battistini and Gareis (2023) use an experimental quarterly dataset integrating household finance and consumption surveys with the Eurosystem quarterly financial sector accounts. They define excess savings as change in household disposable income minus consumption, relative to pre-pandemic trends. They confirm that excess savings were mostly retained by richer households and spent by lower-income households (figure 11).

Figure 11

SHARES OF ACCUMULATED EXCESS SAVINGS BY INCOME QUINTILE

As second quarter of 2023



Source: Battistini and Gareis (2023) using Eurostat, ECB, Household finance and consumption survey.

Battistini and Gareis (2023) observe for euro area households:

> *"[Households] at the top of the income distribution are holding the bulk of the excess savings. While households in the top 20 percent (highest income quintile) own about half of total excess savings, the bottom 20 percent (bottom income quintile) own less than one tenth. This finding is consistent with research showing that richer households were less affected by income losses during the pandemic. The consumption behaviour of the top 20 percent also helps explain the relatively high level of excess savings."*

To add some German-specific evidence, Fratzscher (2021) noted in the German newspaper *Die Zeit* that:

> "In the first quarter of 2021, for example, companies in Germany listed on the Dax made the biggest profits of the past ten years. It is not uncommon for companies in Germany to have also taken advantage of state aid, sending their employees into short-time work with state assistance, while at the same time allowing shareholders to enjoy dividend payouts."

Even though top income households hold 'the bulk' of the excess savings, still the EA excess savings distribution is less skewed than is the case in the US. Klein (2023) noted in December 2023 that American households in the top 1% of the income distribution (with incomes of at least $1.2 million/year in Q3 2022) effectively held "almost the entire pool of "excess" cash".

Note that besides traditional investment classes, prices of other purely speculative instruments like Bitcoin have also increased rapidly during the pandemic. Bindseil and Schaaf (2024) mention temporary factors as well as criminal usages of Bitcoin as drivers behind the price surge. In line with the LPT, an overall rise in deposits would increase proportionally the demand for speculative assets.

Beyond the distributions of wealth and income, and beyond the (top-income-biased) form in which COVID related support was delivered in the US, there were other, structural factors that funneled deposits more quickly into asset markets in the US than was the case in Europe. After the initial share price plunge, the US price rally was longer and steeper, *doubling* share prices over the year 2020, while EA share prices initially rose by half until the fall of 2021, then peaked (figure 2). In the US, the COVID support landed in an economic system which had increasingly become a savings-reallocation machine, with liquidity channeled away from the bottom and middle incomes towards the top where it boosted share prices. Mian et al (2020) wrote about the ‘saving glut of the rich’ in the US, observing that

> *“[t]he high financial asset accumulation of U.S. Americans in the top 1% of the income or wealth distribution over the past 40 years has come from the dissaving by other households as well as the government sector”*

The reasons for this are structural. Also in the EA, but more strongly in the US economy, significant shareholder pressures exist for firms to increase profit and distribute it as payouts (dividends and buybacks). Given the market power gains of corporates in recent decades (Philippon, 2019; Eeckhout 2021), both profits and payouts have structurally increased. In addition, during the Covid shock, corporates combined market power with price information advantages to increase output prices more than costs, further increasing profits (Weber and Wassner 2023; ECB 2023).

Payouts are largely re-invested in existing financial assets, not into new issues, let alone into capital goods investment (Fried and Wang 2019). The evidence is that in 2014 in the US total shareholder payouts in the forms of dividend and share buybacks were more than $1.2 trillion, but as Mason (2015) reports, investors put less than $200 billion into the productive economy via IPOs and venture capital. Similarly, Fried and Wang (2019) report that for S&P 500 firms for the decade 2007-2016, payouts were $7 trillion while equity issuances totalled approximately $3.3 trillion, so that shareholder payouts had only partially returned to the productive sector via new issuances, (even assuming that production is what new issuances are used for).

Therefore, the structural rise in distributed profit is another element that helps explain reallocation of the increase in deposits towards asset markets via profits. And moreover, even retained profit within corporates is not necessarily invested in capital goods, as corporates invest increasingly in the financial markets. This after all helps ensure a steady income flow from financial assets (different from the more variable profit from operations), enabling corporates to satisfy shareholders’ increased quarterly payout expectations. For a large sample of nonfinancial US firms across industries, Davis (2016) finds that investment in financial assets increased from 28% of sales in 1980 to 45% of sales in 2014, while the volume of investment in capital goods declined from 23% of sales to 18% during the same period. Also, the same study found that financial assets and capital goods moved in tandem until 1980 but that this correlation disappeared after 1980 (in line with Mischke et al, 2022).

Combined, these pressures shifted deposit use within corporates away from capital goods investment (I) (and wages) and towards NAFA, benefiting the real estate and financial asset markets at the bottom right of figure 5. For instance, a recent U.S. Securities and Exchange Commission report shows that for reporting companies, capital expenditures (as percentage of market value) were higher in firms that did not repurchase their shares than it was in firms that did repurchase their shares in every year from 1983 to 2016 except 1999 (SEC 2020). Almeida et al (2016) study a large sample of firms between 1988 and 2010. They show that share repurchases made to increase earnings per share, were followed by reduced employment and capital investment.

An amplifying feedback operated. As more profits were channeled into dividends and therefore NAFA equity investments, this raised equity prices, and in a self-reinforcing loop, backward-looking expectations formation created expectations that more of profit would go as payouts into equity investments, in line with the dynamic described by Minsky (e.g., 1986, chapters 8 and 9).

In this way, non-bank corporate financial dynamics are a conduit for household deposits to be channeled into asset markets. With rising prices and profit, and increased payouts, the recovery in consumer spending was transformed into higher profits and then larger inflows into asset markets. This implied a reallocation of the government-financed liquidity injections towards the higher incomes, who hold most of the equity.

