An Assessment of the Tax Gap from Cryptocurrency Trading

A report by the Analysis Unit at
the Swedish Tax Agency

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Registration number: 8-3091367

Skatteverket
Postal address: SE-205 30 Malmö
Telephone: +46 (0)771-567 567
Email: skatteverket@skatteverket.se
www.skatteverket.se

Lina Andersson
lina.andersson@skatteverket.se
Telephone: +46 72 146 9451

Damián Migueles
Damian.migueles.chazarreta@skatteverket.se
Telephone: +46 72 148 8459

Timo Niemenmaa
timo.niemenmaa@skatteverket.se
Telephone: +46 73 944 1995

Foreword

The purpose of this report is to assess the tax gap that resulted from cryptocurrency trading during 2021. The report is important because the Swedish Tax Agency has had limited knowledge of the extent of this tax gap until now. The number of individuals declaring sales of cryptocurrencies has increased from around 100 to over 8,000 over an eight-year period. Although many Swedes have made significant profits from cryptocurrencies, few have paid taxes on those profits. The tax gap from cryptocurrency trading is estimated to be 1.4% of the determined capital gains tax for households.

The report will also be of interest to other tax agencies, since the Swedish Tax Agency's Analysis Unit is among the first organisations to assess the tax gap resulting from cryptocurrency trading. The report can therefore serve as a basis for evaluations carried out by other tax authorities. The report has been prepared by Lina Andersson, Damián Migueles, and Timo Niemenmaa at the Swedish Tax Agency's Analysis Unit.

We have received valuable feedback on earlier drafts from experts at the Analysis Unit, including Erik Nyström and Louise Johannesson, as well as from the Scientific Council at the Swedish Tax Agency.

The Swedish Tax Agency's Analysis Unit is responsible for the analytical findings and conclusions of this report.

Sundbyberg, May 2024

Cecilia Öst

Head, Analysis Unit

Summary

The number of individuals declaring sales of cryptocurrencies in Sweden has steadily increased since 2013; from around 100 individuals per year during 2013-2015 to just over 8,000 individuals in 2021. During the same period, total declared sales rose from a few tens of millions of Swedish kronor[1] to nearly SEK 19 billion and the declared profits increased from a few tens of millions of Swedish kronor to nearly SEK 2.7 billion.

By comparing the number of declared sales of cryptocurrencies in income tax returns with sales by Swedish taxpayers on a selection of international cryptocurrency exchanges, it can be noted that compliance is low. Declared sales of cryptocurrencies constitute less than one-tenth of the estimated total sales of cryptocurrencies made by Swedes.

The tax gap is estimated to be 90% of the theoretically calculated tax on profits from the sale of cryptocurrencies, which is SEK 1.5 billion. However, the tax gap from cryptocurrency trading is estimated to be 1.4% of the determined capital gains tax for households.

The tax gap is primarily attributed to individuals selling large amounts of cryptocurrency assets. Those in the top 10% in terms of sales account for nearly three-quarters of the tax gap, while those in the bottom 50% account for only a negligible portion of the tax gap.

However, the calculations are subject to uncertainty, especially since cryptocurrencies are highly volatile assets and the number of declared transactions are few.

Key points:

- The tax gap from cryptocurrency trading was estimated to be just over SEK 1.5 billion in 2021.
- The tax gap corresponds to 90% of the theoretical tax on cryptocurrencies.
- The tax gap corresponds to 1.4% of the final capital gains tax for households.

Recommendations:

- Declaring the sale of cryptocurrencies is perceived by many as complicated. It is therefore reasonable to consider the possibility of simplifying the rules on the taxation of cryptocurrencies.
- More studies need to be carried out to increase knowledge of the factors that influence the tendency to declare crypto gains and income.

[1] In 2021, SEK 10 was equivalent to approximately EUR 1, and SEK 8 to USD 1.

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List of cryptocurrencies

Valutakod	Valuta
ADA	Ada
ALGO	Algorand
BCH	Bitcoin Cash
BNB	Binance Coin
BUSD	Binance USD
BTC	Bitcoin
DOGE	Dogecoin
DOT	Polkadot
ETH	Ether
HEX	Hex
LINK	Chainlink
LTC	Litecoin
MATIC	Polygon
OMG	OmiseGO
SOL	Solana
USDC	USD Coin
USDT	Tether
XLM	Stellar
XRP	Ripple

1 Introduction

Thousands of cryptocurrencies have been released since the introduction of Bitcoin in 2009. At its peak in 2021, the global market value of cryptocurrencies was estimated to exceed USD 3,000 billion. It is difficult to say with certainty how many Swedes trade in cryptocurrencies, but numbers are likely to be increasing. According to a study by the Swedish Internet Foundation (2021, 2022), the number of Swedes trading in cryptocurrencies doubled between 2021 and 2022, from 270,000 to 540,000. A study by Samsung (2022) found that as many as up to 900,000 Swedes traded in cryptocurrencies during 2022.

According to Swedish tax law, the sale of a cryptocurrency is a disposal of an asset and its tax treatment falls under the capital income category. Most transactions within the cryptocurrency markets occur on cryptocurrency exchanges and other digital platforms, which – unlike banks and other financial institutions that hold securities portfolios – do not have any reporting obligations. As a result, there are no pre-filled amounts for capital gains or losses on the income tax return. An individual who has sold cryptocurrencies is required to report these sales in connection with their annual income tax return. They must report each cryptocurrency sale in section D of Annexe K4 and then submit this annexe to the Swedish Tax Agency with their income tax return. Each transaction must be reported separately on its own line in Annexe K4.[2]

The numbers of Swedes who declare sales of cryptocurrencies are also increasing, albeit from relatively low levels. During 2013-2016, around 120 individuals per year declared sales of cryptocurrencies. This number rose to approximately 2,000 individuals per year between 2017 and 2020, and in 2021, it exceeded 8,000.

The tax gap[3] from cryptocurrency trading during 2021 is assessed in this report. The assessment is based on the Swedish Tax Agency's internal data on declared gains and losses from cryptocurrencies, as well as external data on transactions (not gains and losses, however) obtained from cryptocurrency exchanges and platforms. The tax gap is estimated to be SEK 1.5 billion, or 90% of the theoretical tax (the tax that would be final if everyone reported

[2] More information on how to report your sales of cryptocurrencies can be found at https://www.skatteverket.se/privat/skatter/vardepapper/andratillgangar/kryptovalutor.4.15532c7b1442f256bae11b60.html

[3] The tax gap is the difference between the tax that would have final if all taxpayers had accounted for their activities and transactions correctly, and the final tax after the Swedish Tax Agency's audits

their cryptocurrency transactions correctly). The tax gap is 1.4% of the established capital gains tax for households.

