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Is the quantity of money informative for future inflation? The Swiss case

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Indicators based on money in the hands of the public have fallen somewhat out of fashion for monetary policy analysis. The reason is the instability of money demand that was observed in many advanced economies in the 1990s and 2000s. In this note, I show that a careful assessment of monetary developments can still be informative about potential medium-term inflationary pressures in Switzerland.

Money in the hands of the public includes cash and deposits held at commercial banks. The total of this money is measured by so-called broad monetary aggregates. For example, a household's bank account at a cantonal bank is part of broad money. Because the public uses money to purchase goods and services and because the demand for these goods and services in turn affects prices and incomes, the quantity of broad money can matter for inflation.

Broad money is largely supplied by the banking sector. When commercial banks issue loans, they also create money by crediting customers' bank deposits. Credit and money supply are influenced by interest rates and, thus, by monetary policy. After the end of the Bretton Woods system of fixed exchange rates in 1973, the Swiss National Bank (SNB) introduced an annual growth target for monetary aggregates. This target came with an implicit annual consumer price inflation objective of approximately one percent (see Jordan et al., 2010).

In 1999, the SNB stopped using monetary aggregates as intermediate targets for price stability. The communication challenges associated with monetary targets, as well as the advantages of considering a broader set of information, compelled the SNB to instead adopt a new monetary policy strategy. This strategy consists of three elements (see SNB Annual Report, 2024). The first element specifies what the SNB understands by price stability, i.e., an annual change in the Swiss consumer price index that lies between 0% and 2%. The second element refers to the conditional inflation forecast as the main indicator for monetary policy

and as a central instrument of communication. The third element describes how the SNB implements its monetary policy by influencing the interest rate level and the exchange rate.

Other central banks also stopped relying on broad money in monetary policy analysis, mainly reflecting episodes of money demand instability. For example, the demand for the monetary aggregate that used to guide the monetary policy of the Federal Reserve showed signs of instability in the early 1990s, as it was difficult to explain the low demand for certain types of bank accounts given the growth in other investment vehicles such as bond mutual funds (see Duca, 1992). Money demand in the euro area was also subject to instability in the 2000s (see European Central Bank, 2010).

It is sometimes claimed that the empirical link between monetary aggregates and inflation has weakened since the 2000s. However, Reynard (2007 and 2023) and Kugler and Reynard (2022) provide evidence that this relationship is still useful for monetary policy analysis. This note illustrates these results for Switzerland.

Linking money to inflation

One way to explicitly link money to inflation is the so-called quantity theory of money. According to this theory, the overall price level is determined by the quantity of money, real economic output and the velocity of money—that is, the frequency at which a unit of money is used for transactions. This is summarised in the “quantity equation”:

$$PQ = MV$$

where P denotes the general price level, as measured by the consumer price index (CPI), Q represents real gross domestic product (GDP), M indicates the quantity of money circulating in the economy, and V is its velocity. The equation is an identity—it simply says that the total of nominal transactions (PQ) must be settled in money, accounting for how fast money circulates. It becomes useful for assessing the relationships among money, real GDP and prices if we can explain the behaviour of velocity (V).

In the long term, real GDP increases in line with its “potential”. That is, it is determined by structural factors such as capital accumulation, the size of the available labour force and the productivity of these two production factors. Therefore, the quantity equation implies that for a given long-term velocity (which results from a stable money demand, as discussed in the next section), average inflation equals the average increase in money less potential real GDP growth. In other words, for a given amount of goods, the more money there is in the economy, the higher the price level will be since more money chases the same amount of goods.

Characterising a stable money demand

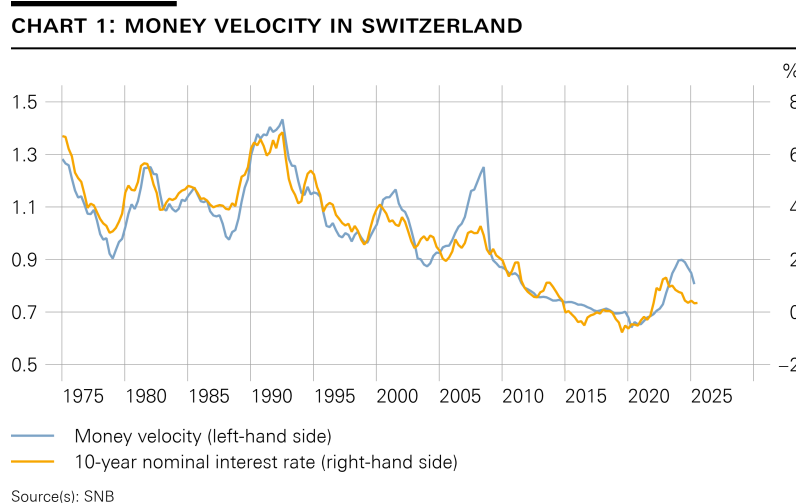
As the link between money and inflation depends on the behaviour of the velocity of money, understanding what determines that velocity is crucial. Money is defined here as assets that people use directly or indirectly (e.g., accounts used to settle credit card transactions) to buy

goods and services. In Switzerland, the best measure in this respect is the monetary aggregate called M2. It includes banknotes, sight deposits (that is, current accounts of households and firms at banks), and transaction and savings accounts, from which funds can be readily withdrawn without incurring significant transaction costs.

Money differs from other financial assets—such as bonds—in that it is a means of payment for goods and services and yields little or no interest. Other assets such as bonds can be sold relatively quickly in exchange for money, but doing so is costly, and there is a risk of financial loss since their prices fluctuate. Consequently, even before the global financial crisis of 2008, when interest rates were generally higher, people and businesses were willing to hold a total of more than CHF 500 billion in (M2) monetary assets.