This analysis extends beyond the closed-economy framework. Capital inflows are the international part of non-bank corporate financial dynamics. The Covid shock was a positive shock to bond and equity markets in risk perceptions (and thus, liquidity preference) in foreign investment relative to US and EA investments. As noted, this led to reallocation of savings to the more liquid euro area and US asset markets, reinforcing the asset price increases there. The US, in contrast to the euro area, has been running persistent current account deficits. This means that foreigners are accumulating net claims on the US – and these claims are typically not held in deposits, but are invested into higher yielding assets like bonds and stocks (Varoufakis, 2015).

Moreover, the trend towards passive investment funds away from active funds might further strengthen the role of the LPT in contrast to real and behavioral asset pricing theories. From 2013 to 2022, passive investment funds increased their share in the global funds market from 19 percent to 38 percent.[6] This means that fewer and fewer investors are actively analyzing and monitoring individual stocks or bonds and are instead buying broad groups of instruments. As Dieckelmann et al (2024) observe for the euro area: “Passive investing may increase co-movement among stock returns, making markets more volatile.”

In this way, liquidity preference, income distribution and corporate financial dynamics help explain how a shock to deposits would increase inflows into real estate, equity, bonds and other asset markets – more than increasing GDP via investment and consumption.

The ’elasticity of the financial system’ (Borio and Disyatat 2011) implies that higher asset prices lead to more deposit creation by bank lending, and more liquidity creation generally – possibly with differences in price elasticity between produced and non-reproduced assets (Palley 2019). Recently also Rajan (2024) has highlighted ‘unintended consequences’ of monetary policy when there is ’an active financial system’. This points to the feedback from asset prices to borrowing and capital inflows, leading to more asset price rises - and so on. In this process bank and nonbank financial dynamics intersect and strengthen each other. Non-bank corporate financial dynamics leading to increased demand for equity, bonds and real estate induce more bank lending to support (leveraged) investment in equity, bonds and real estate, and more issuing of bonds and shares. In line with this, Sissoko (2023) has recently argued that private equity has never been private, but relied on the elasticity of the financial system, in particular loans from (big) banks. The boom in private equity is reflected in the fact that private equity firms, with the help of banks, now own firms worth 10-20% of US stock market capitalization.

The elasticity of the financial system depends on banking and financial market regulation, e.g. on how banks’ securities financing transactions business including Lombard loans is regulated, and also on monetary policy rates. If investors expect equity markets to increase by say 5 per cent, they are happy to pay 0.5 per cent on a Lombard loan, leveraging this portfolio. If, however, the cost of the additional money increases to 4 or 5 per cent, as has been the case in the US and EA since 2023, while safe government bond yields increase, leveraging an equity portfolio becomes less attractive.

[6] According to Morningstar data, https://www.morningstar.co.uk/uk/news/235711/a-world-without-active-funds-boring-and-maybe-dangerous.aspx

If equity issuance rises to meet the increased demand for assets that the covid shock created, then asset prices need not rise (elasticity of asset supply). And some of the additional financial investments by high-income households was indeed met by an increasing supply of financial instruments. Non-financial corporations raised USD 232 billion in the US and USD 110 billion in Europe (excluding the United Kingdom). Globally, both initial public offerings (IPOs) and secondary public offerings (SPOs) by non-financial companies in 2020 reached their highest values since at least 1990, at USD 826 billion. Also 2020 corporate bond issuance was at a record of USD 2.9 trillion (OECD 2021, chapter 4). Flore et al (2022) show that seasoned equity offerings (SEO) activity reached a 20 year high already in May 2020. As to the euro area, by the end of 2021 "the outstanding amount of euro area corporate bonds stood at more than €200 billion above its pre-pandemic level", Holm-Hadulla et al (2022) report. In the US, between January 1st and May 3rd 2020 a record USD 807 billion of US investment-grade corporate bonds were issued.

These numbers suggest that a large part of the excess EA households' savings of around Euro 1 trillion from 2019 to mid-2023 was absorbed into financial asset markets. But Covid-related spending was not the only reason. In addition, a combination of uncertainty, government guarantees, central bank purchase programs and financing needs can explain these levels of issuance. In its Secondary Market Corporate Credit Facility (SMCCF), the Federal Reserve from March 22 was buying corporate bond as well as exchange-traded funds (Federal Reserve 2024).

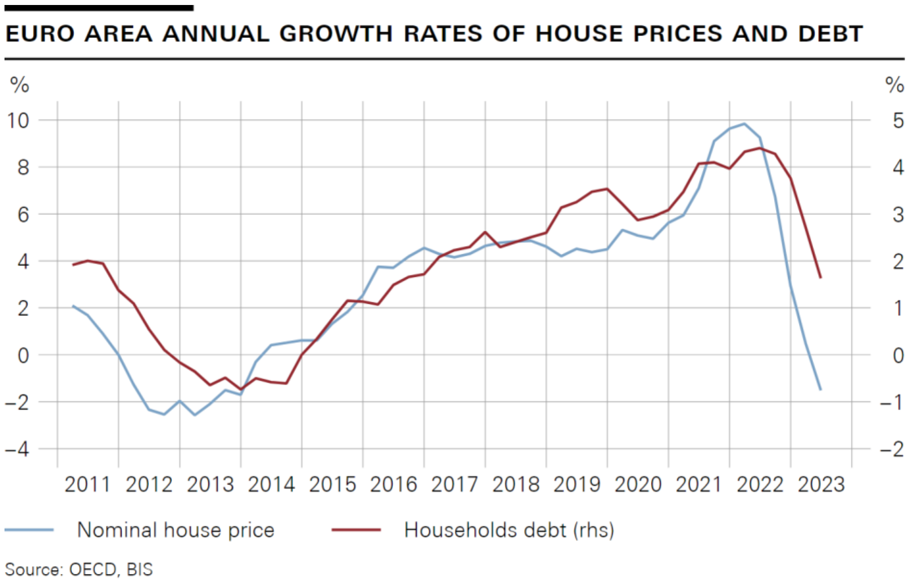
What is not visible in the sector-aggregate perspective used so far are purchases of assets within the household sector, including those that are financed with new bank credit. If household "A" purchases a house or bond from household "B" and borrows money from a commercial bank to do so, this transaction will not change the household sector's aggregate wealth situation. However, these transactions do affect prices – especially if supply is relatively price-inelastic.

