

Cash use in Germany

Cash hoarding by German households – an empirical analysis of how much cash they store and why



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■ Summary

Estimates by the Bundesbank suggest that banknotes worth around €268 billion were in circulation in Germany in 2018. Of that amount, roughly 20% was used directly for transactions. The other, far larger share – somewhere in the region of €200 billion – is thought to be hoarded, i.e. stored for an extended period of time by households and firms. To discover more about the whereabouts of these cash reserves and how they were being used, the Bundesbank commissioned a research survey at the beginning of 2018 in an attempt to find out how much cash households were storing outside their wallets at home or in a safe deposit box. The survey also explored the extent to which these amounts might be related to tax offences, such as illicit work or tax evasion.

According to the findings of the study, individuals in Germany kept an average of €1,364 in cash at home or in a safe deposit box at a bank in 2018. Cash reserves were therefore significantly higher than the amounts of cash that individuals kept in their wallets for short periods of time for transaction purposes (roughly €107). The banknote denomination used most frequently for cash hoarding purposes was €50. The distribution of the amounts among the population was extremely uneven and heavily concentrated. On average, older people, higher earners and self-employed people held the largest amounts of cash.

The data provide no specific indications of tax motives for storing cash. Though 12% of those who kept cash reserves felt that tax considerations could certainly play a role in the storage of cash nowadays, a more detailed regression analysis found no evidence to confirm this suspicion for the existing observations. Rather, a lack of trust in the security and robustness of technical infrastructure appears to be a major factor in explaining cash reserves.

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1 Introduction

Since the introduction of the euro as a physical currency in 2002, the Bundesbank has put cash worth roughly €700 billion net into circulation.¹ Cash is anonymous, so official statistics on the use and whereabouts of issued banknotes and coins are scarce. For this reason, the Bundesbank regularly produces research reports using a variety of empirical methods to analyse the cash in circulation in Germany and abroad. The present study investigates cash hoarding by households in Germany in 2018.

The economic model on the use of cash first subdivides the net cash issued by a central bank into cash in circulation domestically and abroad. The domestic circulation of cash is then broken down further into domestic transaction balances and domestic hoarding balances. The transaction balances comprise cash that is used at short notice to purchase goods and that is part of the constant cash cycle between the Bundesbank, commercial banks, retailers and consumers. By contrast, the hoarding balances serve as longer-term stores of value and are withdrawn from the constant cash cycle until further notice (Boeschoten, 1992; Bartzsch et al., 2011a, 2011b).

For 2018, the Bundesbank puts the domestic stock of banknotes at around €268 billion.² Transaction balances account for around €58 billion of that figure. Estimating and interpreting domestic hoarding, on the other hand, is a challenge. To date, it has only been calculated indirectly with the aid of macroeconomic models and constitutes a residual. This approach is designed to capture cash held for longer

¹ As at the end of 2018. The figures cited in this study on banknotes in circulation are based on an internal extrapolation of estimates taken from the Bundesbank's Monthly Report (2018a).

² Coins have been excluded from this estimate due to their small share of Germany's cumulative net issuance (around 1.2%).

periods of time in the private non-bank sector (households and firms), with previous estimates coming to a figure of around €200 billion. However, these values will inevitably also include cash that has been irretrievably lost or destroyed. It is also unclear how hoarding balances are distributed across households and firms.

The present study uses personal interviews followed by a microeconomic evaluation to analyse the hoarding of cash in the household sector. Household cash holdings are currently a matter of political interest: although the almost universal availability of cashless payment instruments has diminished the role of cash in official economic activity, demand for banknotes and coins in Germany has been increasing for years (Deutsche Bundesbank, 2018a, 2018b). This discrepancy raises the question of whether the population is using the cash issued exclusively for legitimate purposes. In particular, the inexplicably high levels of domestic hoarding are often linked to informal or illegal activities. Calls for restrictions on cash payments or even for cash to be abolished altogether have been voiced (Bofinger, 2015; Rogoff, 2016; Sands, 2016). However, there is a lack of scientifically substantiated insights into who exactly is hoarding cash in Germany and why. In response to the ongoing debate, this paper explores the following research questions:

- How high is the amount of cash hoarded by German households? This comprises all cash holdings kept by households that are not directly used for transaction purposes.
- Which population groups hold the most cash? What role do age, education, region and economic and financial situation play?
- Are there indications of tax motives for storing cash (e.g. tax evasion or illicit work)? And what legitimate reasons for storing cash are of significance (e.g. financial or technical security concerns)?

To answer these research questions, a survey entitled “Cash use in Germany” was conducted at the beginning of 2018. Roughly 2,000 participants provided informa-

tion on the cash they store outside their wallets at home or in a safe deposit box at a bank. At the same time, the questionnaire gathered indications of individuals' honesty in tax matters. Owing to the highly sensitive nature of these topics, the main challenge was to obtain a representative sample with truthful answers. A wide range of confidence-building measures were incorporated into the study to boost participation and response rates, including the option of switching to a computer-assisted self interview (CASI) and a very deliberately structured questionnaire.

This paper will continue by describing the survey design and the stages involved in greater detail, before calculating average household hoarding levels in Germany using the personal data obtained from the survey. This will be followed by a descriptive analysis of how the amounts are distributed across the population and a breakdown by socio-demographic factors. The paper concludes with a regression analysis examining whether there is a correlation between storing larger amounts of cash and an individual's tax morale. Besides considering the individual's general tax morale, this analysis specifically incorporates the provision of undeclared labour as a possible determinant of the amount of cash hoarded.

