

FI Analysis No. 44

Swedish Retail Trading in Cryptocertificates



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Summary

Over the past few years, cryptoassets have increasingly garnered attention, with individuals displaying a rising interest in investments in these assets. Since 2018, the prices of cryptoassets have varied significantly, illustrating the high risks associated with such investments.

The purpose of this analysis is to gain a better understanding of how cryptoassets are traded in Sweden and study the outcomes for those who have traded them. We examine Swedish investments in so-called cryptocertificates, a product that is relatively new to the Swedish market. Cryptocertificates are financial instruments that track the price of an underlying cryptoasset. For Finansinspektionen (FI), which supervises the financial market, it is important to understand how trading on this market changes as new instruments are introduced. By studying the outcomes from the trading of these assets, FI also gains vital knowledge to better understand the consumer risks associated with such trading.

Between January 2018 and March 2024, approximately 200,000 people in Sweden traded in cryptocertificates. The majority were younger individuals, and eight out of ten were men. Most traded relatively small amounts, and about 60 per cent of those who traded had sold off their entire holdings by the end of March 2024.

Interest in investing in cryptocertificates has fluctuated over time, often coinciding with significant price movements in the underlying cryptoassets. However, over the past two years, we have observed a decrease in the influx of first-time buyers and a reduced turnover in trading, indicating a downward shift in interest in Sweden in investing in cryptocertificates.

Among those who sold off their entire holdings in cryptocertificates, most have lost money despite the assets increasing in value by up to 500 per cent since 2018. The sharp price increase during the first quarter of 2024 makes the results look somewhat better for those who still own certificates. Since most of those who invested in cryptocertificates invested relatively small amounts, their profits or losses are also small in monetary terms. A contributing factor to so many losing money on investing in cryptocertificates despite the overall price increase over time is that the investments often come with high fees. According to our calculations, investors in cryptocertificates in Sweden have paid a total of approximately SEK 320 million in fees to trade these instruments.

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What is a cryptoasset?

A cryptoasset can broadly be described as a digital representation of value, or some form of right, which can be transferred and stored electronically using technology for some type of distributed ledger.¹ Often, the term blockchain is used to describe this type of distributed ledger. There are many different types of cryptoassets with many different purposes.²

Unlike conventional money, such as Swedish kronor or US dollars, there is no central bank or government backing the value of cryptoassets. Likewise, there are no underlying cash flows upon which the owner of the cryptoasset can lay their claim. Instead, cryptoassets use a technology called blockchain, a kind of digital accounting, where all transactions are recorded across a network of computers. The most well-known cryptoasset is bitcoin, which is traded on digital platforms and in some cases can be used as a means of payment.

Following bitcoin, several other cryptoassets have been introduced that are based on similar technology, including ethereum, solana, cardano, and polkadot.³

Over the past five years, interest in cryptoassets has increased significantly. Many investors, and particularly private individuals, have viewed cryptoassets as an investment that, thanks to its extreme price movements, can generate high returns. However, large price movements also mean high risk when investing in cryptoassets. Generally, it is difficult to value cryptoassets because they lack characteristics that make them suitable for valuation using traditional methods.⁴ This uncertainty about what the asset is worth is particularly evident from the sharp fluctuations in prices and gives rise to an elevated risk for those who buy or sell it.

In this analysis, we examine investments in cryptoassets based on transactions made in so-called cryptocertificates between 2018 and 2024. We investigate who is trading, how the trading has evolved over time, and the final result for those who have traded.

The purpose of the analysis is to gain a better understanding of how cryptoassets are traded in Sweden and study the outcomes for those who have traded these instruments. This enables us to gain a greater understanding of the consumer risks associated with such trading. By examining who has traded these instruments, we also gain increased insight into the risk propensity of different groups in relation to risky assets. Furthermore, understanding the outcomes from the trade provides an increased understanding of how investors behave after purchasing such a risky asset.

¹ Definition of a crypto asset according to the MiCA regulation, EU 2023/1114.

² For a broader introduction to cryptoassets, see, for example, Finansinspektionen (2021).

³ Cryptocurrencies, cryptoassets, and tokens serve different functions, but in this analysis, the term *cryptoassets* is consistently used as an umbrella term for all three.

⁴ By this, we mean that cryptoassets, for example, lack a concrete underlying value such as cash flows or physical assets.

