



# SNB Economic Note

No. 1/2024

## What drives the demand for large banknotes in Switzerland?

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*In contrast to what one might believe, the demand for banknotes has remained strong in recent years in most advanced economies despite continuing innovation in payment technologies. This Economic Note highlights the importance of the store-of-value motive for holding banknotes. The motive is reflected in the importance of the opportunity cost—the level of interest rates—to explain the demand for large-denomination banknotes in Switzerland.*

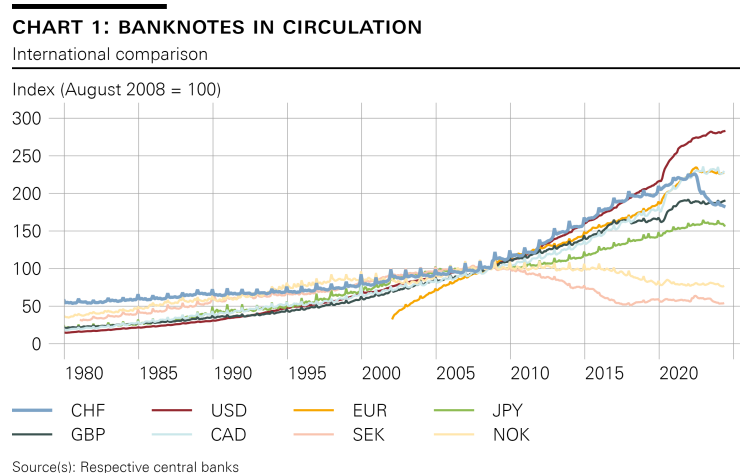
Banknotes are the most direct physical link between the public and a country's central bank. Like other central banks, the Swiss National Bank (SNB) provides banknotes to meet the demand of households and firms. What determines this demand by the public in Switzerland? Given the immediate purpose of cash to facilitate transactions and the widespread use of cashless payment methods (debit and credit cards, payment apps, etc.), many would think that cash is on its way out. It is indeed the case that cash is used increasingly less often for everyday transactions in most advanced economies (see Bagnall et al., 2016). Switzerland is no outlier in this regard, as indicated in the most recent [SNB Payment Methods Survey](#), which indicates that the share of transactions settled using cash declined from 70% in 2017 to 36% in 2022.

However, this is not the whole story. Chart 1 shows that the value of outstanding banknotes has increased almost constantly in recent decades in most advanced economies.<sup>1</sup> With the exception of Scandinavian countries such as Sweden or Norway,<sup>2</sup> we observe a particularly strong increase since the great financial crisis and again with the onset of the COVID-19 pandemic. The value of outstanding banknotes in the countries shown in Chart 1 (excluding Sweden and Norway) was between 61% (Japan) and 168% (USA) higher in 2021, i.e., before

<sup>1</sup> This is sometimes called the “paradox of cash” (see Bailey, 2009).

<sup>2</sup> The development in Scandinavian countries seems to be an exception (see Engert et al., 2019, and Armelius et al., 2022).

the global increase in interest rates, than before the failure of Lehman Brothers in September 2008. In Switzerland, the value of outstanding banknotes was 125% higher.



## What determines the demand for banknotes?

What might have driven this impressive increase in banknote demand? Cash, particularly banknotes, is held for transaction purposes and as a store of value, both domestically and potentially abroad. Consequently, banknote demand is known to depend on the following factors:

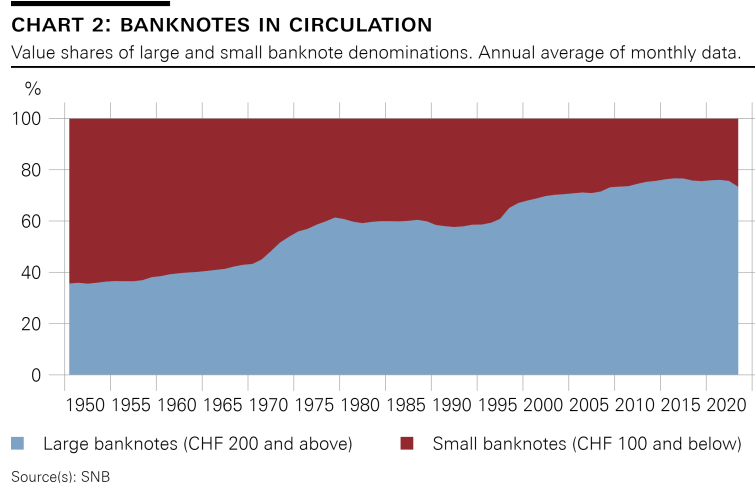
- the **volume of transactions** as well as the corresponding **price level**;
- the **opportunity cost**, which measures the implicit cost to an individual holding non-interest-bearing banknotes instead of a bond or bank deposit (e.g., savings accounts or term deposits), which can be measured by an interest rate;
- the degree of economic, financial, and political **uncertainty** (at home and abroad), which determines domestic precautionary demand for cash as well as safe-haven demand from abroad since cash is free of credit risk. Examples of episodes of elevated uncertainty include banking crises, financial instability abroad and episodes of high inflation;
- **other factors** such as payment habits or innovations in payment technologies.