The study found that households in Germany hoarded €1,364 on average, with older and better-earning individuals tending to hold more cash. There are no specific indications of tax motives for storing cash. Though 12% of those who kept cash reserves felt that tax motives could play a role in the storage of cash, the more detailed regression analysis found no evidence to confirm this suspicion for the existing observations. Rather, a lack of trust in the security and robustness of technical infrastructure appears to be a major factor in explaining cash reserves.

■ 2 The “Cash use in Germany” survey

2.1 General survey framework

2,000 randomly selected individuals were interviewed for the “Cash use in Germany” study between January and April 2018. The survey centred around two main topics – cash holdings and people’s tax morale – and also involved collecting detailed information on participants’ socio-demographic backgrounds.

Multi-stage sampling was used to obtain a representative sample for the German resident population aged 18 and over. In the first stage, 370 locations (sample points) were drawn within Germany. Participating households were then determined using a random route – a technique where each interviewer is assigned with a starting location and a set of random walking rules as a basis for selecting, contacting and ultimately surveying households. To ensure that interviewers followed the random walking rules properly, they were given a list upfront of the addresses where they would be able to find suitable interviewees according to the random route requirements. If no one was home at a randomly selected household, at least two further attempts had to be made to contact them, including one attempt after 18:00 or at the weekend. Within a household, interviewees were likewise selected randomly using the Kish selection grid.

The survey was conducted on the Bank’s behalf by Kantar TNS, a market research institute with its own teams of predominantly highly experienced interviewers. Participants mainly answered the questions in a computer-assisted personal interview (CAPI), and interviews lasted 20 minutes on average. Participants were given a high-quality Bundesbank-branded ballpoint pen made by a well-known manufacturer worth around €15 for taking part in the survey.

2.2 Sensitive nature of the topics and confidence-building measures

The key challenge presented by this study was to broach the two highly sensitive topics of "cash holdings" and "tax morale". Covering these subjects in voluntary surveys can result in low and selective participation, interview break-offs, non-responses and inaccurate answers. For instance, questions about cash holdings relate to a person's financial situation. Participants may opt not to provide information on existing cash reserves or may underestimate (underreport) them if they have concerns about the integrity of the survey. By contrast, questions regarding tax morale are based on socially undesirable or even illegal behaviour. Participants involved in such behaviour may choose not to provide truthful answers for fear of potential prosecution.

If the sample contains selective non-responses and inaccurate answers, evaluations will no longer be representative of the overall population. This distorts extrapolations, and in regression analyses, too, it will no longer be possible to generalise estimated correlations to the population (Wooldridge, 2010).

To address the selection problem, the survey incorporates numerous confidence-building measures in an effort to boost the willingness of interviewees to respond to the key questions regarding cash holdings and tax morale, in particular. In addition, the questionnaire collected supplementary information on the two topics. If interviewees fail to respond, this made it easier to gauge whether the non-responses were random or selective.

One of the prime confidence-building measures was to show that the study had been officially commissioned by the Bundesbank. During interviewee recruitment, interviewers distributed information leaflets to explain the contents and purposes of the study and highlight its anonymous and scientific nature. Furthermore, prospective participants were able to see for themselves that the survey was a respectable and trustworthy undertaking by visiting the Bundesbank and Kantar TNS

websites. They could also personally contact the Bundesbank’s project managers if they wanted to. The Bundesbank’s official status as the party commissioning the survey served the particular purpose of collecting reliable information on the cash holdings of the individuals who were the focus of the study. It cannot be ruled out, though, that this strategy might have made participants less, rather than more, willing to divulge information on their “tax morale”.

The second confidence-building measure concerned the degree of anonymity during the survey. All interviews initially began as personal interviews, where the interviewer read the questions aloud and entered the answers into the survey laptop. However, participants had the option to switch to a computer-assisted self-interview (CASI) at any time, for some or all of the survey. In this case, participants answered the questions independently using the survey laptop. In addition, the “Back” button was deactivated, meaning that once answers had been entered, they could no longer be viewed or changed afterwards. These options and settings were demonstrated to participants at the beginning of the interview. This assured respondents that the interviewer was unable to see the answers they provided in CASI mode. Additionally, the option of a paper-assisted personal interview (PAPI) was offered to answer the particularly sensitive question concerning the amount of cash respondents held. Respondents who did not wish to disclose the amount of their cash assets in the presence of the interviewer were given a paper questionnaire and a stamped envelope. This enabled them to write down the amount of cash they held and send the letter directly to the survey institution.

Another key confidence-building element was the survey’s composition. The questionnaire was structured in such a way that it introduced sensitive topics with more general questions before participants were asked about their specific situation. This led participants gently towards the sensitive topics. Moreover, the lead-up questions were designed such that, in the event of non-responses to key questions, conclusions could be drawn about the variables that were actually of interest. A list of the

questions relevant to the study is provided in the annex. For example, on the topic of cash holdings, study participants were first asked generally whether they actually keep cash at home and for what purpose (**Q08**). This question was used to introduce the topic and made it possible to first narrow the respondents down to people who held cash. Listing various uses of cash was also intended to jog the memory, so that when it came to the subsequent question about the level of respondents' cash reserves, no amounts would be forgotten, where possible. In a second section of the questionnaire, participants were asked whether they thought they should keep cash in reserve and in what amount (**Q12, Q13**). As well as serving to lead further into the topic, such insights are helpful in analysing missing data on the question about the actual amount of cash hoarded. Finally, in a third step, participants were asked directly about the size of their cash reserves (**Q14**).