Retail investors can gain exposure to cryptoassets through cryptocertificates

Barber and Odean (2006) show that individuals are more likely to invest in stocks that capture their attention by the stock having

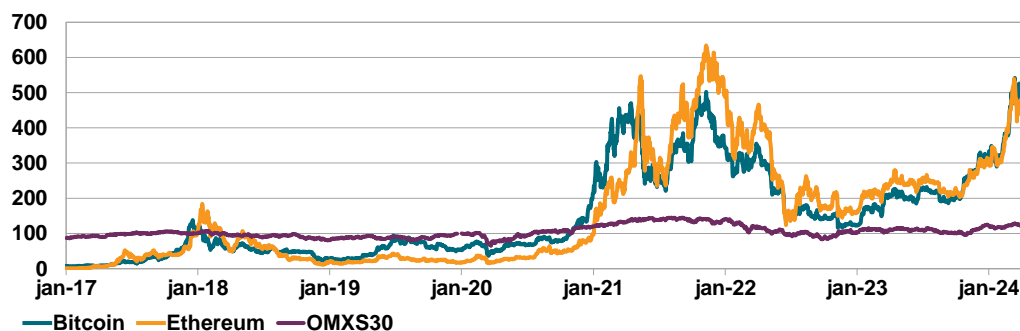
- shown abnormally high returns,
- been traded unusually frequently, or
- been recently mentioned in the news.

These three factors can likely explain to a large extent the interest in cryptoassets among retail investors. Cryptoassets have demonstrated significant price movements at times, which has created substantial attention, including in the media. During such periods, and when prices rise, the turnover of cryptoassets tends to increase significantly.

Between January 2018 and March 2024, the price of cryptoassets varied greatly (see Diagram 1). In 2018, the price dropped from the record-high levels reached at the end of 2017. This was followed by a period of relatively stable prices during 2019 and 2020. In 2021, the price increased sharply again, coinciding with increased interest from institutions and broader acceptance of cryptoassets. In 2022, the value decreased significantly in connection with various issues regarding the regulation of cryptoassets and uncertain macroeconomic conditions, which persisted for much of 2023. At the end of 2023 and the beginning of 2024, prices rose rapidly again as interest from institutional investors increased yet again.⁵

1. Price development in cryptoassets, indexed

Index with base 100



Source: LSEG

Note. Base 100 = 2018-01-01.

To invest in cryptoassets, retail investors primarily can either buy the actual cryptoasset or invest in financial instruments that reflect the price development of a cryptoasset, such as tracker certificates or exchange-traded products. For the consumer, it may be simpler to do the latter as it is usually easier to invest in the financial instruments than directly in a cryptoasset. For example, buying a tracker certificate is often as easy as buying a stock.

⁵ Financial Times (2024).

In Sweden, tracker certificates are the most common form of financial instruments that use cryptoassets as the underlying asset. Certificate issuers charge a fee for the certificate as well as sometimes additional fees for services such as redemption. The investment in a tracker certificate only provides synthetic exposure to the cryptoassets. This means that the investor does not own the underlying cryptoasset. In the analysis, we consistently use the term cryptocertificates to refer to these types of financial instruments that have cryptoassets as the underlying asset.

We use transaction data

A fundamental purpose of cryptoassets is anonymity, although it is often possible to follow transactions by studying the blockchain. However, since the blockchain usually does not identify the physical or legal person who is executing the trade, it is difficult for FI to analyse direct investments in cryptoassets. Instead, we can analyse the trading of cryptocertificates, which are traded on the financial markets. To do this, we use individual-based transactions reported to FI's transaction reporting system, TRS. In the analysis, we study all trading in cryptocertificates between January 1, 2018, and March 31, 2024. In cases where we present results based on unrealised gains or losses, we value the remaining positions at the prevailing market price. Additionally, we exclude individual-to-individual trades that have not occurred on a trading platform. Due to a format limitation in TRS, individuals without a Swedish personal identity number are excluded from the data, and therefore the term *Swedes* in the following analysis refers solely to traders who have a Swedish personal identity number.

We have simplified the analysis by assuming that all investors pay the same fees. Transaction costs are assumed to be brokerage fees of 0.4 per cent, which go to the broker, a spread⁶ of 0.25 per cent, which goes to the issuer, and an annual management fee of 2.5 per cent, which also goes to the issuer. These assumptions are derived as an overall average after studying several prospectuses and brokers' price lists. This is a simplification because these fees vary between different actors and can also differ between customers at the same actor. For example, individuals who trade a lot may be offered lower brokerage fees. For a more detailed explanation of these assumptions and transaction fees, see Appendix 1.

Most traders are young men

In total, nearly 200,000 individuals have traded in cryptocertificates between January 2018 and March 2024. Of these, approximately 8 out of 10 are men. During the period studied, Swedes have turned over SEK 86 billion in cryptocertificates through 5.8 million unique transactions. The median investor has purchased crypto for about SEK 9,800, but some have invested significantly more since the average amount a Swede has invested was SEK 64,500.

⁶ *Spread* is the difference between the buying and selling price; this is explained in more detail in Appendix 1.