The size of the tax gap can be compared with an estimation by Thiemann (2021) of the tax gap from bitcoin trading during 2020. Thiemann studies how bitcoins are transferred between countries, focusing on the EU, and can thus estimate (undeclared) realised gains for each country. For Sweden, the estimate is of SEK 1 billion in 2020, which would indicate a tax gap of about SEK 300 million. There are two reasons why the estimate in this report is higher. First, Thiemann only considers the tax gap from bitcoin trading, while this report also assesses the tax gap from other cryptocurrencies. Second, the value of bitcoin increased fivefold, and the value of other cryptocurrencies also rose significantly, between November 2020 and November 2021, which may have prompted more individuals to take the opportunity to realize larger gains in 2021.

The IMF estimates that the global tax gap from trading in cryptocurrencies amounts to approximately USD 100 billion (IMF, 2023). It is estimated that less than half of the tax from trading in cryptocurrencies in the US is paid, with a tax gap of around USD 50 billion (Bloomberg, 2022). However, both the taxation of cryptocurrencies and the extent of trading in cryptocurrencies can vary significantly between countries, making direct comparisons of the figures difficult.

Both the EU and OECD have developed directives aimed at facilitating the exchange of information regarding cryptocurrency trading between countries. The EU directive DAC8 was adopted in October 2023 to prevent tax evasion from cryptocurrency trading. The directive requires cryptocurrency exchanges and platforms to provide information about their customers and their transactions to the authorities in their customers' countries. The OECD is working on a similar initiative, the Crypto-Asset Reporting Framework (CARF), to facilitate the automatic exchange of information about cryptocurrencies between countries.[4]

2 Method

Cryptocurrencies are used both as capital investments and as payment for goods or services.[5] Every sale of a cryptocurrency is the disposal of a capital asset that must be declared and taxed appropriately. In Sweden, capital gains are taxed at flat rate of 30%, and in the event of a loss, a tax deduction is

[4] See https://ec.europa.eu/commission/presscorner/detail/sv/qanda_22_7517 for information about DAC8, and OECD (2022) for information about CARF.
[5] Cryptocurrencies are commonly used as payment for illegal goods or services. However, this practice is not accounted for in the tax gap.

granted. If a cryptocurrency has been used as a means of payment for goods or services, it means that the buyer has either paid with a cryptocurrency in their possession or acquired one to make the payment. The sole proprietor who sold the goods or service and received payment in cryptocurrency can choose to dispose of the asset immediately to exchange it for Swedish kronor. The seller must report the disposal even if it did not trigger any tax effect. However, from a tax gap perspective, there is a significant risk of sellers who have not declared disposals correctly also failing to declare their sales and thus report the VAT and income tax due. The tax effect of a sale is typically over 30%. For example, an item sold for SEK 100 (excluding VAT) by a sole proprietor would incur SEK 25 in VAT and approximately SEK 15 in municipal tax if the profit were SEK 50, resulting in a tax effect of SEK 40, not including self-employed social security contributions. At the same time, it is theoretically possible for sole proprietors to have failed to report the sale of cryptocurrencies with which they have been paid, but to have otherwise declared their income correctly. It is also possible for private individuals to have sold goods and services for which they were paid in cryptocurrencies, overlooked the accurate reporting of the disposal of this asset, but otherwise reported the income or profits correctly.

Since it is difficult to determine which transactions are investments and which are payments, this report treats all cryptocurrency trading as investments and all disposals as capital gains or losses. This assumption could lead to both under- or overestimation of the tax gap. However, the Swedish Tax Agency has determined that cases where sole proprietors or private individuals fail to report the disposal of cryptocurrencies but correctly report the income in their tax returns are very few and that an assumption of a 30% tax rate on any profit is reasonable.

To assess the tax gap, this analysis is based on two sub-populations: a) an "internal" dataset consisting of individuals who have declared the sale of cryptocurrencies in their income tax return, and b) an "external" dataset comprising individuals who can be assumed to have unlimited tax liability in Sweden[6] and have sold cryptocurrencies on international crypto exchanges. The total population of Swedes who traded in cryptocurrencies during 2021 is assumed to be approximately 300,000 according to the report "Svenskarna och

[6] The Swedish Tax Agency has received transaction data on individuals who can be presumed to have unlimited tax liability in Sweden since they have provided a Swedish address, telephone number, email address, or similar information. To the extent that an individual in the external data is identified, he or she have unlimited tax liability in Sweden.

internet" (the Swedish Internet Foundation, 2021).[7] We follow HM Revenue & Customs (2022b) that suggests that about half of those who traded sold assets.

The distribution of sales amounts in external data is divided into 10 parts (deciles), providing a range of sales figures for each decile. For example, the 10% of sellers in external data with the lowest sales figures have made sales of up to SEK 547. The next 10% of sellers with the second-lowest sales amounts made sales of between SEK 548 and SEK 1,769. The 10% of sellers with the highest sales amounts made sales of between SEK 800,000 and SEK 131 million.

For each decile, a median agent is created using internal data of individuals who have reported a sales amount within the respective sales range. Since the acquisition value is also reported, the median capital gain for each decile can be calculated. It is then assumed that individuals from external data falling within the same sales range also make similar profits from the sale of cryptocurrencies.

It should be noted that capital gains and losses (under certain conditions) can be offset against each other, and that profits from cryptocurrencies do not always lead to taxation if the losses made from other assets are greater. Since capital losses grants tax reductions, the gain on disposals of cryptocurrencies, results in a corresponding reduction of the individual's tax reduction. Similarly, a loss from the sale of cryptocurrencies can reduce capital taxation or increase the tax deduction. The taxation, or the effect on the tax reduction, that arises as a result of a profit or loss from the sale of cryptocurrencies is referred to here as the crypto tax effect.