A similar approach was chosen to assess respondents' tax morale. First, tax morale was captured as part of a general introductory question (**Q01, H**). As the interview progressed, increasingly specific questions were used to filter for people who may be committing a tax offence in the form of undeclared work (**Q20**: Undeclared work in my circle of acquaintances, **Q22**: Openness to engaging in undeclared work, **Q23**: Actual provision of undeclared work).

■ 3 Data quality

3.1 Response rate, participant structure and weighting

Out of 5,769 target individuals who interviewers met at home and who had the mental and linguistic capacity to participate in a survey, 36% were willing to participate (AAPOR cooperation rate). The response rate is thus comparable to established social surveys such as the ALLBUS/GGSS survey.³ The additional confidence-building measures therefore compensated relatively well for the recruitment difficulties arising from the sensitive nature of the questions.

Participants tended to be older, and the proportion of them who were out of employment was higher than in the total population. In order to ensure that the evaluations were representative, non-response weights were calculated that align the structure of the sample with that of the total population. To do this, the distribution of the characteristics of gender, age, professional status, nationality, federal state, size of locality, and administrative district in the dataset was compared with those in the 2016 microcensus and adjusted by weighting.

3.2 Non-responses and imputations

In the interviews themselves, participants were very willing to give responses. As expected, however, non-responses to the sensitive questions about cash hoarding and undeclared work were somewhat more frequent. For the open-ended question on cash reserves (Q14), a valid response was initially missing in 224 cases (around 10%). In 128 of those cases, however, this information is available within a range of amounts (Q14a), meaning that the median of the specified category can be used as a proxy for the actual hoarding amount. In addition, four respondents made use

³ See <https://www.gesis.org/en/allbus/contents-search/study-profiles-1980-to-2018/2018>, accessed on 9 March 2020.

of the option to submit a postal response to **Q14** later. For two individuals, the cash amounts were replaced by missing values owing to implausible responses (more than €1 million). In the end, no information at all could be gleaned about the cash holdings of 93 individuals (4.7%).

A representative extrapolation of cash reserves to the total German population requires that the non-responses are random (missing completely at random), i.e. that there is no systematic difference between the amounts of cash hoarded by respondents and non-respondents (Rubin, 1976). To check for this, the two groups can be compared on the basis of factors that play a role in cash hoarding. If differences were identified, one conceivable approach would be regression-based substitution of missing values based on these factors (imputation) (Rubin, 1987). Alongside the usual socio-demographic aspects, the “recommended hoarding” (**Q13**) of the two groups was one particular factor used for the comparison. This question was asked to lead into the topic of hoarding, and the data show a strong, highly significant correlation with actual hoarding ($\rho = 0.41$, $p = 0.00$). Comparing the average “recommended hoarding” of respondents and non-respondents does not reveal any significant differences. The same goes for a comparison of socio-demographic aspects. As there are no indications of selective non-responses, regression-based imputation of the missing values is not required.

When asked about the provision of undeclared labour (**Q23**), 35 respondents stated that they had engaged in undeclared work in the past year (1.8%). A further 42 respondents answered that they had not engaged in undeclared work in the past year, but had done so within the past ten years (2.1%). The number of respondents who stated that they had never engaged in undeclared work was 1,857 (92%). There are no data for 66 respondents (3.3%).

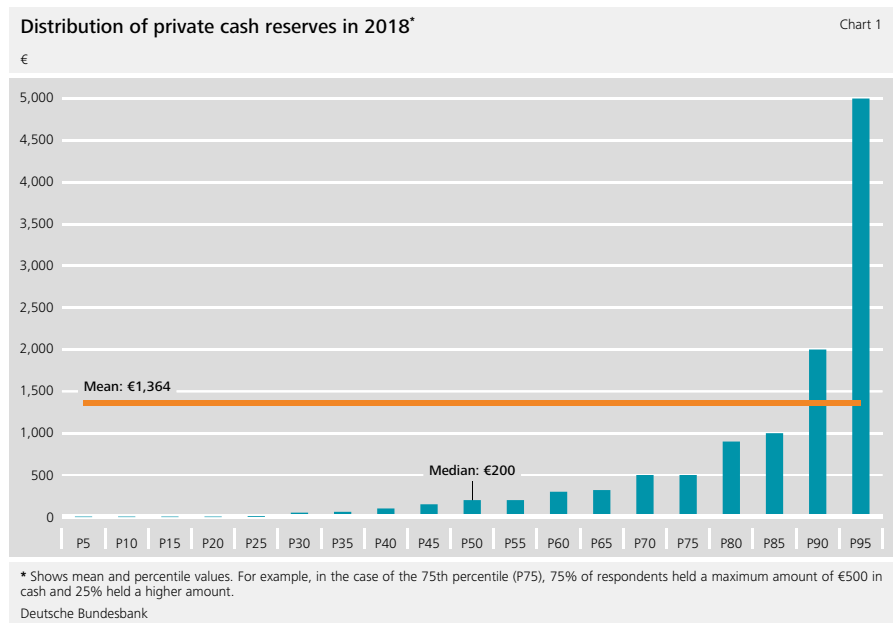
Although the proportion of missing values is relatively small for **Q23**, there is an increased risk of inaccurate answers for this question. People engaged in undecla-

red work might be inclined to explicitly deny undeclared work, as simply refusing to respond could be interpreted as an implicit admission of guilt. In a regression of hoarding amounts on possible undeclared work, inaccurate responses of this type would lead to the size of the correlations being underestimated (attenuation bias). Thus, in addition to the direct question about undeclared work (**Q23**), the regression analysis alternatively uses the undeclared work indicators asked about as lead-up (**Q20**: Undeclared work in my circle of acquaintances, **Q22**: Openness to engaging in undeclared work) as well as the general judgement question on tax morale (**Q01**, **H**). These indicators show a strong correlation with an individual's undeclared work behaviour ($p = 0.00$ in Pearson's chi-square test). At the same time, however, it can be assumed that these questions were answered accurately for the most part, as they are less compromising for the respondents.