Table 1. Descriptive statistics of the trading in cryptocertificates

Number of people, per cent, and SEK

	Underlying cryptoasset			
	All	Bitcoin	Ethereum	Other
Number of people who have traded (thousands)	198.7	143.4	122.8	73.6
- Percentage who have sold off their entire holdings (%)	58.3%	61.6%	60.4%	48.6%
Total traded amount (SEK billion)	86.3	32.0	43.0	11.3
Number of unique transactions (millions)	5.8	2.4	2.5	0.9

Source: FI

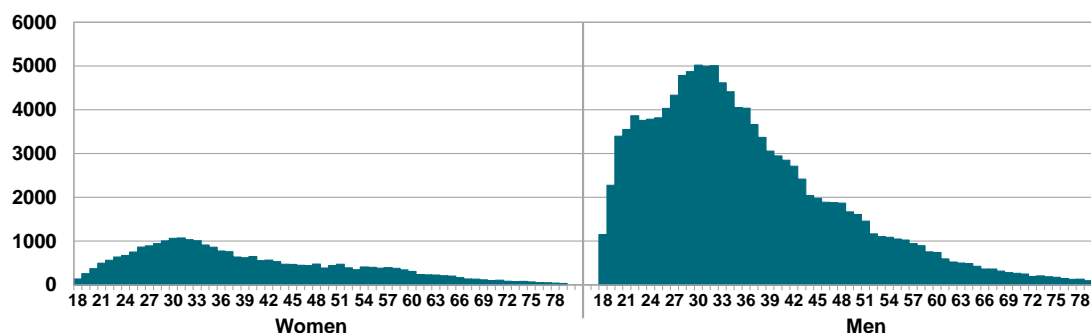
Note. *Other* includes certificates that have avalanche, cardano, polkadot, solana or uniswap as the underlying cryptoasset.

Of those who traded in cryptocertificates, 81 per cent traded certificates that have bitcoin as the underlying asset. This makes bitcoin the most popular underlying asset, closely followed by ethereum. In terms of volume, the turnover of certificates that have bitcoin as the underlying asset amounted to SEK 32 billion, which only constitutes 37 per cent of the total turnover of trading in cryptocertificates. In volume, certificates that have ethereum as the underlying asset instead have the largest turnover at SEK 43 billion or about 50 per cent. In cryptocertificates that have other underlying assets than bitcoin or ethereum, Swedes have traded for SEK 11 billion.

The majority of those who traded were men (see Diagram 2). The average age was 36, and the median age was 34. Women who traded were on average a few years older than the men. Although it was generally younger individuals who traded, older individuals generally traded for larger amounts, accounting for a proportionally larger share of the total turnover.

2. Breakdown in age and gender of those who traded

Number of people



Source: FI

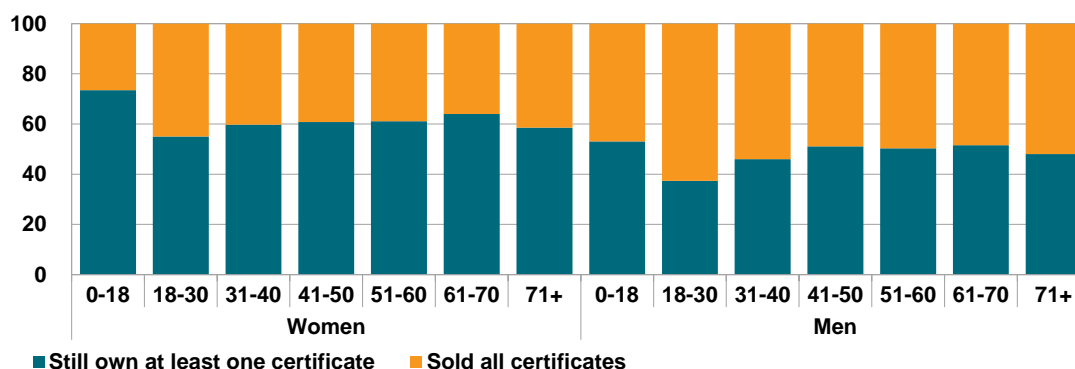
Note: Some of the traders were either younger than 18 or older than 79. Among the women, 856 were younger than 18, and 164 were older than 79. Among the men, 2,523 were younger than 18, and 366 were older than 79.

Differences are evident in both gender and age when we study how many have sold off their entire holdings compared to how many still owned at least one cryptocertificate on March

31, 2024. As shown in Table 1, 58 per cent of those who traded cryptocertificates had sold off their holdings by the end of March 2024. In all age groups, it is more common for men to have sold off their entire holdings; see Diagram 3. This aligns with the tendency of women to hold onto stock holdings longer than men.⁷

3. Distribution by age and gender among those who traded and sold off all holdings

Per cent



Source: FI

Note: Refers to the proportion of traders who, as at March 31, 2024, had either sold off their entire holdings or still owned at least one cryptocertificate.

Individuals between the ages of 18 and 30 were most likely to have sold off their entire holdings. This applies to both men and women. Generally, we can see that individuals between the ages of 18 and 30 were the earliest to invest in cryptocertificates and thus could sell off at a profit given the sharp price increase that has occurred. This may be an explanation for why they were most likely to have sold off their holdings.