To calculate the tax gap for the entire population of Swedish crypto sellers, the crypto tax effect within each decile needs to be multiplied by the number of individuals whose sales amounts fall within the respective decile's sales range. Given the assumption that external data constitutes a representative sample for the total population of individuals trading in cryptocurrencies, and that approximately 150,000 individuals are estimated to have sold cryptocurrencies during 2021, the population is divided into 15,000 individuals per decile. The crypto tax effect for each decile is therefore multiplied by 15,000 to determine the tax gap. A numerical example is provided in Appendix A.

Hence, the method rests on four assumptions:

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[7] The Swedish Internet Foundation's survey question is formulated such that both trade in cryptocurrencies (studied in this report) and trade in exchange traded funds (ETF) with cryptocurrencies as the underlying asset can be included. However, during 2021 it was still uncommon to trade in crypto using ETF.

1. Individuals who have sold cryptocurrencies for a certain amount have made similar gains and losses, regardless of whether they have declared them or not.
2. The distribution of sales amounts in external data corresponds to the population's distribution of sales amounts.
3. Approximately 300,000 Swedes traded in cryptocurrencies during 2021.
4. About half of those who traded in cryptocurrencies during 2021 sold assets.

The first assumption is based on the fact that it cannot be proven that certain investors systematically are better than others identifying undervalued or overvalued assets and therefore buy/sell at more opportune times than others for a given risk level.

The second assumption cannot be verified but is conservative for two reasons. Firstly, many crypto traders are active on more crypto exchanges than those included in the external data. Secondly, the crypto exchanges in the external data are relatively small and have lower turnover than larger exchanges.

The third assumption is based on survey studies of the number of Swedes who traded in cryptocurrencies during 2021 (the Swedish Internet Foundation, 2021).

The fourth assumption is based on observations from external data, which show that of the people who traded in cryptocurrencies during 2021, approximately half sold assets. HM Revenue & Customs (2022b) also found that just under half of the UK citizens who owned cryptocurrencies during 2021 also sold cryptocurrencies during this period.

3 Data

The assessment of the tax gap is based on two sub-populations, consisting of individuals with unlimited tax liability in Sweden who sold cryptocurrencies during 2021: internal data on taxpayers who declared sales of cryptocurrencies during 2021 and external data on Swedish customers who sold cryptocurrencies on international crypto exchanges.

3.1 Internal data

The Swedish Tax Agency has identified taxpayers who declared sales of cryptocurrencies in Section D of a K4 Annexe (K4D), during 2013-2021. When a person declares the sale of a cryptocurrency, the field for the cryptocurrency's designation is filled in by the taxpayer, either digitally or in paper form. This results in a wide variation in how the sales are reported.[8] Sales

[8] Examples from K4D: 0,31336215 BTC (BITCOIN, KRYPTOTILLGÅNG); $MATIC - FÖRSÄLJNING DOLLAR; BITCOIN (BTC) KONVERSION TILL ETHEREUM (ETH).

of cryptocurrencies have been identified using a fine-meshed filter that matches most known cryptocurrencies, abbreviations and currency codes against the text in the designation to capture all rows on K4D related to cryptocurrencies. Since the filter risks capturing sales of other assets, such sales have been removed manually after matching. There were 8,218 individuals who declared sales of cryptocurrencies in 2021. The Swedish Tax Agency's internal data also includes other information about these taxpayers, including gender, age, registered address, and all details of declared income.

Figure 1 shows how the number of sales, sales amounts, and net profits in the internal data are distributed among different cryptocurrencies. Each square represents 1%, or approximately 1,200 sales, SEK 190 million in sales and SEK 23 million in profit. The 10 most frequent cryptocurrencies are represented.[9]

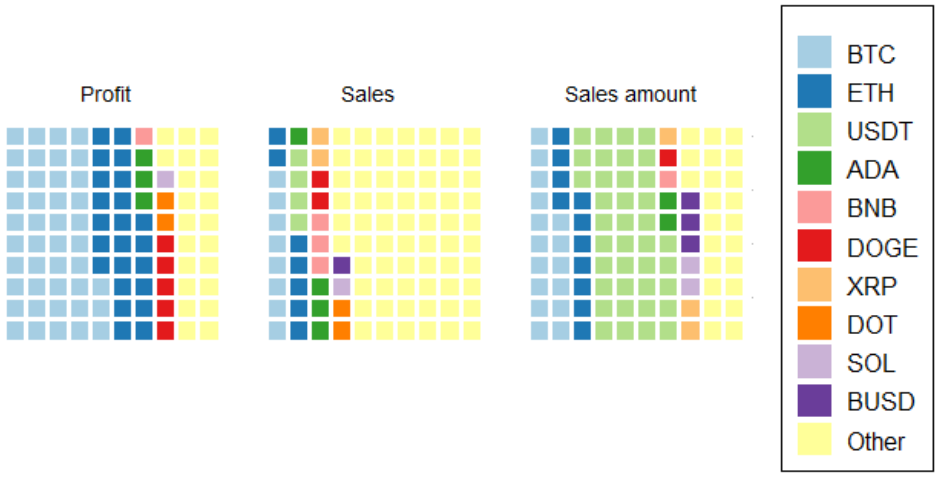

Figure 1. Waffle chart showing the number of sales, sales amounts, and profits per cryptocurrency. Internal data. Each square represents 1%. For the number of sales, 1% corresponds to approximately 1,200 sales. For sales values, 1% corresponds to approximately SEK 190 million. For profits, 1% corresponds to approximately SEK 23 million.

From Figure 1, it is evident that many different cryptocurrencies are traded, as two-thirds of all sales are of cryptocurrencies other than the 10 most common ones. Bitcoin (BTC) and ether (ETH) account for the most sales, largest profits, and among the highest sales amounts. Bitcoin accounts for 8% of sales, 16% of sales amounts, and 43% of profits. Ether accounts for 7% of sales, 11% of sales amounts, and 23% of profits. Tether (USDT) stands out with 38% of sales amounts, but only 4% of the number of sales and no profits.[10]

[9] These 10 assets are the ones accounting for the highest number of sales. Among the 10 assets representing the largest share of sales volume, USDC is also included, with about 2% of the sales volume. Among the top 10 on the profit side, MATIC is also included, accounting for 5% of the profit, as well as HEX and LINK, each representing less than 1%. These are included under "others" in the diagram.

[10] Declared trading with tether is associated with a net loss.