4 Cash hoarding by German households

4.1 Distribution and extrapolation

Analysis of the data shows that individuals in Germany stored an average of €1,364 in cash per capita outside their wallets in 2018.⁴ The amounts were distributed very unevenly among the population, however. Many people held either no or only minimal cash reserves. By contrast, a small number of people kept very large sums of cash in reserve. The quantile distribution presented in **Chart 1** shows how often the various amounts were specified by respondents. Some 22% had no cash reserves.



⁴ For individuals who did not provide a valid response about their cash holdings, the average amount held by all other respondents was assumed. The same applies to eight other participants who stated that they hold their reserves in foreign currencies as well.

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Some 50% held €200 or less (median), while 75% held a maximum amount of €500. Amounts over €5,000 were only observed in 5% of cases (95th percentile). The highest figure reported was €100,000 (not shown in the chart).

The following three reasons can be cited to explain the uneven distribution: first, preferences for cash and book money vary throughout the population. Second, the distribution of cash reserves is based on income and wealth distribution, which, taken in isolation, is already concentrated (Deutsche Bundesbank, 2019). Third, there could be different reasons for individuals storing particular amounts of cash. For instance, larger sums are seen when individuals hold cash long term as a proportion of their assets. Smaller sums probably represent more of a consumption-related “stand-by” reserve, which may be used again for transaction purposes in the foreseeable future.

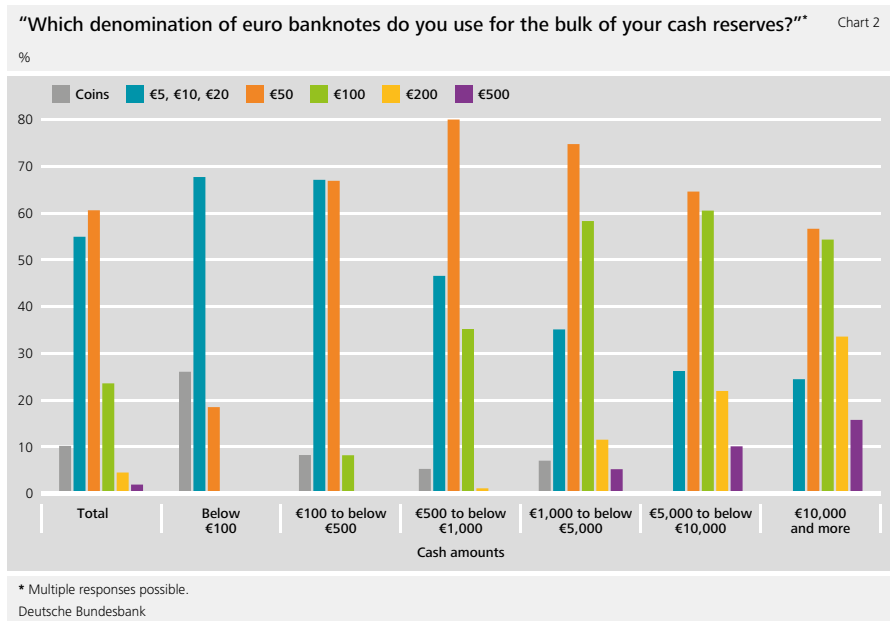
The results obtained from the 2,000 respondents are representative of the total German population over the age of 18. In 2017, this comprised 69.254 million people.⁵ This results in a total of approximately €94 billion worth of cash reserves when extrapolated for the total population.

Cash is held in all denominations. **Chart 2** shows what percentage of respondents use certain denominations – overall and broken down by the size of the amounts hoarded (see **Q15**). The €50 banknote is the most popular: 61% of respondents said that they use this denomination for cash reserves, which fits with the fact that this denomination also accounts for the largest share of total circulation in Germany.⁶ Being a mid-size denomination, it is suitable as a store of value, but can also readily be used for transactions. The higher the amount held, the more attractive it becomes to use larger denominations (€100, €200 and €500 banknotes). However, the €500 banknote,

⁵ As at 31 December 2017.

⁶ Current figures on German cash in circulation are available on the Bundesbank’s website: https://www.bundesbank.de/dynamic/action/en/statistics/time-series-databases/time-series-databases/759784/759784?listId=www_s13b_bargeld

which has not been issued since 2019 but remains legal tender, plays virtually no role as a store of value for households. Even for large amounts in excess of €10,000, €100 and €200 banknotes are used more frequently. Foreign currencies are virtually irrelevant. Their share is below 1% both overall and for all ranges of amounts (not shown).