Interest has cooled recently

Interest in trading cryptocertificates has been closely linked to the price of the underlying cryptoassets. As mentioned in earlier sections, cryptoassets typically receive more attention when prices rise sharply or are at historically high levels. We can see that the number of first-time buyers of cryptocertificates per month and the price development of bitcoin appear to correlate (see Diagram 4).

There are two periods during which the number of new investors in cryptocertificates increased the most; the first occurred during the winter of 2017–2018, and the second during 2021. We also see that the number of new investors increases during the first quarter of 2024 in conjunction with the value increase that occurred then. Unfortunately, we do not have data in the TRS database for the period before 2018. According to a survey FI conducted in 2020, about 18,000 Swedes had invested in cryptocertificates before 2018.⁸ Since we do not have

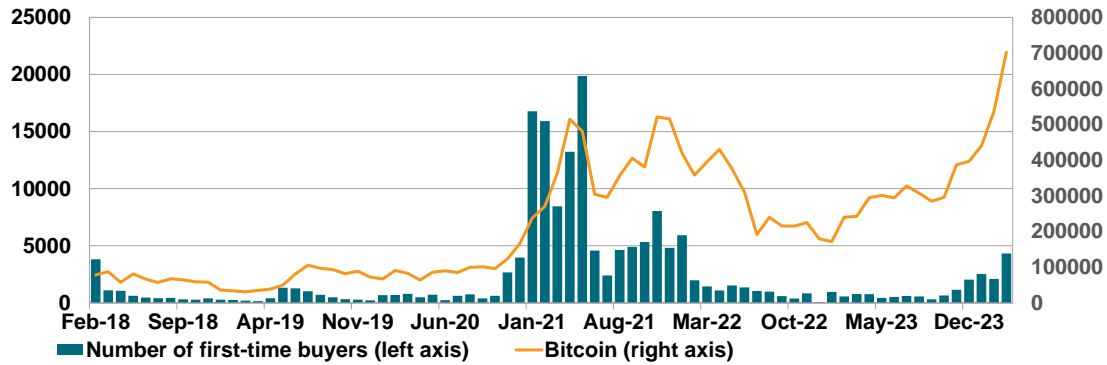
⁷ Lien Oskarsson (2023).

⁸ Finansinspektionen (2021).

data for these individuals' purchases, they are not captured in the analysis. Although the number of purchases is large, the dropout only accounts for 9 per cent of the total data.

3. Number of first-time buyers per month

Number of people, SEK



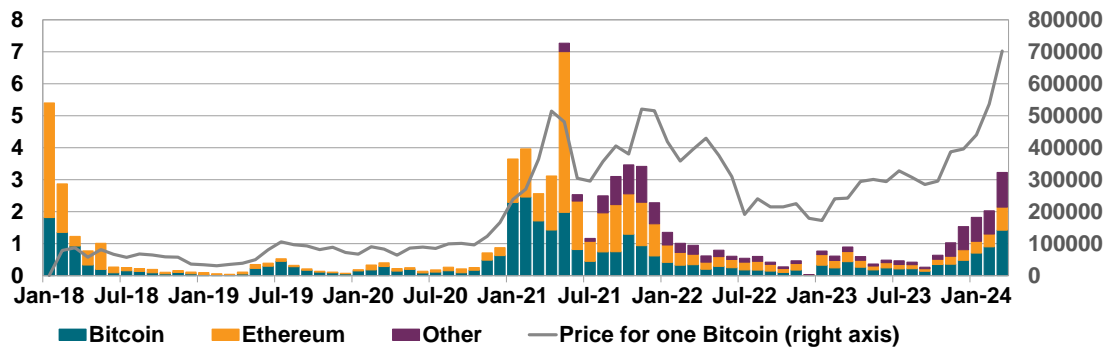
Source: FI, LSEG

Note: First-time buyers are defined as individuals who are trading a cryptocertificate for the first time. The orange line indicates the price of bitcoin expressed in SEK.

It is interesting to note that when the price reached its lowest point in two years in December 2022, only 57 people chose to invest in cryptocertificates for the first time (see Diagram 4). This illustrates the uncertainty surrounding the value of cryptoassets and that the price movements become self-reinforcing and thus unusually large. Furthermore, the difficulty in valuing cryptoassets makes the prices change rapidly. Overall, these factors contribute to unusually large variation in cryptoassets' values compared to stocks, for example.

4. Monthly turnover for cryptocertificates with different underlying cryptoassets

SEK billion, SEK



Source: FI, LSEG

Note: *Other* refers to avalanche, cardano, polkadot, solana and uniswap. Applies only to individuals who have traded for a maximum of SEK 1 million during any single trade. Turnover is measured in SEK billions on the left axis, and the price of one bitcoin is measured in SEK on the right axis.