The velocity of money is related to money demand. The public holds money for essentially two reasons: for purchases of goods and services (i.e., the financing of immediate transactions) and for saving purposes. If the general level of interest rates increases, the interest rates paid on other assets such as bonds typically increase by more than the interest rates on bank deposits. Holding money for saving purposes thus becomes less attractive relative to other higher-yielding assets. People therefore tend to hold less money. M2 declines relative to the level of transactions, which implies that velocity increases: for a given level of transactions, a unit of money circulates more quickly in the economy.

In empirical studies of money demand, a long-term interest rate is used to capture the fact that the alternatives to bank deposits include bonds with longer maturities. Chart 1 displays the velocity of money (measured as nominal GDP divided by M2) and the 10-year nominal interest rate. The two series have moved closely together over the past fifty years. As the velocity and, thus, desired money holdings by the public have been driven by interest rates over the long term, we conclude that money demand as a function of transactions and interest rates has been stable in Switzerland.¹

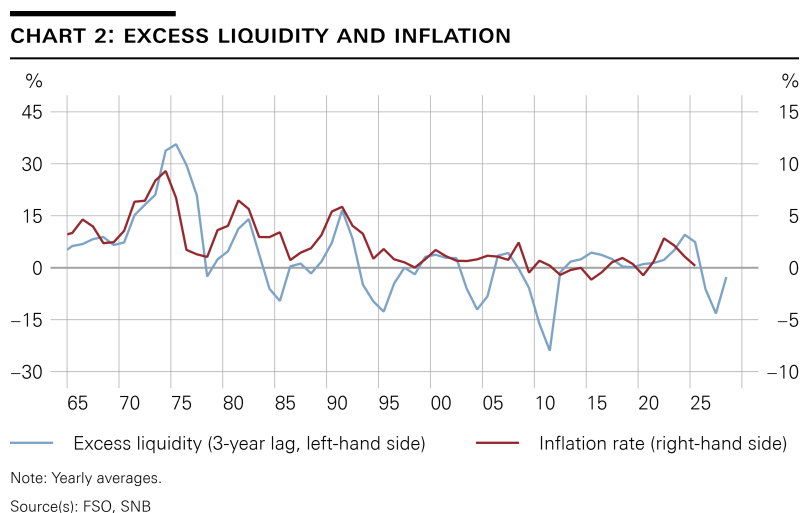


¹ For formal tests of money demand stability, see Kugler and Reynard (2022).

Positive excess liquidity tends to precede increases in inflation

Thus, a stable money demand implies that we can estimate the long-term velocity, i.e., the velocity implied by the interest rate from the long-term relationship displayed in Chart 1. According to the quantity theory, we can then assess whether there is “too much” or “too little” money in the economy. From the quantity equation, if money supply times the long-term velocity exceeds (falls short of) GDP, then too much (little) money is chasing too few (many) goods, and inflationary (deflationary or disinflationary) pressures can build up.

We quantify this phenomenon with the measure of so-called *excess liquidity* defined in Reynard (2007).² Excess liquidity is the proportion of broad money that the public holds at any given point in time relative to the quantity of money that people want to hold in the long term, given the interest rate level and nominal GDP. In Switzerland, there have been several episodes where excess liquidity preceded a marked increase in inflation. To see these episodes, Chart 2 plots lagged excess liquidity against inflation (as measured by annual changes in the CPI).



Excess liquidity is lagged by three years to account for the usual long lags in the monetary transmission process noted by Friedman (1960). For example, the value of excess liquidity plotted in 2024 corresponds to the excess liquidity measured in 2021. After banks provide credit (typically, a mortgage), the money (bank deposits) generated in the process usually first flows mostly into the real estate or construction sector and thereafter is transmitted to other sectors of the economy. The transmission lag is variable since the transmission is influenced by the price-setting behaviour of firms and by the various changes to which the economy is exposed.

Chart 2 shows that episodes of positive excess liquidity have been followed by increasing inflation, whereas episodes of negative excess liquidity have been followed by decreasing

² For details on how the excess liquidity measure is computed, and applications to other countries, see Reynard (2007 and 2023).

inflation—but not by persistently negative inflation, i.e., deflation. Thus, in Chart 2, inflation does not fall (or only slightly falls) below zero after excess liquidity becomes negative. This asymmetry at zero is due to downward price rigidities. That is, prices rarely fall because, for example, firms rarely cut the wages of their employees during economic recessions.

The 1970s and 1980s were characterised by three episodes of large excess liquidity that were followed, after an approximately three-year lag, by inflation rising above five percent. Since the 1990s, excess liquidity has remained relatively low, and so has inflation. However, the four smaller positive excess liquidity episodes of 1996–1999, 2003–2004, 2012–2014 and 2020–2022 were again followed by increasing inflation. During these episodes, the relationship between excess liquidity and inflation was at times temporarily affected by special events. For instance, the discontinuation of the minimum exchange rate for the Swiss franc against the euro in 2015 delayed and partially offset the response of inflation to excess liquidity. Moreover, the economic shocks caused by the COVID-19 pandemic in 2020 reduced the transmission lag to only one year.

Conclusion

As shown here for Switzerland, the quantity of money in circulation can be informative for future inflationary developments. This ability requires the use of an appropriate definition of money (namely, money in the hands of the public that is used for transactions). When the demand for money is stable, a measure of excess liquidity can display a systematic relationship with subsequent inflation. Therefore, the quantity of money in circulation continues to provide a valuable indicator for monetary policy analysis.

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