This can be explained by the fact that tether is a so-called stablecoin, a cryptocurrency whose value is fixed to another asset, often currencies, and therefore maintains a more stable value than other cryptocurrencies. As a result, stablecoins are usually used as medium of exchange and store of value without having to leave the crypto market.[11]

3.2 External data

The Swedish Tax Agency has gained access to transaction data on cryptocurrency trading for individuals who can be presumed to be taxable in Sweden from a number of international crypto exchanges and platforms. The transactions occurred during the period 2017-2022 and involve approximately 50,000 individuals, of whom 2,528 sold cryptocurrencies in 2021. Of these, 1,481 individuals were identified, which means that the Swedish Tax Agency's internal information about taxpayers can be linked to these crypto traders. This also means that it is possible to see to what extent they have declared their sales.

The transaction data includes, among other things, information about the time of the transaction, whether the transaction is a purchase or sale, which cryptocurrency is involved, and the payment method used.

In the external data, there is information about 2,528 individuals who sold cryptocurrencies during 2021. Of these 1,481 (59%) were identified, and of these identified individuals, 214 (8%) have declared cryptocurrency sales in their tax returns.[12] Among the identified sellers who filed tax returns 88 taxpayers (41%) have reported a lower sales amount than those observed in the external data, 119 (56%) reported a higher amount and 7 (3%) reported exactly the same sales amount as those observed in the external data.

It can be concluded that compliance in the group as a whole can be considered low, as few (8%) reported their sales. Among those who have been identified and filed tax returns, the transactions carried out in the external data do not correspond to the transactions declared (except for the seven individuals who reported exactly the same amount). The transactions reported to the Swedish Tax Agency but not found in external data have likely been carried out on a

[11] It can be difficult and costly to convert assets from crypto to fiat currency. If an investor wants to maintain a position in cryptocurrencies, but is currently unsure which one, they can hold Tether while considering their options.

[12] The proportion of identified individuals varies depending on the crypto exchange, ranging from just under 3 percent to 98 percent. The proportion of identified sellers who have filed tax returns varies between just under 2 percent to just over 15 percent, depending on the source. These large variations can be explained by the fact that crypto exchanges differ and attract different types of customers. The crypto exchange with the highest proportion of identified individuals also has the highest proportion of tax filers and is known for its cooperation with authorities.

crypto exchange not included in the external data available to the Swedish Tax Agency. However, it is also possible that the sales amounts have been underreported.

Figure 2 shows the distribution of different cryptocurrencies in terms of number of sales and sales amounts. Crypto exchanges that only allow trading of a single cryptocurrency are excluded. Note that the colour coding differs from Figure 1, except for bitcoin and "others", as there are different assets in the top 10 in the external data.

Figure 2 does not follow the same pattern as Figure 1. The three largest assets (in this case bitcoin, XRP, and ether) account for clear majorities of both sales and sales amounts, 70% and 87% respectively. The cryptocurrencies that are most frequently traded differs as well. Only bitcoin, ether, and XRP are found among the top 10 in both internal and external data.

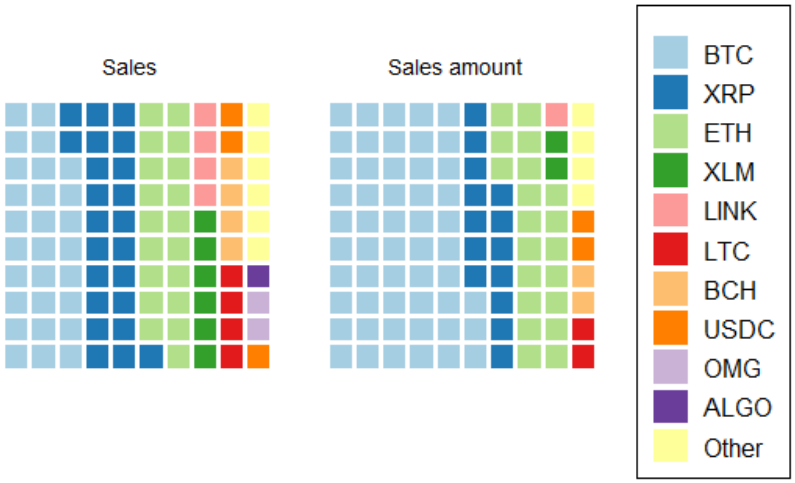

Figure 2. Waffle chart showing the number of sales and sales amounts per cryptocurrency. External data. Each square represents 1%. For the number of sales, 1% corresponds to approximately 500 sales. For sales amounts, 1% corresponds to approximately SEK 14.6 million.

4 Descriptive statistics

Figure 3 shows how reported sales amounts, profits, and losses from cryptocurrency sales developed during 2013-2021 for internal data. From a few tens of millions of Swedish kronor in total sales amounts during 2013-2016, the amounts grow to a couple of billion Swedish kronor during 2017-2020, and then increase to almost SEK 19 billion in 2021.

Profits rose from a few million Swedish kronor in 2013 to SEK 2.6 billion in 2021. However, the share of profits relative to sales amounts decreased. During the period 2013-2016, profits corresponded to more than 50% of sales

amounts, while in 2021, they constituted about 15% of sales amounts. Losses increased from a few hundred thousand Swedish kronor in 2013 to just over half a billion Swedish kronor in 2021.

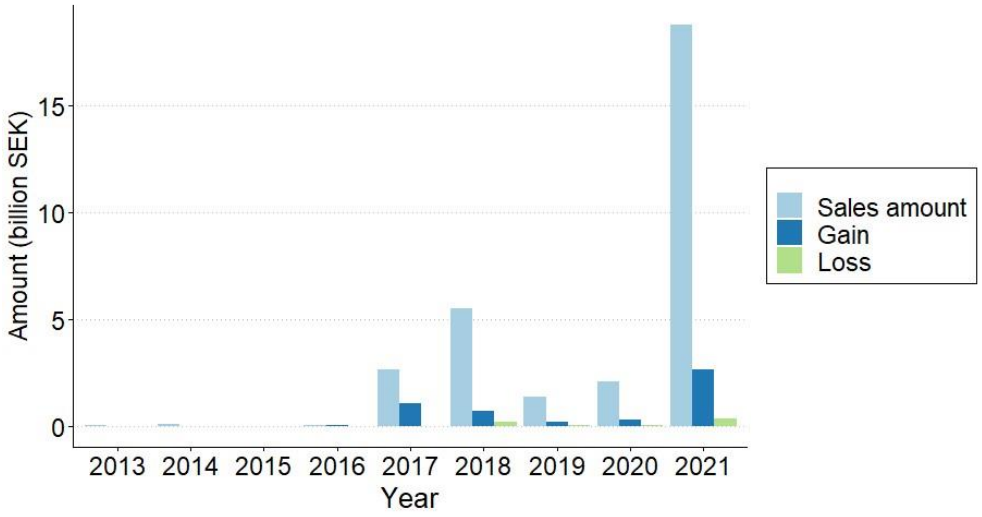

Figure 3. Declared sales amounts, profits and losses per year, 2013-2021.