As we can see in Table 1, certificates that have ethereum as the underlying cryptoasset were traded most during the period. In total, Swedes traded SEK 43 billion in cryptocertificates with ethereum, compared to SEK 32 billion in certificates with bitcoin. In Diagram 5, we can

see that this difference can partly be explained by the particularly high interest in trading certificates with ethereum between January 2018 and May 2021.

The particularly large volumes of ethereum certificates traded during May 2021 can likely be explained by the extreme movements that occurred in the ethereum price during the same month; it first rose by 49 per cent, only to then drop by 50 per cent (see Diagram 1). Similar price movements can also be seen at the beginning of 2018.

The interest among Swedes to invest in cryptocertificates has waned in recent years despite rising prices – especially when we study the bitcoin price in SEK (see Diagrams 4 and 5). In 2023, relatively few first-time buyers entered the market to buy cryptocertificates.

There is a slight increase in traded volumes towards the end of 2023 and the beginning of 2024, but relative to the price development of the cryptoassets, there are fewer transactions than before. Additionally, the traded volumes are lower than the record highs during 2018 and 2021 despite prices reaching new peak levels. One contributing factor to the traded volume increasing again in 2024 is that many are selling off holdings that they have long held as an unrealized loss.

Newer, lesser-known cryptoassets have increased the most in terms of traded volume around the turn of the year 2023/2024. This may be due to new investors hoping that the lesser-known cryptoassets will have a similar development to that of bitcoin and ethereum. We can also see that individuals who previously made money on their investments in cryptocertificates are more inclined to invest in these instruments again, but they often choose to invest in certificates that have a different underlying cryptoasset.

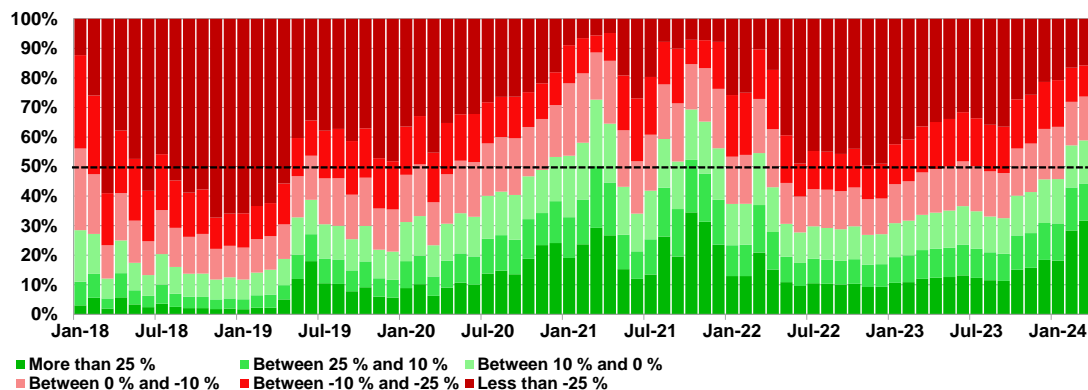
Trading outcomes vary in line with the cryptomarket

As at March 31, 2024, 53 per cent of those who traded cryptocertificates and sold their entire holdings incurred a loss. Despite cryptoassets increasing in value by up to 500 per cent during the period 2018–2024, more than half of those who invested in cryptocertificates and sold their holdings did so at a loss. This highlights the difficulty of choosing the right time to invest, particularly in assets whose value varies so drastically and lacks fundamental value.

However, the above result only pertains to those who sold their entire holdings. Individuals who experience negative developments are often less inclined to sell their holdings. To provide a supplementary comparison, we also perform a calculation where we value the holdings month by month. We do this for each of the 75 months for which we have data. Since the price has moved significantly throughout the period of study, the result varies depending on when the calculation is made. When the price has risen sharply, more people have a positive outcome, and vice versa. Our results show that over the entire period, 59 per cent of those who traded cryptocertificates achieved a positive result. However, the same calculation on March 31, 2023, shows that 66 per cent of all traders had lost money (see Diagram 6).

5. Distribution of outcomes over time among retail traders

Per cent



Source: FI

Note: Refers to the outcome relative to the maximum invested amount measured up to the time of calculation. Those with holdings at the time of calculation are assumed to sell their holdings at the prevailing market price. The calculation date is the last day of each month.