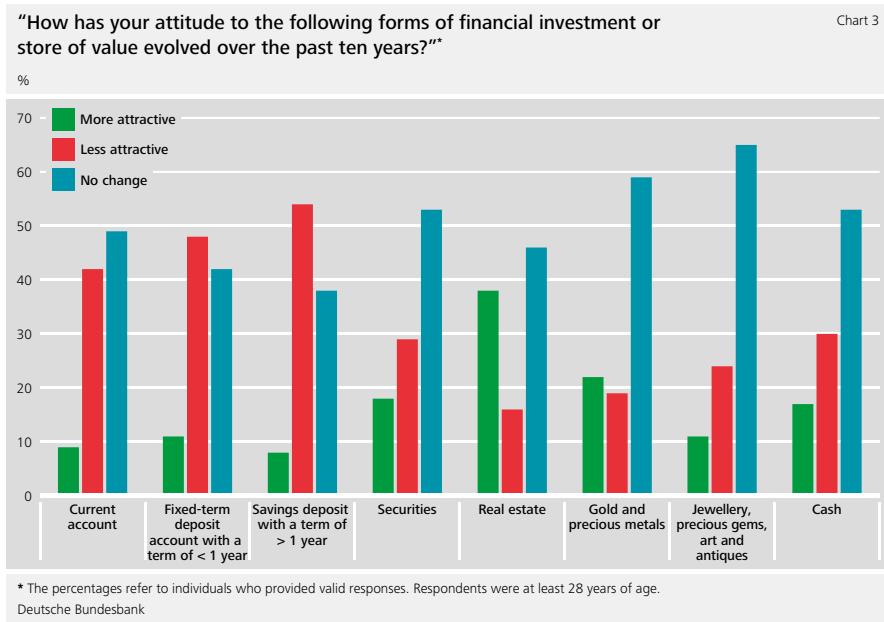
Another interesting aspect of cash hoarding is how it evolves over time. Macroeconomic estimates of the circulation of euro banknotes and coins show a steady rise in domestic hoarding since 2002. Between 2010 and 2018, there was an increase of 100%.⁷ By comparison, the total assets of German nationals grew by only around 20% in the same period (Deutsche Bundesbank, 2013; Deutsche Bundesbank, 2019a).

⁷ Internal extrapolation of estimates from the Bundesbank's Monthly Report (2018a).

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One possible explanation for the sharp increase in total cash hoarding in Germany could be higher demand from households, who may see cash as a safe investment option owing to uncertain developments in the economy and financial system. The study therefore asked respondents to compare their investment preferences from today to those from ten years ago (Q09).⁸ **Chart 3** shows the results. Though 17% of respondents said that cash is actually more attractive for them as a store of value today than it was ten years ago, the opposite was true for almost twice as many (30%), while 53% reported no change in their attitude towards cash. A further analysis of the data shows that those people who found cash more attractive today kept an average of around €700 more in reserve than other respondents did. Nevertheless, this group accounted for only 20% of the total amount of cash held. The available survey data

⁸ The question was posed only to respondents who were at least 28 years of age at the time of the interview and who had thus already come of age ten years earlier (1,785 individuals).

therefore do not provide an explanation for the sharp overall increase in cash hoarding.

4.2 Socio-demographic distribution

The extremely uneven distribution of cash reserves described in **Chapter 4.1** suggests that there are also differences between various population groups. Specifically, the following socio-demographic variables are considered here:

- gender (male/female);
- age;
- region (eastern/western Germany);
- education (no school leaving certificate/lower or intermediate secondary school leaving certificate/upper secondary school leaving certificate (Abitur));
- employment status (employed/unemployed/retired/homemaker/in education or training);
- professional status (wage earner/salaried employee/civil servant/self-employed or freelancer);
- net household income (in categories);
- nationality;
- household size.

Table 1 compares mean values and selected percentiles to determine group differences regarding the storing of cash. Since this comparison is based on a sample of the total population ($n = 2,000$), only statistically significant differences may be interpreted. To determine statistical significance, the cash reserves were regressed linearly on the respective socio-demographic group characteristic and heteroscedasticity-robust standard errors were calculated.⁹ In Table 1, the asterisks by the names of the socio-demographic variables indicate whether the differences are statistically significant.

⁹ This method was used in preference to a simple t-test as the variance of cash reserves can also differ across the individual groups.

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Cash reserves of different socio-demographic groups

Table 1

	Cash reserves (€)				Share in the sample
	Mean value	50th percentile	75th percentile	95th percentile	
Gender					
Male	1,476	200	500	5,000	0.49
Female	1,256	200	500	5,000	0.51
Age***					
Under 25	335	50	250	2,000	0.10
25 to under 35	472	100	400	1,500	0.16
35 to under 45	985	160	500	3,000	0.13
45 to under 55	1,114	200	750	5,000	0.18
55 to under 65	2,293	200	550	10,000	0.19
65 and older	2,072	200	500	8,000	0.24
Region					
Eastern Germany	2,281	150	700	7,000	0.20
Western Germany	1,130	200	500	5,000	0.80
Education					
Lower/intermediate secondary school leaving certificate	1,471	200	500	5,000	0.66
Upper secondary school leaving certificate (Abitur)	1,181	100	500	5,000	0.31
No school leaving certificate/ no information	737	120	500	5,000	0.02
Employment status***					
Employed	1,275	200	500	5,000	0.59
Unemployed	591	20	170	1,500	0.04
Retired	1,930	200	500	5,500	0.27
Homemaker	1,509	160	500	7,000	0.03
In education or training	234	50	200	1,500	0.06
Other/no information	723	200	500	5,000	0.01

Cash reserves of different socio-demographic groups

Table 1

	Cash reserves (€)				Share in the sample
	Mean value	50th percentile	75th percentile	95th percentile	
Professional status***					
Wage earner	1,898	200	500	7,000	0.19
Salaried employee	1,043	200	500	5,000	0.64
Civil servant	543	50	250	3,000	0.05
Self-employed or freelancer	2 129	500	2,000	10,000	0.12
Other/no information	389	200	500	1,000	0.02
Nationality***					
German nationality	1,493	200	500	5,000	0.89
Foreign nationality	332	50	200	1,750	0.11
Net household income***					
€0 to below €1,000	627	50	250	2,000	0.07
€1,000 to below €1,500	968	150	400	3,000	0.11
€1,500 to below €2,000	980	100	500	5,000	0.12
€2,000 to below €2,500	1,730	200	800	5,000	0.12
€2,500 to below €3,000	1,690	300	1,000	5,000	0.13
€3,000 to below €4,000	1,571	200	500	7,000	0.15
€4,000 and above	2,635	200	1,000	20,000	0.12
No information	504	100	300	2,000	0.17
Household size					
Single-person household	1,097	150	500	5,000	0.20
Multi-person household	1,430	200	500	5,000	0.80

Note 1: Data weighted.