As to real estate construction, this decreased in March 2020 as recession seemed to loom, but recovered quickly once government support was in place. In the US new privately owned housing units reached pre-pandemic levels in summer or autumn 2020 (US Census Bureau etc. 2023). But there was no increase in construction activity or in sales, comparable to equities and bonds. This is intuitive because on the one hand, public income support allowed home owners to avoid forced real estate sales. On the other hand, the Covid-related surge in financial savings was expected to be temporary, so that long-term income and consecutive construction activity, did not go up. But due to feedbacks between asset prices and borrowing, mortgage issuance and house prices can shoot up.

Figure 12 illustrates the dynamics of residential real estate prices and household mortgage borrowing in the EA. Covid happened during an upswing in the housing market in all EA countries. Leverage had been decreasing until 2015 and from then on it had been rising again, leading house price growth. Thanks to public spending support, the Covid lockdowns did not really dent house prices. Borrowing growth dropped precipitously but briefly in the first half of 2020, then recovered following its post-2015 trend. Only with the onset of monetary policy tightening in 2022, household debt growth declined again.

The literature on housing markets since the Great Financial Crisis has shown that financing (e.g. mortgage) inflows can increase house prices, without changes in housing supply, income, demographics or other 'fundamentals' (Duca et al, 2011, 2021; Favara and Imbs 2015; Hodula et al 2022). In this respect the housing market is just one other application of the importance of flow of funds analysis in understanding asset prices. As a result, house price growth rose steeply to almost 10 per cent on average in mid-2022, before rising interest rates made themselves felt. This EA average hides large country-level variation, with some countries experiencing years of double-digit house price growth (Tarne and Bezemer 2024). The elasticity of the financial system ran into the short-run inelastic supply typical of housing markets. Rising house prices and rising borrowing interacted to strengthen each other and so amplified the Covid support effect on both asset prices and debt growth. In this way Covid support maintained macroeconomic confidence, but at the cost of deepening the housing affordability crisis.

Figure 12



Our results are in line with Heimlicher (2025) who assesses the situation of Swiss households and finds that they have also invested their excess savings in equities and other assets:

> *"Swiss households accumulated substantial additional savings. This resulted from an unprecedented and involuntary decline in consumption concurrent with fiscal support that compensated households for their loss in income. Households accumulated between CHF 30 and 40 billion in savings in excess of what the pre-pandemic trend would have predicted. … I show that pandemic savings were primarily invested in equities and, to a lesser extent, debt securities."*

7. Concluding remarks

This paper has assessed two macrofinancial observations on the early 2020 Covid shock: excess household financial savings with exceptionally high deposit growth rates relative to GDP, and steeply rising asset prices, in times of low economic growth.

We suggested that Liquidity Preference Theory (LPT) is a helpful framework. LPT subsumes both fundamental and sentiment theories by charting the macrofinancial dynamics that first determine the level of financial savings and then determine portfolio allocations into deposit hoarding, debt repayment, and investments into financial assets and real estate. We showed empirically that liquidity preference, observed as the money share in household portfolios, appear remarkable stable. Households desire a relatively fixed share of deposits in their overall portfolio (EUR 1 or USD 1 deposit for EUR 6 resp. USD 10 other assets), in both the EA and the US.

The allocation of the deposit shock was mediated by income distribution, corporate financial dynamics and the price inelastic response of financial and real estate asset markets, combined with the elasticity of the financial system (Borio and Disyatat 2011; Gabaix and Koijen 2022). In times of high uncertainty and low economic growth in the EA, the deposit boom financed by the public and the foreign sectors, and monetized by central banks, so supported asset prices after portfolio adjustment. The purchase of assets and financial instruments beyond their issuance (inelastic asset markets) deserves special attention, because it has the potential to affect asset prices beyond what conventional rational market theories or sentiment pricing theories suggest.

More research is needed to decompose asset price changes into fundamental price effects, if any, sentiment factors and the portfolio reallocations that are the focus of this paper. More granular and higher-frequency data would be needed for proper identification. On the theoretical side, future research could embed different deposit uses into a dynamic macrofinancial model (see Lipton, 2016, and Senner and Sornette, 2018, for work in this direction). In particular, while this paper focused on households' consumption and households' financial investments, future research could analyse more in-depth how non-financial and financial corporates (non-bank financial intermediaries, NBFIs) use their deposits. Corporate savings are high by historical standards and not consistent with textbook models of saving households and borrowing entrepreneurs.

More generally, acknowledging a significant role for Liquidity Preference Theory has important implications for how regulators, academics and professionals, whose views often appear to be dominated by some version of the efficient market hypothesis, will regulate, assess and invest in financial markets.

References

Almeida, H., V. Fos, and M. Kronlund (2016), "The Real Effects of Share Repurchases", Journal of Financial Economics, 119(1), 168-185.

Barberis, N. and R. Thaler (2003), "A survey of behavioral finance", In: Handbook of the Economics of Finance, 1, 1053-1128.

Battistini, N. and J. Gareis (2023), "Excess savings: To spend or not to spend", ECB Blog, November 2, 2023, https://www.ecb.europa.eu/press/blog/date/2023/html/ecb.blog231102~66a04caa1e.en.html.

Bernanke, B. (2005), "The global saving glut and the U.S. current account deficit", Board of Governors of the Federal Reserve System (US), Speech 77.

Bibow, J. (2005), "Liquidity Preference Theory Revisited—To Ditch or to Build on It?", The Levy Economics Institute of Bard College Working Paper, (427).

Bindseil, U. and J. Schaaf (2024), "ETF approval for bitcoin – the naked emperor's new clothes", ECB Blog, February 2024, https://www.ecb.europa.eu/press/blog/date/2024/html/ecb.blog20240222~0929f86e23.en.html.

Bindseil, U. and R. Senner (2023), "Destabilisation of bank deposits across destinations: assessment and policy implications", ECB Working Paper no. 2887.

Bertocco, G. (2009), "The Relationship Between Saving and Credit from a Schumpeterian Perspective", Journal of Economic Issues, 43(3), 607-640.