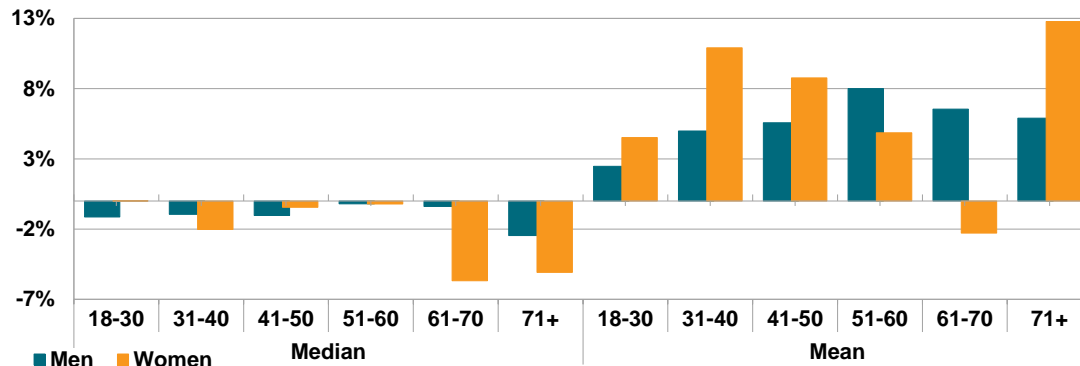
When we study the distribution of results in the trading of cryptocertificates over time, it is clear that most people would have lost money if they had sold their holdings during our period of analysis. Of the 75 months in our study, only 13 have a positive median. This means that it is only during these 13 calculation instances that more people would have benefited from selling their cryptocertificates.

Differences in returns between different groups

The analysis shows that the results vary greatly between groups, and there is a difference in outcomes between women and men. According to Diagram 8, there is a significant difference between the average return and the median return, which means that a few investors achieved very high returns while the largest proportion realized only small gains or losses. In this case, we only study those who have sold off their entire holdings.

6. Turnover based on gender and age – median and mean

Per cent



Source: FI

Note. Refers only to those individuals who have traded and subsequently sold off all of their positions.

On average, women achieved higher returns than men among those who sold their entire holdings before March 31, 2024, with an average return of 7.06 per cent for women compared to 4.38 per cent for men. This can largely be explained by a greater spread in the women’s returns, namely that the proportion who realized very high returns is larger among women. This is further illustrated by the fact that the median return is somewhat lower among women than among men. The median return is -1.15 per cent for women and -0.94 per cent for men. When we look at the results for different age groups, we find no clear pattern.

The traders’ interest in making repeated investments in cryptocertificates seems to depend on how well the certificates performed previously. In Table 2, we can see that traders who made money on their investment in cryptocertificates are more likely to trade with these instruments again. Among those who had a return of over 10 per cent, twice as many chose to buy cryptocertificates again after selling off their entire holdings compared to those who realized a loss of more than 10 per cent the first time they traded with cryptocertificates.⁹

Table 2. How previous results correlate with interest in future trading and returns
Number and per cent

Return after first round of trading	Obs. bought again	Total Obs.	Share that bought again	Return after second round of trading	
				Median	Average
Over 25 per cent	7,465	26,012	28.7%	-1.3%	11.7%
Between 25 and 10 per cent	5,336	18,522	28.8%	-0.2%	4.4%
Between 10 and 0 per cent	5,800	22,972	25.2%	-0.5%	3.2%
Between 0 and -10 per cent	4,674	22,082	21.2%	-1.8%	2.4%
Between -10 and -25 per cent	3,256	18,302	17.8%	-1.8%	4.6%
Below -25 per cent	2,267	24,945	9.1%	-0.3%	11.9%

Source: FI

Note: The return is calculated for the first time those who traded have sold off their entire holdings.

Interestingly, we cannot see any significant differences in returns between those who previously had high returns and those who had low returns. This is because the standard deviations within each group are relatively large. Although there are some differences in median and average, we also cannot see any clear trend in differences between these groups. This means that we do not find signs that certain individuals have been better or worse at investing in cryptocertificates. The outcome seems to be more about luck than skill.

The fact that more people who made money during their first trading round choose to trade again suggests that they had greater confidence in their own ability. This is something that

⁹ By “the first time they traded”, we refer to a situation where the investor both bought and sold off their entire holdings. By “the second time they traded”, we refer to the holdings they had when they again traded in crypto certificates after having sold off their first position.

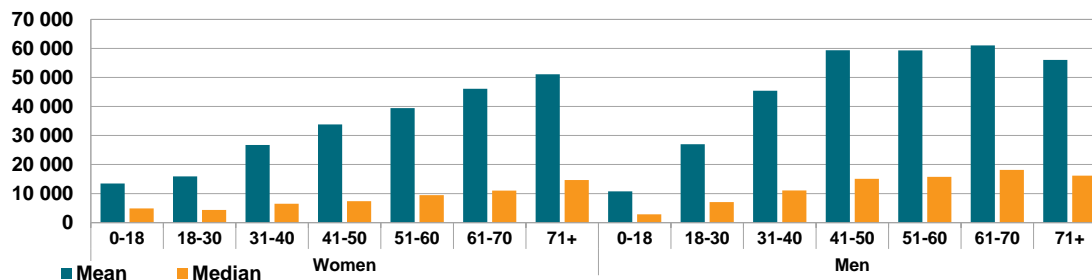
previous research has found; namely, that favorable outcomes often lead to this type of increased confidence.¹⁰ That these individuals do not achieve higher returns than other groups is a telling sign that they have an overconfidence in their own ability.