Note 2: The shares in the category "Professional status" refer to the group of people in employment.

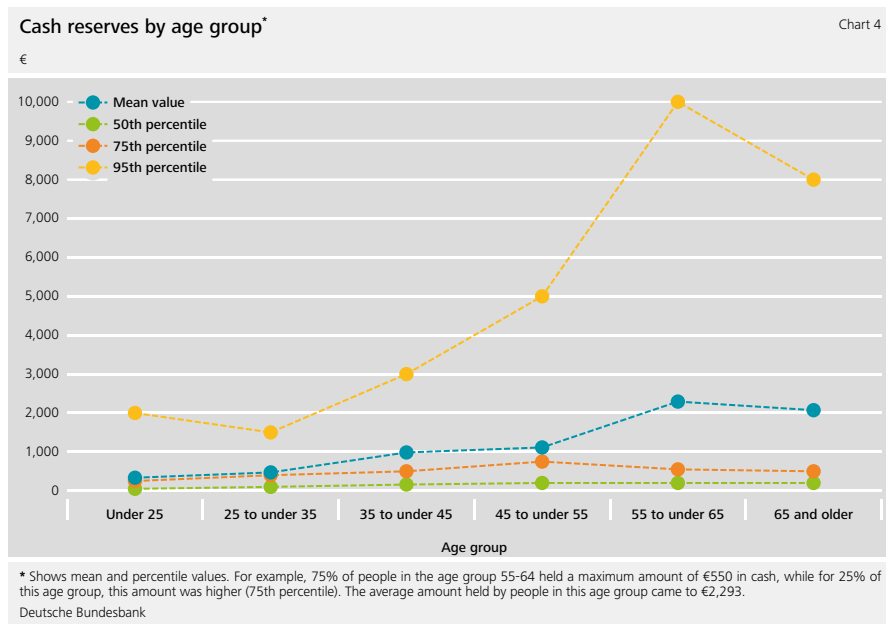
Note 3: ***, ** and * denote statistical significance at the 1%, 5% and 10% level in an F-test for joint statistical significance of the coefficients of a regression of individuals' cash reserves on the respective group of characteristic indicators using heteroscedasticity-robust standard errors.

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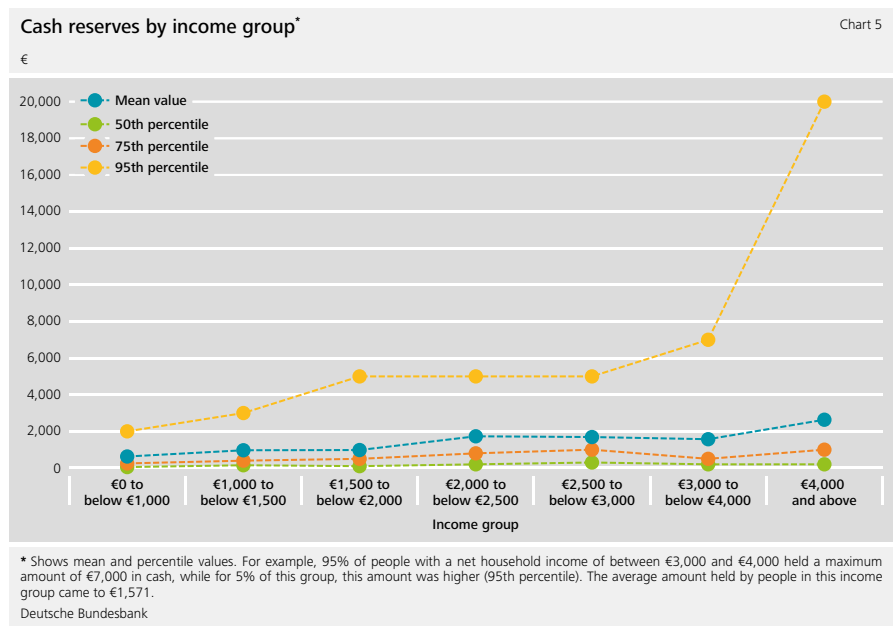
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Very marked and statistically highly significant differences in cash reserves are visible with regard to age. Older people store more cash on average, around €30 more for each additional year of age. However, this relationship is not linear. Average cash reserves increase up to the age of 65. By contrast, people store less cash again from the age of 65. High cash reserves shortly before the start of retirement can indicate the accumulation of a reserve for a person's retirement, which is slowly reduced after the age of 65. **Chart 4** additionally presents the mean and percentile values of the individual age groups from **Table 1** in graphic form. This clearly demonstrates that the influence of age is limited to the top percentiles. Age therefore has a particular influence on the decision to hold larger amounts of cash (above the 75th percentile).



Statistically significant heterogeneities are also apparent with regard to income. Average cash reserves rise as income increases, but their distribution also becomes

broader: while there are fewer opportunities for lower-income earners to store cash, cash reserves are broadly distributed among very high earners. **Chart 5** presents the income-specific mean and percentile values of the cash reserves from **Table 1** in graphic form. As seen in the case of age, the lower percentiles are barely influenced. Income therefore plays a noteworthy role in explaining higher cash reserves.