Bonizzi, B. and A. Kaltenbrunner (2020), "Critical macro-finance, Post Keynesian monetary theory and emerging economies", Finance and Society, 6(1), 76-86.

Borio, C and P Disyatat (2011): "Global imbalances and the financial crisis: Link or no link?", BIS Working Papers, no 346, June. Revised and extended version of "Global imbalances and the financial crisis: reassessing the role of international finance", Asian Economic Policy Review, 5, 2010, 198–216.

Borio, C., B. Hofmann, and E. Zakrajšek (2024), "Money growth and the post-pandemic surge in inflation", Revue d'économie financière, forthcoming.

Bouchaud, J. P. (2022), "The inelastic market hypothesis: a microstructural interpretation", Quantitative Finance, 22(10), 1785-1795.

Brunnermeier, M. (2024), "American Finance Association Presidential Address", 5 January, San Antonio, Texas.

Bundesbank (2017), "The role of banks, non-banks and the central bank in the money creation process", Bundesbank Monthly Report, 24 April 2017.

Cottin-Euziol, E., H. Bougrine, and L. P. Rochon (2022), "The reflux phase in monetary circuit theory and stock–flow consistent models", European Journal of Economics and Economic Policies: Intervention, 1(aop), 1-16.

Dieckelmann, D., E. Siciliano, and A. Sowiński (2024), "Passive investing and its impact on return co-movement, market concentration and liquidity in euro area equity markets", ECB Financial

Stability Review, November 2024, https://www.ecb.europa.eu/press/financial-stability-publications/fsr/focus/2024/html/ecb.fsrbox202411_03~87408e7fb3.en.html.

Dillard, D. (1948), "The Economics of John Maynard Keynes: The Theory of Monetary Economy", Prentice-Hall, Inc., p. 14. ISBN 978-1-4191-2894-3.

Duca, J. and J. Muellbauer (2013), "Tobin LIVES: Integrating evolving credit market architecture into flow of funds-based macro-models", ECB Working Paper Series, No. 1581, August 2013.

Duca, J., J. Muellbauer, and A. Murphy (2011), "House Prices and Credit Constraints: Making Sense of the US Experience", Economic Journal, 121 (552), 533-551.

Dutta, S. J., R. Kremers, F. Pape, and J. Petry (2020), "Critical macro-finance: An introduction", Finance and Society, 6(1), 34-44.

ECB (2023), "Financial Stability Report", May 2023.

Favara, G. and J. Imbs (2015), "Credit supply and the price of housing", American Economic Review, 105(3), 958-92.

Federal Reserve (2024), "Secondary Market Corporate Credit Facility", https://www.federalreserve.gov/monetarypolicy/smccf.htm.

Fisher, I. (1930), "The Theory of Interest", The Macmillan Company, New York.

Flore, C., M. Zenzius, and D. Schiereck (2022), "Tough times for seasoned equity offerings: performance during the COVID pandemic", Journal of Business Economics, 92, 1491–1510.

Foellmi, R., N. Isaak, P. Jäger, T. Schmidt, and P. Seiler (2021), "Ursachen und Wirkungen der Tiefzinsphase – Eine empirische Analyse mit Mikro- und Makrodaten", Grundlagen für die Wirtschaftspolitik, Nr. 26, Staatssekretariat für Wirtschaft SECO, Bern, Schweiz.

Fratzscher, M. (2021), "Milliardäre sind die Pandemiegewinner", Die Zeit, May 20, 2021.

Fried, J. and C. Wang (2019), "Short-Termism and Capital Flows", The Review of Corporate Finance Studies, 8(1), 207–233.

Friedman, M. (1970), "The Counter-Revolution in Monetary Theory", IEA Occasional Paper, No. 33, https://miltonfriedman.hoover.org/internal/media/dispatcher/214480/full.

Gabaix, X. and R. S. Koijen (2021), "In search of the origins of financial fluctuations: The inelastic markets hypothesis", NBER Working Paper, No. w28967.

Gabor, D. (2020), "Critical macro-finance: A theoretical lens", Finance and Society, 6(1), 45-55.

Godley, W. and M. Lavoie (2007), "Monetary Economics: An Integrated Approach to Credit, Money, Income, Production, and Wealth", Palgrave Macmillan.

Gormsen, N. J. and R. S. J. Koijen (2023), "Financial markets and the COVID-19 pandemic", Annual Review of Financial Economics, 15, 69-89.

Heimlicher, F. M. (2025), "Lifting the veil on the pandemic savings of Swiss households", SNB Economic Note, No. 1/2025, https://www.snb.ch/en/publications/research/economic-notes/2025/economic_note_2025_01.

Hodula, M., Melecký, M., Pfeifer, L., & Szabo, M. (2022), "Cooling the Mortgage Loan Market: The Effect of Recommended Borrower-Based Limits on New Mortgage Lending." Czech National Bank WP 3/2022.

Holm-Hadulla, F., Musso, A., Nicoletti, G., & Tujula, M. (2022), "Firm Debt Financing Structures and the Transmission of Shocks in the Euro Area." ECB Economic Bulletin, Issue 4/2022 https://www.ecb.europa.eu/pub/economic-bulletin/articles/2022/html/ecb.ebart202204_02~b35a8321b7.en.html.

Howell, M. J. (2020), “Capital Wars: The Rise of Global Liquidity”, New York: Palgrave Macmillan.

Howells, P., & Bain, K. (2014), "The Role of a Financial System." In Economics of Money, Banking and Finance: A European Text. FT-Prentice Hall.

Kahneman, D., Slovic, P., & Tversky, A. (1974), “Judgment Under Uncertainty: Heuristics and Biases”, Cambridge University Press.

Keynes, J. M. (1930), “A Treatise on Money”, The collected writings of John Maynard Keynes, Cambridge University Press.

Keynes, J. M. (1936), “The General Theory of Employment, Interest, and Money”, Palgrave Macmillan.

Keynes, J. M. (1972), “Collected Writings Volume VII”, In: The collected writings of John Maynard Keynes, 30 Volumes, General editors Donald E Moggridge and Elizabeth S Johnson, London: Macmillan and New York: Cambridge University Press for the Royal Economic Society.