Most traded small amounts

Most of the individuals who traded crypto certificates invested relatively small amounts. Consequently, gains and losses, measured in SEK, are also small. The median woman invested SEK 6,900 in cryptocertificates, while the corresponding figure among men is SEK 10,200. However, there are a few individuals who have invested large sums, which means that the average amount invested is significantly higher than the median across the various groups, as shown in Diagram 8.¹¹

Even for the group that lost the largest proportion of their invested amount, namely those who lost more than 25 per cent, the losses in SEK are relatively limited. This group lost on average SEK 18,100, while the median loss is SEK 3,400. This is because this group's original investment in cryptocertificates was limited.

7. Invested amounts in cryptocertificates for different groups – median and mean SEK



Source: FI

To study how large a portion of the total investment portfolios was invested in cryptocertificates, we can compare with the total amount invested in the stock market from a random sample of individuals and only study those included in both data sets.¹² Among those who invested in both stocks and cryptocertificates, we find that women invested on average 14 per cent of their stock portfolio in cryptocertificates, while the corresponding figure for men is 12 per cent.¹³ Furthermore, these individuals tend to hold onto cryptocertificates for an average of 52 days. The same figure for stocks is 73 days.

¹⁰ Barber & Odean (2001).

¹¹ See also Diagram 7.

¹² The sample is the same as described in FI Analysis No. 42; the figure refers only to savings in stocks. Thus, this does not include, for example, mutual fund savings and bank savings.

¹³ Pertains only to the portion of the portfolio that was traded between 2018 and March 31, 2024. Holdings acquired before 2018 are thus not included in the portfolio we can study.

An interpretation of the results for the randomly selected individuals is that most who choose to invest in both cryptocertificates and stocks seem to use cryptoassets as a way to have some additional exposure to high-risk assets, rather than investing their entire portfolio in cryptocertificates. Furthermore, they seem to adjust their holdings in cryptoassets somewhat more frequently than their stock holdings.

Fees reduce the results from trading

Trading financial instruments usually involves a cost in the form of brokerage fees, which are typically paid to the institution where the transaction was initiated. In the case of cryptocertificates, additional fees are paid to the issuer of the certificate or a market guarantor in the form of a spread and a management interest rate.¹⁴ By studying the platforms where investors traded cryptocertificates, it is evident that the majority of trading occurred through online brokers.¹⁵

According to the assumptions made regarding fees paid, the total cost for Swedes amounts to SEK 322 million. Of this sum, approximately SEK 181 million was paid to the institutions that executed the orders in the form of brokerage fees. The remaining SEK 141 million was paid to the companies that issued the certificates. Of this sum, SEK 57 million constituted spread fees and SEK 84 million management interest.¹⁶ However, the fee structure varies considerably. There are significant differences between institutions, and there are significant differences within the same institution for the type of fee each customer pays. This introduces some uncertainty into the results presented, and especially the calculations of individuals' realized net outcomes. The distribution of realized outcomes is not significantly affected if we adjust the assumption about fees by 0.10 per cent upwards or downwards.

Brokers, market guarantors, and issuers charging a fee for their services is a natural part of the business model. However, it is important for investors to understand the fees they are paying and how they can affect the return.¹⁷ Research shows that investors who trade too frequently reduce their portfolio returns because they pay fees for each transaction.¹⁸

Discussion

Between January 1, 2018, and March 31, 2024, nearly 200,000 Swedes traded cryptocertificates. This can be compared to approximately 2.3 million Swedes who owned stocks as of December 31, 2022.¹⁹ This shows that there has been significant interest in

¹⁴ See Appendix 1 for a more detailed explanation of these terms.

¹⁵ Of the traded volume, 92 per cent occurred through online brokers. The remaining 8 per cent are evenly distributed between securities firms and major banks.

¹⁶ The management interest is only calculated for cases where we have observed both the purchase and sale transactions.

¹⁷ These costs are generally listed in the fact sheet that must be available for investment products marketed to non-professional investors.

¹⁸ Barber & Odean (2001).

¹⁹ Euroclear (2022).

investing in cryptoassets, even though it is a marginal phenomenon compared to the stock market itself. Young men are predominant among those who traded crypto certificates. One explanation may be that men tend to be more risk-seeking in their investments, and that young adults tend to take more financial risk.²⁰

Interest in trading cryptocertificates appears to have waned in recent years. The number of new individuals choosing to invest in cryptocertificates for the first time has decreased significantly since 2021. It is also clear that the traded volume in cryptocertificates during 2022 and 2023 is far below the record levels in 2021. The traded volume jumped again in March 2024 as crypto asset prices rose sharply, but the number of transactions is still lower than at historical peaks. Additionally, the majority of those who traded have chosen to sell off their holdings, which also indicates a lower interest in owning cryptocertificates. The interest in investing in cryptoassets tends to increase when prices rise and decrease when prices fall. This is likely a contributing reason to why relatively many have lost money on their investments in cryptoassets, as many bought at relatively high prices.