Furthermore, statistically significant differences can be seen with regard to employment status. For example, individuals in education or training (school pupils, students, trainees) have very low cash reserves, which is consistent with the observations on age and income effects.

Among those in employment, self-employed people have the largest reserves. It is striking that, in comparison to age and income, the status of self-employment

significantly increases the amounts of cash held from as early on as the 75th percentile. Cash receipts from self-employed individuals' own business transactions are the obvious explanation for this. Civil servants keep the smallest cash reserves. However, the low figures reported here could also be the result of more cautious responses being given by civil servants, who have a reputation for being risk averse (Buurman et al., 2012).

Statistically significant differences in cash reserves can also be identified when looking at nationality. On average, German study participants keep around €1,100 more cash in reserve than foreign participants. The fact that there are nationality-specific differences in cash holdings is already known from the demand for cash for short-term transaction purposes (Kosse and Jansen, 2013; Bagnall et al., 2016; Esselink and Hernandez, 2017).

By contrast, an individual's gender, region and education do not account for any discernible differences in cash reserves. The differences between individuals from single and multi-person households are also small and not significant. This finding is important from a methodological point of view. The survey entailed recording the amount of cash held by individuals. Errors may occur when members of multi-person households report the cash reserves of their entire household instead of their own, possibly because it is difficult to break down the amounts in their head. If this were to happen, the cash reserves of multi-person households would be systematically higher. As this is not the case, any distortion resulting from such a recording error also appears to be negligible.

■ 5 Cash reserves and tax honesty

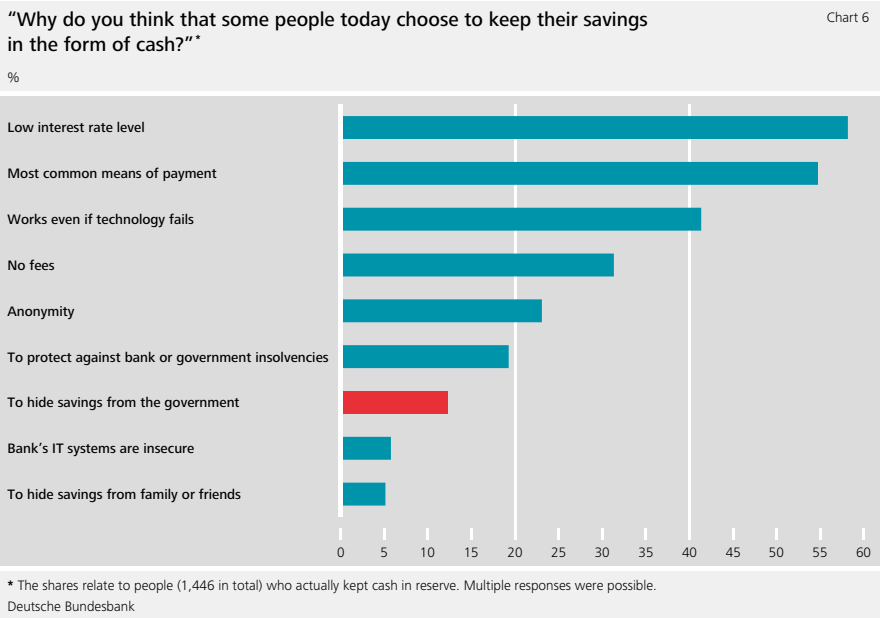
There are various reasons why people keep cash reserves. From an economic perspective, one of the first questions to emerge, for example, is whether they regard the reserves as long-term assets or as medium to long-term liquidity reserves for future transactions. In the former case, portfolio theories on asset diversification could be employed, which model cash holdings as a function of the risk and return of the individual forms of investment (Markowitz, 1952). In the latter case, one could use cash demand models, such as those developed by Baumol and Tobin, in which cash holdings depend, in particular, on transaction costs, interest foregone, and planned consumption (Baumol, 1952; Tobin, 1956). However, the present study takes a current issues-based approach and, in line with current socio-political debate, primarily questions the extent to which cash reserves might be linked to the desire to keep income and assets private from the government.

5.1 Findings from the questionnaire

Given its compromising nature, it does not make sense to confront participants directly with the question as to whether they personally hold certain amounts in cash for tax-related reasons. Truthful responses are unlikely. Rather, individuals who feel that they are being wrongly suspected could, at worst, withdraw their consent for the interview. So as to make the most of the opportunities presented by the study here in spite of this, participants were asked a general question on the reasons behind keeping cash reserves (Q10): *“Why do you think that some people today choose to keep their savings in the form of cash? Please outline the three key reasons for this from your viewpoint.”* The wording of this question refers not to the interviewees themselves, but to the behaviour of the general public. In addition to the tax motive, the respondents were given a range of other possible reasons to choose from. Assuming that participants take their own behaviour as the basis for answering this general question, we can gather clues on the general public’s motivations.

The results for **Q10** are shown in **Chart 6**. The evaluation focused solely on the responses of people who actually keep cash reserves themselves, since the objective is to draw conclusions about this group's own behaviour. Financial and practical considerations are revealed as the most important: "Savings at a bank yield little interest these days" (58%), "Cash is the most common means of payment" (55%), "Cash can be used even if technology fails" (41%) and "Cash does not involve fees" (31%) were the most frequent answers given, though the protection of personal data through the anonymity of cash is still important to 23% of respondents. Protection against bank or government crises, which has probably been an issue for investors over the last few years, was cited less frequently by respondents in 2018 (19%). Tax motives only rank near the bottom of the list: 12% of people who keep cash reserves agree that an important reason for doing so is that "Cash reserves are a good way of keeping your money secret, and safe from the hands of government". Only potential security gaps in banks' IT systems (6%) and hiding savings from friends and relatives (5%) are less frequently cited as motives.