If neither the transaction volume nor changes in payment behaviour and payment innovations are the driving factors of the recent increase in banknote demand, then the driving factors may be opportunity cost and increased uncertainty. For example, important events such as the fear of a possible millennium bug in 2000, the terrorist attacks on 11 September 2001, the great financial crisis of 2008/09 and the COVID-19 pandemic starting in 2020 were all associated with strong increases in the demand for banknotes in advanced economies (see Rösl and Seitz, 2022).<sup>3</sup>

<sup>3</sup> There even seems to be a response of banknote demand in Sweden to the Russian invasion of Ukraine in February 2022.

## The Swiss case

Chart 1 shows that banknote demand decreased noticeably in Switzerland during the recent tightening of monetary policy. It did so despite the continued economic and geopolitical uncertainty that probably on its own has been associated with an increase in banknote demand.<sup>4</sup> This indicates the important role played by opportunity cost considerations in the Swiss case. Given the composition of banknote holdings, this is not surprising. Chart 2 shows that the largest denominations—CHF 1000, CHF 200, and until 1997, CHF 500—have accounted for the majority of the total value of banknotes since the mid-1970s.<sup>5</sup> These large banknotes are held primarily as a store of value. Opportunity cost considerations are therefore much more important than for smaller denominations, which are used mainly as a medium of exchange (see Assenmacher et al., 2019).



## The importance of the opportunity cost

Opportunity cost considerations can explain movements in banknote demand in Switzerland. Chart 3 plots the interest rate on 10-year Swiss government bonds, which is used here to measure the opportunity cost of holding banknotes, against the velocity of large banknotes. To work with a stable set of denominations, the chart starts in the year 2000, i.e., after the transition from the CHF 500 banknote to the CHF 200 banknote. The banknote velocity is an approximate measure of the number of times a typical banknote changes hands within a year. The fewer banknotes that are available, the higher the velocity to handle a given number of transactions. In Chart 3, the velocity is simply calculated as the ratio of economic transactions (measured by nominal GDP) to the (nominal) value of outstanding large banknotes.<sup>6</sup> While

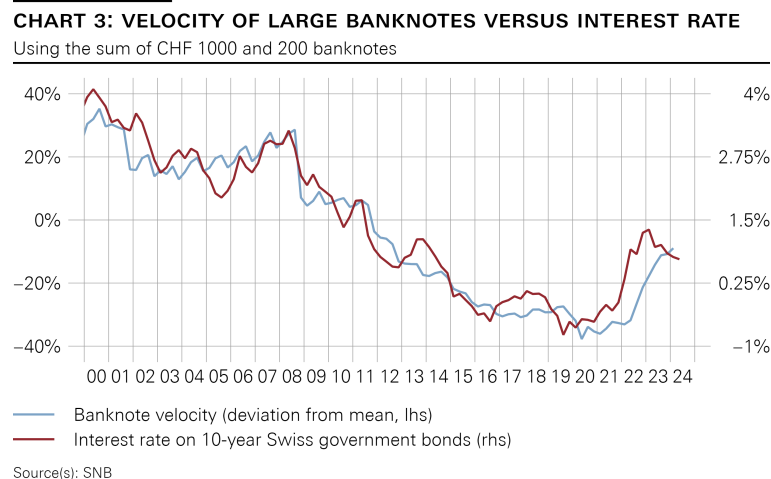
<sup>4</sup> See also the [introductory remarks](#) by Martin Schlegel at the news conference of the Swiss National Bank on 15 December 2022.

<sup>5</sup> The first banknote series issued by the SNB in 1907 included denominations of CHF 50, 100, 500 and 1000. Banknote denominations of CHF 5 and 20 were added in 1914 to provide sufficient means of payment as gold and silver coins dropped out of circulation in response to the outbreak of World War I. In 1956, CHF 10 banknotes were first issued, and the issuance of CHF 5 banknotes was suspended in 1958. The last change in the denomination mix occurred in 1997, when the CHF 500 banknote was replaced with the CHF 200 banknote (see Assenmacher et al., 2017).

<sup>6</sup> The velocity in the graph is shown as the percentage deviation from the sample mean of 4.

the velocity is affected by changes in the value of transactions (related to both volume and price), typically, its key driver is a change in the volume of banknotes in circulation. An increase in outstanding banknotes leads to a decrease in velocity (i.e., each banknote is used less often to handle transactions). Conversely, a decrease in outstanding banknotes leads to an increase in velocity.

The interest rate on 10-year Swiss government bonds is used to measure the opportunity cost since it represents the interest foregone when people hold banknotes (instead of bonds or bank deposits). Interest rates on government bonds are a good approximation of the overall interest rate developments. Moreover, when government bonds have a long maturity, they are a good representation of lasting interest rate movements. The demand for money, particularly banknotes, typically responds only to persistent movements in interest rates (see Benati, 2020, and Reynard, 2007).



In general, velocity and interest rates should move in the same direction. If opportunity costs are high, people will hold less currency and banknotes will consequently need to circulate faster. This is indeed what we observe in Chart 3. Overall, the swings in velocity are in line with the interest rate movements. In particular, the sustained decrease in interest rates since the great financial crisis of 2008/09 to the end of 2021 was accompanied by a similar decrease in banknote velocity (which reflects a strong increase in banknote demand). The recent tightening of monetary policy, which sharply increased interest rates, was accompanied by an increase in velocity resulting from the considerable drop in banknote demand shown in Chart 1.

The fit is not perfect, of course. As mentioned above, there are other important drivers of banknote demand, such as changes in payment habits and technology as well as economic and political uncertainty. However, Chart 3 suggests that opportunity cost considerations are a key driver of banknote demand in Switzerland. This highlights the important role that cash plays for the public as a store of value.

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