Kohlrausch, B., Zucco, A., & Hövermann, A. (2020), "Verteilungsbericht 2020: Die Einkommensungleichheit Wird Durch Die Corona-Krise Noch Weiter Verstärkt." WSI-Report, Nr. 62.

Koo, R. C. (2013), "Balance Sheet Recession as the 'Other Half' of Macroeconomics." European Journal of Economics and Economic Policies, 10(2), 136-157.

Davis, L. (2016), "Identifying the 'Financialization' of the Nonfinancial Corporation in the U.S. Economy: A Decomposition of Firm-Level Balance Sheets." Journal of Post Keynesian Economics, 39(1), 115-141.

Lavoie, M. (1999), "The Credit-Led Supply of Deposits and the Demand for Money: Kaldor’s Reflux Mechanism as Previously Endorsed by Joan Robinson." Cambridge Journal of Economics, 23(1), 103-114.

Lavoie, M. (2014), “Post-Keynesian Economics: New Foundations”, Edward Elgar.

Lindner, F. (2015), "Does Saving Increase the Supply of Credit? A Critique of Loanable Funds Theory." World Economic Review, 4, 1-26.

Lipton, A. (2016), "Modern Monetary Circuit Theory, Stability of Interconnected Banking Network, and Balance Sheet Optimization for Individual Banks." International Journal of Theoretical and Applied Finance, 19(6), 1650034.

Lunsford, K. G., & West, K. D. (2019), "Some Evidence on Secular Drivers of US Safe Real Rates." American Economic Journal: Macroeconomics, 11(4), 113-139.

Marsh, C. (2023), "Lessons from the Great Reflation: Monetary Policy Is Under the Cosh. Where Did It All Go Wrong?" Money: Inside and Out Blog Post. February 3, 2023, https://moneyinsideout.exantedata.com/p/lessons-from-the-great-reflation.

Mason, J. W. (2015), "Understanding Short-Termism." Washington: Roosevelt Institute.

Mian, A. R., Straub, L., & Sufi, A. (2020), "The Saving Glut of the Rich." National Bureau of Economic Research Working Paper No. 26941.

Minsky, H. P. (1986), “Stabilizing an Unstable Economy”, New York: McGraw-Hill.

Mischke, J., Windhagen, E., White, O., Woetzel, J., Smit, S., Birshan, M., Kemeny, S., & Sanchez Cumming, J. (2022), "Global Balance Sheet 2022: Enter Volatility." McKinsey Global Institute Discussion Paper.

Mischke, J., White, O., Windhagen, E., Woetzel, J., Birshan, M., Smit, S., & Govindarajan, A. (2023), "The Future of Wealth and Growth Hangs in the Balance." McKinsey Global Institute Discussion Paper, May 2023.

OECD (2021), “The Future of Corporate Governance in Capital Markets Following the COVID-19 Crisis”. Corporate Governance Report. OECD Publishing, Paris. https://doi.org/10.1787/efb2013c-en

Palley, T. I. (2019), "The Fallacy of the Natural Rate of Interest and Zero Lower Bound Economics." Review of Keynesian Economics, 7(2), 151-170.

Palley, T. (2023), "The Theory of Monetary Disorder: Debt Finance, Existing Assets, and the Consequences of Prolonged Monetized Budget Deficits and Ultra-Easy Monetary Policy." FMM Working Paper 93.

SEC (2020), "Negative Net Equity Issuance." SEC Report, sec.gov/files/negative-net-equity-issuance-dec-2020.pdf.

Senner, R., & Sornette, D. (2018), "A Simple Model of Financial Crises: Household Debt, Inequality and Housing Wealth." https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3176904

Senner, R., & Sornette, D. (2019), "The Holy Grail of Cryptocurrencies: Ready to Replace Fiat Money?" Journal of Economic Issues, 53(4), 966-1000.

Sissoko, C. (2023), "'Private' Equity Is a Misnomer: Government Support Has Been Driving the Restructuring of US Corporate Structure and the Transfer of Wealth to Buyout Firms Over the Past 40 Years", available on SSRN, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4547079.

Shabani, M., & Toporowski, J. (2015), "A Nobel Prize for the Empirical Analysis of Asset Prices." Review of Political Economy, 27(1), 62-85.

Tarne, R. & Bezemer, D. (2024), “Roof or Real Estate? An Agent-Based Model Of Housing Affordability in the Netherlands”, available at SSRN: https://ssrn.com/abstract=4697070 or http://dx.doi.org/10.2139/ssrn.4697070.

Tily, G. (2012), “Keynes’s monetary theory of interest”, BIS Papers No 65, 51-81, https://www.bis.org/publ/bppdf/bispap65c_rh.pdf.

Tobin, J. (1969), "A General Equilibrium Approach to Monetary Theory." Journal of Money, Credit and Banking, 1(1), 15-29.

Tooze, A. (2018), " Framing Crashed II: 2008, the Crisis of the National Macroeconomics and the “Revolution” of Macrofinance.", Blog article, July 5th 2018, https://adamtooze.com/2018/07/05/framing-crashed-ii-2008-the-crisis-of-the-national-macroeconomics-and-the-revolution-of-macrofinance/.

Tooze, A. (2021), "Shutdown: How Covid Shook the World's Economy", Viking.

Toporowski, J. (2000), "The End of Finance: Capital Market Inflation, Financial Derivatives and Pension Fund Capitalism", Routledge.

U.S. Census Bureau and U.S. Department of Housing and Urban Development (2023), New Privately-Owned Housing Units Started: Total Units [HOUST], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/HOUST, December 21, 2023.

Varoufakis, Y. (2015), "The global Minotaur: America, Europe and the future of the world economy", Bloomsbury Publishing.