During the same period, the number of tax filers rose from around 100 during 2013-2015 to 8,218 in 2021, as shown in Figure 4. During the period 2013-2021, a total of 12,387 unique individuals reported a sale of cryptocurrencies. Of these, 9,778 only reported sales for one of the years, of which 6,400 only for 2021. Just under 2,000 people reported sales for two year and a few hundred reported for three years or more.

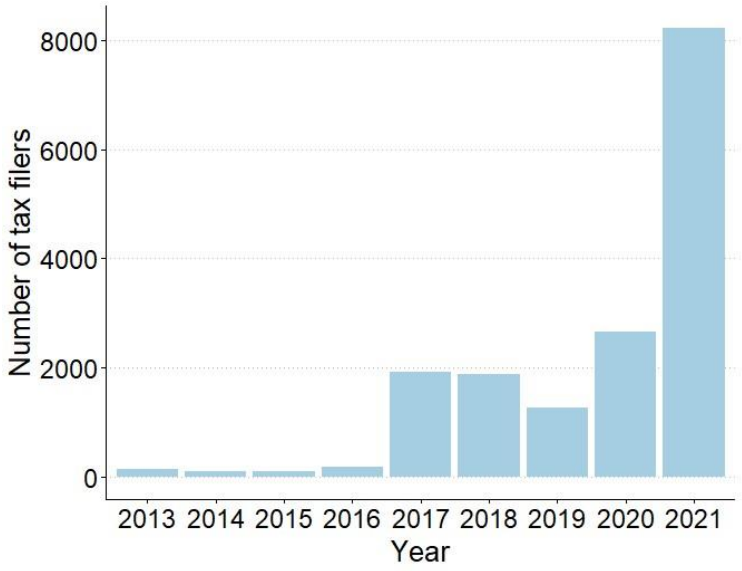

Figure 4. The number of people who declared cryptocurrency trades per year, 2013-2021.

Table 1 shows descriptive statistics for the 8,218 individuals who declared sales of cryptocurrencies in 2021. The tax filers are primarily men in their 30s.

Women make up only 8% of the tax filers, and although the age range spans from 13 to 86 years, half of the tax filers are between 28 and 40 years old. The median income of the declarants was approximately SEK 420,000. It is also somewhat more common for the tax filers to be registered in metropolitan regions, particularly Stockholm, than in the rest of Sweden.

The table also shows that the total sales amounts vary significantly among the tax filers.[13] The highest sales amount is approximately SEK 5.5 billion, accounting for just over 25% of the total sales amount of nearly SEK 19 billion. The median sales amount is SEK 81,458, and 75% of all sales amounts are under SEK 434,000. The smallest declared sales amount is SEK 0. For this last case, it is likely that the individual wrote off a cryptocurrency.

Table 1. People who declared cryptocurrency trading in income year 2021.

	Min	Max	Median	Mean	SD
Age	13	86	33	35	9.65
Gender (male=1)	-	-	-	0,92	-
Employment income[14]	0	288 874 791	421 185	471 033	3 232 955
Deemed income	0	25 783 039	1 029	9 570	288 135
Sales amount (SEK)	0	5 493 490 342	81 458	2 275 209	62 179 800
Number of transactions	1	881	5	15	28
Profit	0	105 850 050	13 503	321 677	2 159 547
Loss	0	15 459 452	745	42 843	323 440

Figure 5 shows the relationship between net profit and sales amount per tax filer and indicates a positive correlation between the two. It can also be noted that the highest net profits increase proportionally with the sales amount, which can be explained by the fact that profits can never exceed the sales amount, as well as the observation that a large portion of the profits is close to zero regardless of the sales price.

[13] The sale amount corresponds to one or more sales.

[14] In this report, individuals' employment income is taken into account. It is also possible to look at individuals' earned income, which refers to their total taxable income before tax, excluding capital income. However, in this case, employment income and earned income are largely equivalent.

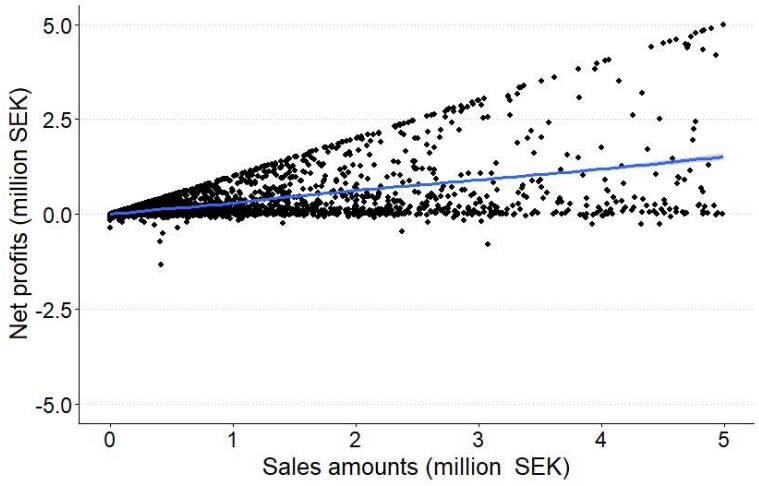

Figure 5. The relationship between net profits and sale amounts. Includes sale amounts of up to SEK 5 million (just above 95% of the observations).

Descriptive statistics for identified individuals in the external data are shown in Table 2, which can be compared with Table 1. Just as in the internal data, crypto traders are primarily men in their 30s. The sales amounts are also similar, although slightly higher for internal data. Even though the highest sales amount in internal data significantly exceeds the highest amount in external data, there are only 11 individuals in the internal data with a sale amount that exceeds the highest sale amount in the external data.