As at March 31, 2024, 59 per cent of investors would have made money if they had sold their remaining holdings. However, this percentage has fluctuated significantly in line with the market price of cryptoassets. The same calculation for March 31, 2023, shows that 66 per cent would instead have lost money. If we perform this calculation for each month-end during the studied period, it is evident that only in 13 of the 75 months would more people have made money than lost money.

The fact that so many have money despite the prices having risen sharply during our studied period illustrates the difficulty of timing the market, especially when the underlying asset is difficult to value using traditional methods. By this, we mean that it is difficult for the individual investor to determine whether a cryptoasset is under- or overvalued, which makes it even harder to time the market. Some have been lucky and timed it right, but the majority have timed the market incorrectly, particularly when considering the cost of trading these instruments.

Most who have invested in cryptocertificates have done so with relatively small amounts. This means that their gains and losses have also been relatively small. The fact that investments in cryptocertificates only seem to have constituted a minor part of an investor's total stock portfolio suggests that investors have been somewhat cautious when investing in these very risky assets.

One reason so many have lost money is that these investments often come with relatively high fees, especially when compared to passively managed index fund, for example. According to our estimation, Swedes have paid approximately SEK 322 million in fees to trade cryptocertificates.

²⁰ Jianakoplos & Bernasek (2006).

Appendix 1. Fees

We have simplified the analysis by assuming that all investors pay the same fees.

Transaction costs are assumed to be brokerage fees of 0.4 per cent, which go to the broker, a spread for the certificates of 0.25 per cent, which goes to the issuer or market guarantor, and a management interest fee of 2.5 per cent per year, which also goes to the issuer.

The origin of these assumptions comes from studying various actors' price lists for trading these instruments and reviewing the prospectuses for the leading issuers of these certificates. However, fees vary somewhat between actors and can also differ between customers at the same actor. For instance, individuals who trade a lot may be offered a lower brokerage rate. Furthermore, different issuers and market guarantors have different fee structures for their certificates. Thus, these assumptions involve a degree of simplification.

The distribution of realized results is not significantly affected if we change the assumption about fees by 0.10 percentage points either up or down. When calculating the total fees paid by Swedes, it decreases to SEK 248 million if the assumptions about fees are adjusted downward by 0.10 percentage points. If these assumptions are adjusted upward by the same figure, the estimated total fee paid by Swedes for their trading becomes SEK 389.

The spread is the difference between the buying and selling price that the issuer or market guarantor offers to buy or sell the certificate. That the spread is 0.25 per cent means, simplified, that the customer pays 0.125 per cent more than the certificate's theoretical value when buying it and receives 0.125 per cent less than its actual value when selling it.²¹

Management interest is the cost incurred from owning a financial product, in this case a cryptocertificate. It is a fee calculated based on how long an investor has owned the product. We assume that this fee amounts to 2.5 per cent per year, which means that if the product is owned for six months, the fee is 1.25 per cent.

Adding all this together, we can somewhat simplify what the fee structure would look like for someone who invests SEK 10,000 in cryptocertificates according to our assumptions:

1. When the investor purchases the certificate, they pay a transaction fee to the broker. In this case, it amounts to SEK 40 ($10,000 * 0.4\%$).
2. Since the spread is 0.25 per cent, the customer will pay a price 0.125 per cent higher than the certificate's theoretical value, which incurs a cost to the investor of SEK 12.5 ($10,000 * 0.125\%$).
3. Fifteen months later, the investor chooses to sell their holding in the product, meaning they owned the certificate for 1.25 years. During this period, the issuer has charged management interest of SEK 312.5, which erodes the certificate's value by

²¹ If the issuer or market guarantor offers to sell the certificate for SEK 10,000, it means they value the underlying asset at SEK 9,987.5 – after adjustment to take into account the certificate's nominal amount. In this case, they would simultaneously offer to buy the certificate for SEK 9,975, given that the spread is 0.25 per cent.

the same amount. Assuming that the market value of the underlying asset has not changed, the investor will sell the position now worth SEK 9,687.5.

4. In connection with the sale, the investor will receive 0.125 per cent less than the certificate's theoretical value, which implicitly means that they will pay an additional SEK 12.1 to the issuer or market guarantor ($9,687.5 * 0.125\%$).
5. Finally, the broker also charges a commission to broker the transaction, which according to the assumption in this analysis amounts to SEK 38.8.

In total, the investor has paid SEK 415.9 in various types of fees to invest in the certificate and own it for 15 months. Of these, SEK 337.1 goes to the issuer or market guarantor, and SEK 78.8 goes to the broker.

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