Appendices

Appendix A.I Additional figures

Figure A1

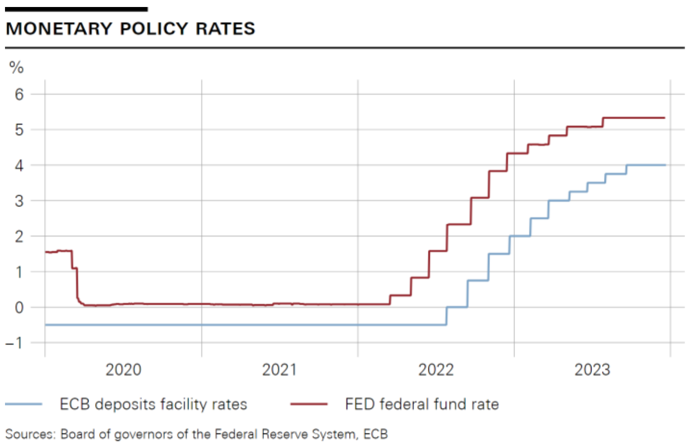
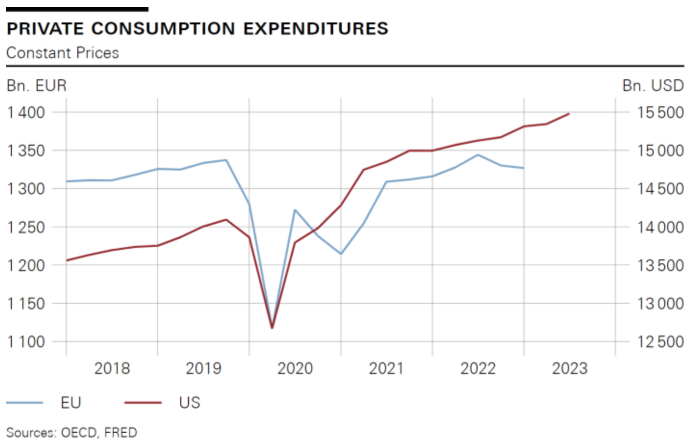


Figure A2



Appendix A.II A flow of funds representation

For each different deposit use case discussed in section 4, it is worth keeping the accounting relationships in mind. Table A1 explores which actors are involved and how the deposit shock and the associated fund flows affect their balance sheets.

Table A1

Combined balance sheets and flow of funds in a closed system

Household (HH)			
Deposits Bank	X **-A -B -D**	Equity	X
GDP goods	X **+A**	Loans with Bank	X **-D**
In real terms	*x* ***(+a1) (+a2)***		
Non-GDP investments	X **+B**		
# NFC shares	*x* ***(+b1)***		
# IF shares	*x* ***(+b2)***		
Non-Financial Corporation (NFC) which sells GDP-goods or issues new shares			
Deposits Bank	X **+A (+B1)**	Equity	E **(+B1) (+ΔP2 * E)**
GDP-relevant goods	X **-A**	*# NFC shares outst.*	*x* **(+b1)**
In real terms	*x* ***(+a1-a1) (-a2)***		
Assets	X **(+ΔP2 * E)**		
Mixed Investment Fund (IF) which invests in deposits and securities			
Deposits Bank	X **(+B2)**	Equity	X
Equities	X **(+ΔP2 * E)**	Shares (nom.)	S **(+B2+ΔP2 * E)**
# NFC *shares*	x	*# IF shares outst.*	*x* ***(+b2)***
Bank			
Loans to HH	X **-D**	Deposits HH	X **+A -B -D**
		Deposits NFC	X **+A (+B1)**
		Deposits IF	X **(+B2)**

Table A1 is a system of accounts where assets of the individual actors are shown on the left and their liabilities on the right. Aligned with the taxonomy of the paper, we show four types of balance sheet changes, some with associated payment flows (spending, investing and loan repayment) and some without associated payment flow (deposit hoarding and valuation gains). In the balance sheet we also include in parentheses payment flows "1" or "2", which signify increases in quantities and increases in prices, respectively. For instance "(+a1)(+a2)" signifies increased spending on output (a1) at constant prices, while (a2) indicates a constant level of spending at increased prices. Here "(+a1)(+a2)" indicates that total spending is a mix of flows of types "1" and "2". This distinction will aid the analysis later on.

Starting in the first row of the table, entry (**A**) is spending on consumption or investment goods. This is the classical use case of deposits. Deposits are redistributed across sectors and entities, without changes in the amount of overall deposits. Nominal GDP grows, either because of an increased supply of real goods at constant prices ***a1*** or due to rising prices at constant transaction volumes ***a2*** (so that in real terms a2<a1)

Second, **(B)** is financial investment in assets or real estate (or Bitcoin, art, or any other form of wealth). This portfolio reallocation from deposits towards other asset classes does not in and of itself change spending and GDP. In case **b1** the payment flow is absorbed by quantity adjustment (e.g. new equities issuance or new real estate construction) at constant asset prices.

In case **b2** markets are inelastic and asset prices rise by **ΔP2** in response to the additional demand. This might be due, for instance, to the investment fund's rigid asset allocation rules (Gabaix and Koijen 2021), or to real estate supply constraints. In the new equilibrium, the investment fund holds the deposits with the bank, the household holds the firms' shares at higher valuations of **(+ΔP2 * E).** Note that new real estate construction is covered in case A and is not part of this case, because such investments are GDP-relevant.

Third, in the case of deposit hoarding (**C**), households keep their deposits in the bank account. This might be due to perceived uncertainty, lack of investment opportunities, or in preparation for future investments. No financial flows are associated with case (C). Fourth, case (**D**) is deposit absorption though loan repayments, which destroys the deposit.

For tractability, we do not discuss asset purchase from or by (central) banks, nor deposit transfer between banks or from banks into central bank money (see Bindseil and Senner, 2023, for this).

In the following, we summarize the different deposit use cases of households and their implications for financial stability, economic development and asset prices (cf. table A2).

Case A: The purchase of GDP-relevant goods and services can enhance economic development, also improving fundamentals for asset prices, if the economy is demand-constraint, i.e. if the economy has spare capacity. If, however, the economy is supply-constraints, or at least in certain sectors, the deposit flows into consumption goods and services can be inflationary, with ambiguous effects on economic development, stability and asset prices, depending on how the deposits and the spending is distributed. If, for example, wages in certain sectors rise following the increased demand, certain households' nominal income increases so that they could improve their balance sheets by lowering debt levels, while other households' real income could decline as well as their debt service capacity.