However, one notable difference is that identified individuals in the external data have a lower median income than those in internal data. Deemed income attributed to these individuals is also lower than for those in the internal data.

There are several possible explanations for this:

1. The external data come from smaller crypto exchanges, while crypto traders with higher incomes and more investment experience might trade on larger exchanges.
2. The tendency to declare might be greater among individuals who have more investment experience and who sell for higher amounts.[15]
3. These experienced traders might be better at concealing information that makes their accounts on crypto trading platforms more difficult for the Swedish Tax Agency to identify.
4. Finally, it's possible that some individuals choose to increase their disposable income by declaring gains from trading cryptocurrencies because they have somewhat lower employment and capital incomes.

[15] In the external data, there is a positive correlation between sales value and the probability that the individual has filed a declaration. This relationship is also noted by HM Revenue & Customs (2022b).

Table 2. Identified individuals in external data, and their cryptocurrency trading, during income year 2021.

	Min	Max	Median	Mean	SD
Age	18	84	36	37	10.24
Gender (Male=1)	-	-	-	0,91	-
Employment income	0	6 309 114	361 023	373 612	399 363
Deemed income	0	489 172	234	4 376	19 067
Sales amount	1	131 112 406	65 107	1 058 382	5 801 993
Number of transactions	1	45 842	21	133	1 238

Figure 6 shows the base-10 logarithm of all sales amounts in internal and external data.[16] The diagram indicates that the values overlap to some extent, but the sales amounts in the external data are consistently lower than the sales amounts in the internal data.[17]

As previously mentioned, the internal sub-population might consist of more experienced stock traders in general, with larger assets. Another explanation could be that sales in the external data doesn't necessarily represent a person's total sales, since data isn't available from all crypto exchanges and platforms. It's common for individuals to trade on multiple platforms.

An additional explanation is that low sales amounts, and consequently low profits, correlate with a lower tendency to declare.

[16] Since the sales amounts are exponentially distributed, the diagram becomes more readable and the curves easier to compare if using a base-10 logarithm.
[17] Similar comparisons can be made regarding the distribution of declared sales amounts per fiscal year. These are also similar, albeit with somewhat higher sales amounts during 2018 and 2021 compared with 2020 and 2019. Comparisons can be found in Appendix C.

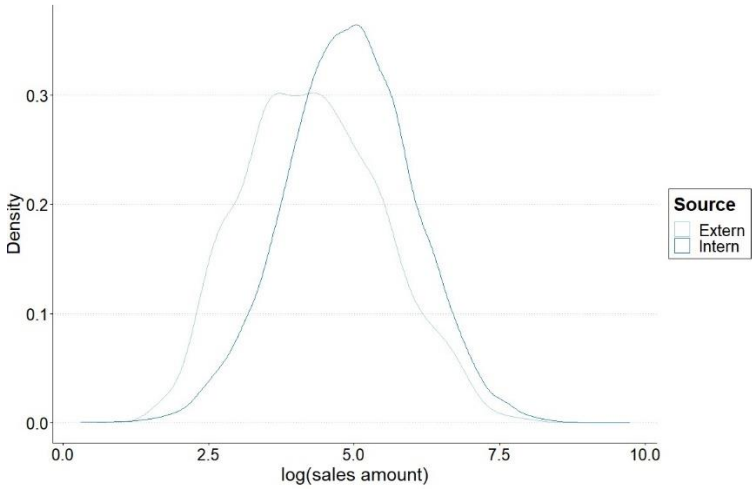

Figure 6. Probability distribution of the base-10 logarithm of sales amounts. Internal and external data.

5 Tax gap

The tax gap assessment is based on the external data covering 2,528 individuals who sold cryptocurrencies during 2021, as well as 8,218 individuals from the internal data who declared sales of cryptocurrencies.

First, 10 deciles are defined based on the sales amounts in the external data. Table 3 shows sales amounts per decile. There is a clear difference in sales amounts between the lower and higher deciles. The first four deciles have sales amounts under SEK 10,000, while the ninth decile has sales amounts up SEK 800,000. The tenth decile has sales amounts just over SEK 800,000 up to SEK 131 million.

The table also shows the number of tax filers who have reported a sales amount within each interval. Since internal sales amounts are higher than external sales amounts, there are fewer tax filers in the lower deciles and more in the higher ones.[18] Note also that 11 tax filers have been excluded as their sales amounts are higher than the highest sales amount in the external data.

[18] It is also possible to use only internal data and divide the sales amounts in internal data into deciles. In that case, each decile would have had approximately 800 declarants each. However, due to the positive correlation between sales amount and declaration tendency, this approach involves the risk of overestimating the tax gap. The results for such a calculation can be found in Appendix C.

Table 3. Sales amounts in SEK and number of tax filers per decile.

Decile	Sales amount	Number of tax filers
1	0 - 547	214
2	548 - 1,769	319
3	1,770 - 3,879	360
4	3,880 - 8,119	520
5	8,120 - 17,780	765
6	17,781 - 37,420	887
7	37,421 - 85,306	1,019
8	85,307 - 227,816	1,277
9	227,817 - 809,709	1,329
10	809,710 - 131,112 406	1,429

For each decile, a representative median agent is created with a capital tax profile based on median values for:

1. Standard rate of capital income[19]
2. Interest income
3. Profits from listed funds, etc.
4. Profits from unlisted funds, etc.
5. Interest expenses
6. Losses from listed stocks, etc.
7. Losses from unlisted stocks, etc.

In practice, the capital tax profile for the median agent almost exclusively contains values for deemed income and interest expenses. This is in line with a study that found that crypto traders tend to have the majority of their assets placed in the crypto market (Binance Research, 2021). The capital tax profile for each median agent can be found in Appendix B.

Table 4 shows the median profit from the sale of cryptocurrencies and the crypto tax effect per individual. The crypto tax effect is the additional tax on capital income that the median agent of each decile should pay as a result of capital gains from the sale of cryptocurrencies.

From Table 4 one can see that median agent 1 has SEK 0 in median gains. Thus, the crypto tax effect is also SEK 0. Median agents 2-6 have gains from their cryptocurrency sales, but since the gains together with the agent's standard rate of capital income (for all except median agent 3) are less than the agent's interest expenses, they incur capital losses. Median agents 7-10 have larger profits from their cryptocurrency sales. For them, the gains from the sales of cryptocurrencies together with the standard rate of capital income exceeds the interest expenses, resulting in a positive capital surplus on which they must pay income tax at the rate of 30%.