Table A2

Implications of the different deposit use cases of households for financial stability, economic development and asset prices

Deposit uses and implications		**Financial stability**	**Economic development**	**Asset prices**
A Purchase of GDP-relevant consumption or investment goods	A1: increased supply	↑	↑	↑ (via fundamentals)
	A2: inflationary	↑↓ (depends on distribution)	↑↓ (depends on distribution)	↑↓ (depends on distribution)
B Investment into financial assets or real estate	B1: new issuance	↑	↑	→
	B2: inelastic market	↓	↓	↑
C Deposit hoarding		↓	↓→	↓→
D Deposit absorption though loan repayments		↑ ↓ (balance sheet recession)	↑ (if debt overhang) ↓ (balance sheet recession)	↑ (if other borrowers) ↓ (if balance sheet recession)

Case B: If households reduce consumption spending in relative terms and instead desire to increase the stock of non-money financial assets, such as equities and bonds, bank deposits are transferred from one party to another. Therefore, bank deposits are reallocated, total bank deposits do not change, and bank credit supply is not directly affected. However, ceteris paribus, an increase in demand for assets will increase prices (**case B2**), so that long-term bond yields, for example, could decrease. Mutatis mutandis, lower interest rates on the bond markets could also reduce banks' funding costs, so that they in turn lower their lending rates. Moreover, higher demand for bonds and equities might increase corporate investment spending through higher issuance of instruments (**case B1**), which in turn could reduce the output gap, increase inflationary pressures and motivate the central bank to tighten monetary policy. Depending on the financial market structure and macroeconomic environment, companies could also engage in share buybacks financed by cheap bonds, for example, to boost management compensation. In response to declining consumption by high savers without offsetting corporate spending, the central bank might cut interest rates to boost inflation and growth. Overall, in this case, interest rates could rise, fall or remain constant, depending on a variety of factors such as capital market regulation, corporate financing or labor market policies.

Friedman (1970, 11-12) acknowledges the Liquidity Preference Theory, but neglects case B2 where higher financial investment do not lead to higher economic activity, a phenomenon that can be very long-term (Mischke et al, 2022), and instead assumes that case B2 is always temporary and eventually transforms into case B1:

> "… the liquidity effect stressed by Keynes, is an effect on the balance-sheet, not on the income account. An increased rate of monetary growth, whether produced through open-market operations or in other ways, raises the amount of cash that people and businesses have relative to other assets. The holders of the now excess cash will try to adjust their portfolios by buying other assets. … as people attempt to change their cash balances, the effect spreads from one asset to another. This tends to raise the prices of assets and to reduce interest rates, which encourages spending to produce new assets and also encourages spending on current services rather than on purchasing existing assets. That is how the initial effect on balance-sheets gets translated into an effect on income and spending."

Note that while the LPT has monetarist flavor in the sense that the money stock matters, the theory does not imply any stable relationship between money and inflation. See Senner and Sornette (2019) for a more detailed discussion of consumer price theories.

Case C: Deposit hoarding is almost exclusively bad for financial stability, economic development and asset prices, because less money is in circulation that could increase output or stabilize/increase prices of assets.

Case D: The recent literature on optimal debt levels often assumes some kind of curve with an optimal debt level. If this was somehow true, than a reduction of too high debt levels could be good for financial stability and economics development. Too little debt, as well as in particular the desire to reduce debt levels collectively in times of asset pricing stress has the potential to increase instability and lower growth significantly (balance sheet recession).

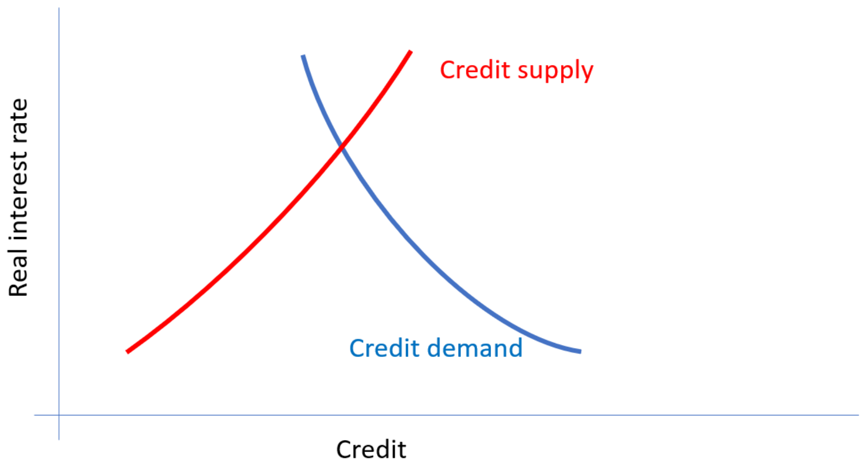
Appendix A.III Deposit glut and macroeconomics modelling

A deposit glut, i.e. the excess financial savings of households, directly fits in with the LPT which relies on a monetary representation of the economy with fundamental uncertainty. In neoclassical models, such a phenomenon is not inherently representable.

Neoclassical models typically rely on loanable funds. A loanable funds model, in its simplest form, uses a universal good for consumption, investment and means of finance, the so-called 'corn model' originating with Adam Smith (Bertocco 2009). Credit money is not present in the model and real savings (non-consumed goods, i.e. capital goods) are equated to financial savings, which play no independent role. Savings are conceptualized as the all-purpose good called "loanable funds", waiting to be lent out. Interest rates are determined by the supply of credit (identical to the supply of savings) and the demand for credit (identical to the demand for investments). Interest rates decline when the supply of credit increases or the demand for credit decreases. In other words, interest rates adjust to balance the supply and demand for loanable funds (Figure A3).

Figure A3

Interest rate change in a loanable funds model, without financial assets, in line with e.g. Foellmi et al (2021).