[19] The Swedish Tax Agency impute an income on investment savings account on a standardized basis.

The theoretical tax, i.e., the crypto tax effect for the entire population, is calculated by multiplying the crypto tax effect for each decile by 15,000.[20]

Table 4. Median profit and crypto tax effect in SEK per decile and individual.

Decile	Median profit	Crypto tax effect
1	0	0
2	41	12
3	203	61
4	755	227
5	1,936	581
6	4,212	1,264
7	10,133	3,040
8	22,691	6,807
9	64,435	19,331
10	272,169	81,651

The theoretical tax is SEK 1,694 million and is shown per decile in Table 5. However, the tax gap from the sale of cryptocurrencies must also take into account the individuals who have declared their sales. The declared amounts are subtracted from the theoretical tax amounts. The tax from reported sales of cryptocurrencies is estimated in the same way as the crypto tax effect based on a median agent for each decile and is referred to here as estimated final tax.[21]

As a result, the tax gap is assessed to be SEK 1,538 million, approximately SEK 155 million less than the theoretical tax. This means that the tax gap's share of the theoretical tax is 90%. However, the tax gap only constitutes 1.4% of the final tax for households' capital income.

It is primarily the individuals with the highest sales amounts who contribute to the tax gap. The highest decile accounts for over 70% of the tax gap, while the second highest accounts for over 15%. The combined contribution of the five lowest deciles to the tax gap is around 1%. This is in line with the study from HM Revenue & Customs (2022), which found that just under 20% of crypto traders were responsible for almost the entire tax gap.

[20] The figure 15,000 is based on the assumption that 300,000 Swedes traded in cryptocurrencies during 2021 and that half of them sold assets. (See the "Method" section.)
[21] For the sake of comparability, the tax payments are estimated for a median agent per decile instead of making an actual calculation per tax filer. An actual calculation is better suited to a method based on an average measure of profit. Given that the distribution is exponential, our methodological approach based on the median carries less risk of overestimating profits, and consequently, the tax gap.

Table 5. Crypto tax effect, estimated final tax, and tax gap in SEK, per decile for the Swedish population of crypto traders.

Decile	Theoretical tax	Estimated final tax	Tax gap
1	0	0	0
2	180,000	4,000	176,000
3	915,000	22,000	893,000
4	3,405,000	118,000	3,287,000
5	8,715,000	444,000	8,271,000
6	18,960,000	1,121,000	17,839,000
7	45,600,000	3,098,000	42,502,000
8	102,105,000	8,693,000	93,412,000
9	289,965,000	25,691,000	264,274,000
10	1,224,765,000	116,680,000	1,108,085,000
Total	**1,694,610,000**	**155,850,000**	**1,538,760,000**

6 Discussion

The number of people declaring sales of cryptocurrencies in Sweden has increased from around 100 individuals during 2013-2015 to just over 8,000 in 2021. However, only about 5% of Swedes who sold cryptocurrencies during 2021 have also declared their sales.

The tax gap from the sale of cryptocurrencies is estimated to be 90% of the theoretical tax, or SEK 1,538 million. As a proportion of households' capital income tax, the tax gap from cryptocurrency trading constitutes 1.4%. The tax gap primarily results from individuals with high sales amounts. The individuals with the top 10% of the highest sales amounts account for nearly three-quarters of the tax gap, while those with the lowest 50% of sales amounts account for a negligible part of the tax gap only.

The tax gap of SEK 1.5 billion can be compared with the tax gaps of other capital incomes. In the Swedish Tax Agency's tax gap report "Skattefelsrapport 2021", it was estimated that the tax gap for incorrect capital deductions were on average SEK 3.6 billion per year for the period 2016-2018 and that the tax gap for returns on foreign assets were on average SEK 4.4 billion during the same period. These figures provide context for the magnitude of the tax gap due to cryptocurrency trading in relation to other areas of capital income taxation.

Of the 8,218 individuals who declared sales of cryptocurrencies in 2021, 6,400 individuals, or nearly 80% of this group, did not declare sales of cryptocurrencies in any previous year. The tax filers are primarily men aged 28-40 years. The total declared sales amount of cryptocurrencies for 2021 were nearly SEK 19 billion. However, most declare sales for smaller amounts, up to SEK 100,000. The individuals trade in a wide variety of cryptocurrencies, but the gains stem mainly from bitcoin (BTC) and ether (ETH). The largest

transaction volumes, however, come from tether (USDT), which can be explained by the fact that tether is used to "park" assets, since it is a stablecoin tied to the US dollar, giving it a more stable value than other cryptocurrencies.

There is a positive correlation between sales amounts and filing tax return, which means that individuals who have made larger gains from their sales are also more likely to declare those sales. This positive correlation is somewhat counterintuitive, as the incentive not to declare correctly increases with the size of the profit. On the other hand, there are more factors that influence the tendency to file in a tax return. Some of these factors may also correlate with sales amounts, such as how experienced or sophisticated the trader is, the trader's knowledge of the tax system, the trader's perceived risk of detection if they do not file accurate income tax return, as well as any potential tax surcharges and penalties upon discovery. The overall low compliance among individuals who have sold cryptocurrencies is an interesting issue that unfortunately falls outside the scope of this report.

It is worth noting that 2021 was a non-typical year in the cryptocurrency market, as many cryptocurrencies rose sharply until November 2021, only to fall at the end of 2021 and throughout 2022. Therefore, it is difficult to draw any conclusions about the tax gap for other years or the development of the number of individuals trading and declaring sales of cryptocurrencies. For example, there were over 2,000 fewer individuals who declared sales of cryptocurrencies in 2022 compared with 2021. The total declared sales amount in 2022 was less than half of that for 2021. This may be due to more individuals realising gains during the high prices that prevailed in 2021, while those who entered the market in 2021 refrained from realising losses in 2022.