Among the factors affecting the supply and demand for credit, the academic literature highlights demographic change as one of the most important drivers. If demographic change leads to an increase in the propensity to save and thus in the supply of funds, the interest rate will fall. Empirical support for this theory is provided, for example, by the evidence that the proportion of 40- to 64 year-olds in the population is negatively correlated with the real rate of interest (Lunsford and West 2019), which is however little convincing as we will see below.

In loanable funds models, "hoarding" would be reflected in a higher supply of the all-purpose good that is saved, lowering interest rates, and increasing investment. This result differs once we consider models that reflect the actual functioning of monetary economies.

In a monetary model, the rate of interest depends on banks' behavior and the policy of the central bank. The short-term interest rate is set by the central bank, taking into account inflation, and other outcomes such as growth, distribution, employment, sustainability depending on its mandate and the interpretation of the mandate. Long-term interest rates are influenced by short-term rates plus a variety of other factors subsumed in the Liquidity Preference Theory. Thus, interest rates are not primarily determined in a commodity-like market as in loanable funds models.

Moreover, in monetary models, it is recognized that ultimate savers and ultimate borrowers do not interact; credit markets are primarily served by banks. Banks extend credit and thereby create new deposits. The banking system does not need pre-existing savings, such as those from an aging population, to lend (Lindner 2015; Bundesbank 2017). Bank lending rates are influenced by various elements, including the stance of monetary policy. The extent to which monetary policy is transmitted to bank lending rates depends on a number of factors including the macroeconomic environment, financial market structure, the state of expectations in the financial markets and banking system characteristics like capital and liquidity buffers.

In such a modeling environment, the effects of hoarding by some “high savers” can be illustrated as follows: hoarding savers want to spend less of their disposable income and keep an increasing share of their income in cash. Ceteris paribus, i.e., abstracting from macroeconomic effects that might simultaneously lower the disposable income of high savers, bank deposits in the economy shift toward high savers and away from other actors, such as the public sector, firms and non-hoarding households. The overall amount of deposits in the banking system has not changed, nor the total capacity/supply of the banking system to lend (i.e. to create money). However, it is likely, that other actors who experience liquidity shortages due to the hoarding by savers might take out more loans.

Hoarding, then, does not as a rule enable banks to grant more credit and therefore does not necessarily increase the credit supply. Mutatis mutandis, the behavior of high savers to increase their cash balances by cutting spending leads to lower incomes and less money in other sectors of the economy. If this indirect effect, also known as the paradox of thrift, is strong enough, the lower purchasing power leads to a decline in demand. This would reduce investment (and therefore money creation), economic growth and inflationary pressures, so that the central bank could eventually lower short-term interest rates in an attempt to raise inflation. Fiscal policy could potentially counteract the spending cuts of high savers, stabilize employment and inflation, and thus leave the stance of monetary policy unchanged. Overall then, the effects of hoarding depend on a variety of factors and, in any case, does not appear to be purely non-monetary, as if saving is a structural process that is independent of banking or fiscal policy.

Recent SNB Working Papers

2025-05 Dirk Bezemer, Richard Senner:
Asset pricing and the Covid-19 deposit glut: an application of Liquidity Preference Theory

2025-04 Lukas Altermatt, Hugo van Buggenum, Lukas Voellmy:
Money creation in a neoclassical economy: equilibrium multiplicity and the liquidity trap

2025-03 Filippo Cavaleri, Angelo Ranaldo, Enzo Rossi:
The demand for safe assets

2025-02 Marius Faber, Kemal Kilic, Gleb Kozliakov, Dalia Marin:
Global value chains in a world of uncertainty and automation

2025-01 David Borner:
Central bank information and pure monetary policy surprises in Switzerland

2024-13 Aurel Ruben Mäder, Matthias Jüttner, Daniel Gatica-Perez:
You are how you pay: understanding and identifying the payment behavior of sociodemographic groups

2024-12 Francesco Audrino, Jessica Gentner, Simon Stalder:
Quantifying uncertainty: a new era of measurement through large language models

2024-11 Marc-Antoine Ramelet, Anna Zeitz:
Oil price shocks and household heterogeneity: the income side

2024-10 Jayson Danton, Terhi Jokipii:
A decade of low interest rates: impact on Swiss bank profitability

2024-09 Anders Brownworth, Jon Durfee, Michael Junho Lee, Antoine Martin:
Regulating decentralized systems: evidence from sanctions on Tornado Cash

2024-08 Valentin Grob, Gabriel Züllig:
Corporate leverage and the effects of monetary policy on investment: a reconciliation of micro and macro elasticities

2024-07 Thomas Nitschka:
Evidence on the international financial spillovers of the New York Bankers' Panic of 1907

2024-06 Milen Arro-Cannarsa, Rolf Scheufele:
Nowcasting GDP: what are the gains from machine learning algorithms?

2024-05 Jessica Gentner:
The role of hedge funds in the Swiss franc foreign exchange market

2024-04 Tobias Cwik, Christoph Winter:
FX interventions as a form of unconventional monetary policy

2024-03 Lukas Voellmy:
Decomposing liquidity risk in banking models

2024-02 Elizabeth Steiner:
The impact of exchange rate fluctuations on markups – firm-level evidence for Switzerland

2024-01 Matthias Burgert, Johannes Eugster, Victoria Otten:
The interest rate sensitivity of house prices: international evidence on its state dependence

2023-08 Martin Brown, Laura Felber, Christoph Meyer:
Consumer adoption and use of financial technology: "tap and go" payments

2023-07 Marie-Catherine Bieri:
Assessing economic sentiment with newspaper text indices: evidence from Switzerland

2023-06 Martin Brown, Yves Nacht, Thomas Nellen, Helmut Stix:
Cashless payments and consumer spending

2023-05 Romain Baeriswyl, Alex Oktay, Marc-Antoine Ramelet:
Exchange rate shocks and equity prices: the role of currency denomination

SCHWEIZERISCHE NATIONALBANK
BANQUE NATIONALE SUISSE
BANCA NAZIONALE SVIZZERA
BANCA NAZIUNALA SVIZRA
SWISS NATIONAL BANK