Since the tax gap arises from a very low declaration tendency, there is risk of its growing if more Swedes start trading in cryptocurrencies. The Swedish Tax Agency has previously conducted interviews with a selection of Swedish crypto traders to gain a better understanding of the factors influencing declaration tendency. One factor that many mention is the challenge of properly declaring crypto trading accurately. In order to report their transactions the taxpayer may need to spend many hours searching for documentation and calculating costs via fiat and cryptocurrency exchange rates.

Even though accounting services are available, many find that the low sales amounts involved do not justify the costs of these services. Therefore, it is reasonable to consider the possibility of simplifying the rules for taxing cryptocurrencies. There are also additional factors that influence compliance, and complementing the interviews with a quantitative analysis of factors that may affect compliance, such as demographic factors, sales amounts, as well as

the type of cryptocurrency and transaction, could provide insights into further measures to increase the likelihood individuals report their sales correctly.

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Appendix A – Numerical example to illustrate the method used to assess the tax gap

Assume that there are 20 observations of sales amounts (from external data) and 10 observations of sales amounts, net profits, and interest expenses (from internal data). Table A1 shows the 10 observations with the lowest sales amounts from the external data (deciles 1-5), while Table A2 displays the 10 observations from the internal data from which sales amounts correspond to those in deciles 1-5.

The threshold values for the deciles are determined by the sales amounts in external data. Decile 1 covers the range of SEK 0-200, meaning that individual 1 from internal data falls into this decile. Decile 2 covers the range of SEK 200-250, which means that individuals 2 and 3 fall into that decile. Table A3 illustrates the deciles, their threshold values, and the median agent's gains, interest expenses, and crypto tax effect. As the table shows, there can be more or fewer than two individuals from the internal data included in the same decile. For deciles 1-3, the interest expenses exceed the net gain from cryptocurrency sales, resulting in a crypto tax effect of zero, since the analysis is limited to a capital tax effect and disregards the total tax burden.

Table A1. Example – sale amounts in SEK from external data.

Individual	Sale amount
1	50
2	200
3	250
4	250
5	300
6	400
7	500
8	800
9	900
10	1,100
…	…

Table A2. Example - sale amounts, profits and interest expenses in SEK from internal data.

Individual	Sale amount	Gains	Interest expenses
1	200	-10	1,000
2	250	20	0
3	250	-20	0
4	300	50	500
5	300	50	0
6	500	100	200
7	550	200	500
8	600	100	0
9	750	250	0
10	1,000	500	0
…	…	…	…

Table A3. Example – median agents.

Decile	Interval	Individuals	Profit	Interest exepenses	Crypto tax effect
1	0-200	1	-10	1,000	0
2	200-250	2,3	0	0	0
3	250-400	4,5	50	250	0
4	400-800	6,7,8,9	150	100	50
5	800-1,100	10	500	0	500
…	…	…	…	…	…

Appendix B – Distribution of sale amounts

Figure B1 shows the probability distribution of the logarithm (base 10) of declared sales amounts per year for 2018-2021. The distributions are similar, although 2018 and 2021 (red and purple lines) have slightly higher sales amounts than 2019 and 2020.

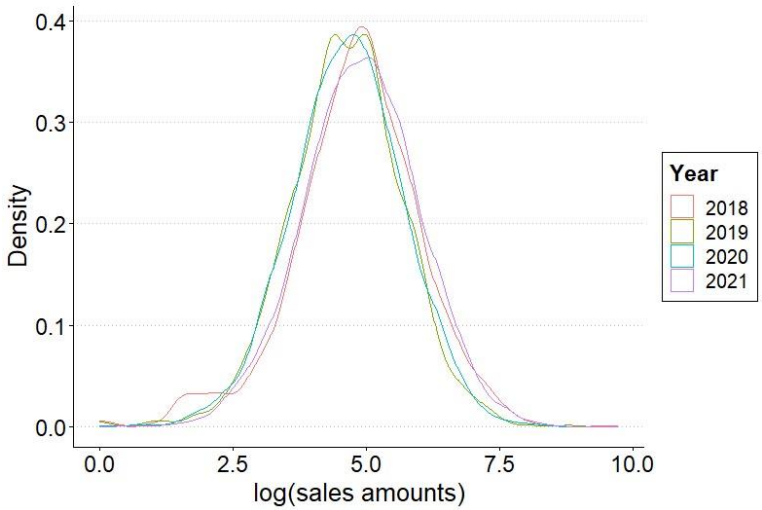

Figure B1. Probability distribution of the logarithm of declared sales amounts, 2018-2021.

Appendix C – Tax gap assessed using internal data only

Tables C1 and C2 show the results from a calculation of the tax gap based solely on internal data. Instead of assuming that the distribution of sales amounts in external data is representative of the distribution of sales amounts in the population, it is assumed here that the distribution of sales amounts in internal data is representative. However, this assumption is likely to lead to an overestimation of the tax gap due to the positive correlation between sales amounts and declaration propensity.

Table C1. Sales amounts, median gains, and crypto tax effect in SEK and per decile. The deciles are based on the sales amounts in the internal data.

Decile	Sales amounts	Median gain	Crypto tax effect
1	0 - 3,360	34	10
2	3,361 - 10,000	882	265
3	10,001 - 21,932	2,467	740
4	21,933 - 43,966	5,894	1,768
5	43,967 - 83,391	10,537	3,161
6	83,392 - 155,770	22,559	6,768
7	155,771 - 311,613	38,220	11,466
8	311,614 - 658,114	77,951	23,385
9	658,115 - 2,092,414	151,575	45,473
10	2,092,414 - 5,493,490,342	486,427	145,928

Table C2. Theoretical tax, estimated final tax, and tax gap in kronor per decile. The deciles are based on the sales amounts in the internal data.

Decile	Theoretical tax	Estimated final tax	Tax gap
1	150,000	8,200	141,800
2	3,975,000	217,300	3,757,700
3	11,100,000	606,800	10,493,200
4	26,520,000	1,449,760	25,070,240
5	47,415,000	2,592,020	44,822,940
6	101,520,000	5,549,760	95,970,240
7	171,990,000	9,402,120	162,587,880
8	350,775,000	19,175,700	331,599,300
9	682,095,000	37,287,860	644,807,140
10	2,188,920,000	119,660,960	2,069,259,040
Total	**3,584,460,000**	**195,950,480**	**3,388,509,520**

Postal address: SE-205 30 Malmö **Telephone**: +46 (0)771-567 567
skatteverket@skatteverket.se, www.skatteverket.se