Assuming that cash holders truly did initially answer the question based on their own behaviour, an upper limit can be derived for the existence of tax motives among the population. In this case, it would not be possible to rule out the existence of tax motives among 12% of cash holders. For 88% of this group, however, there would be no evidence of such motives.



5.2 Regression results

Regression analysis can provide additional clues about the existence of tax motives for storing cash. If cash reserves are motivated by tax considerations, individuals who are dishonest when it comes to tax matters should, *ceteris paribus*, store more cash on average than those with good tax morale. However, if one were to simply compare the average cash reserves of those who are honest in their tax affairs with those who are not, any differences in amounts could also be due to differing group structures with regard to age, income and other explanatory factors. A regression analysis can be performed to estimate a partial correlation between cash reserves and tax honesty, adjusted for the effects of other explanatory variables. It is important to understand that only the effects of observed factors can be excluded, however. If there are unobserved differences between those who are honest and dishonest when it comes to tax which have an impact on hoarding behaviour, it will not be possible to draw any conclusions about causality, even with the help of a

regression. The estimated values may therefore be interpreted merely as an attempt to approximate the actual impact (Wooldridge, 2010).

What is estimated is a linear model of the form

$$\ln(y+1) = \alpha + \beta x + \gamma'Z + u$$

The dependent variable y contains the amounts of cash hoarded by a single person. Owing to their skewed distribution (a small number of very high observation values in the right-hand tail), they are converted into logarithms for the regression. The explanatory factors of the model are x – a variable that describes a person's tax honesty – and Z – a vector with numerous socio-demographic control variables (age, gender, level of education, household size, net household income, employment status, self-employment, nationality, western/eastern Germany, assessment of financial situation). u stands as an error term for all the other determinants of cash hoarding not contained in the model. The model estimates α , the constant, and β and γ , the slope parameters of the explanatory variables. The estimated value for β gives the partial correlation between tax honesty and hoarding behaviour.

The **last column** of **Table 1** shows the distribution of the socio-demographic control variables (Z). To represent tax morale for the purposes of the regression, four different indicator variables (0/1) are derived from **Q01**, **Q20**, **Q22** and **Q23**: the individual in question (i) has, within the past ten years, engaged in undeclared work (4%), (ii) has considered engaging in undeclared work (13%), (iii) has personal acquaintances who engaged in undeclared work (18%) and (iv) is reluctant to pay taxes even if "the government finances a lot of important things with this money" (17%). Four separate estimations are performed, each using one of the four variables.

Table 2 shows the results of the regression analysis. None of the four regressions yielded any indications of tax motives being behind cash holdings. While the estimated coefficients for the indicators for undeclared work and undeclared work in an individual's circle of acquaintances (**columns i and ii**) are positive, which initially suggests that there is a higher level of cash hoarding among those who work off the books, this is statistically insignificant. The coefficients of the indicators for having considered engaging in undeclared work and for aversion to taxes (**columns iii and iv**) are negative and also insignificant. The hypothesis that there is no correlation between tax honesty and cash hoarding in the population cannot therefore be rejected with sufficient certainty.

By contrast, the regression results do confirm the socio-demographic differences identified in **Chapter 4.2**. The influence of age on cash reserves proves very stable in statistical terms. According to the regression, cash reserves increase by 1.6% with each additional year of age ($[\exp(0.0162)-1] * 100\% = 1.6\%$). However, the regression does not reflect the descriptively observed decline in cash reserves in the highest age group.¹⁰

The regression also confirms the influence of financial resources on cash reserves. For instance, the cash reserves of individuals with a household income of between €2,500 and €3,000 are approximately twice as high as those of individuals in the lowest income group ($[\exp(0.7209)-1] * 100\% = 106\%$). The control variables for participants' subjective financial situation also show significant effects: the cash reserves of people who describe themselves as able to "make ends meet" without any problems are almost three times as high as those of people with financial difficulties ($[\exp(1.044)-1] * 100\% = 184\%$).

¹⁰ For the purposes of verification, an additional regression was carried out using five age group indicators instead of the constant age variables. These showed a steady increase in cash reserves up to the highest age group.

Regression results for the relationship between cash hoarding and tax honesty

Table 2

Dependent variable: Cash reserves (log)				
Explanatory variables:	(i)	(ii)	(iii)	(iv)
Indicator for tax honesty x (i/ii/iii/iv)	0.4423 (0.3459)	0.2588 (0.1729)	-0.2388 (0.1964)	-0.1691 (0.1749)
Age (in years)	0.0162*** (0.0061)	0.0165*** (0.0060)	0.0152** (0.0061)	0.0152** (0.0061)
Male	-0.0349 (0.1347)	-0.0301 (0.1347)	-0.0130 (0.1346)	-0.0236 (0.1348)
Education				
Lower/intermediate secondary school leaving certificate	Ref.	Ref.	Ref.	Ref.
Upper secondary school leaving certificate (<i>Abitur</i>)	0.5473 (0.4142)	0.5501 (0.4140)	0.5958 (0.4122)	0.5726 (0.4128)
No school leaving certificate/ no information	-0.0636 (0.4256)	-0.0623 (0.4254)	-0.0313 (0.4238)	-0.0581 (0.4249)
Employment status				
Employed	Ref.	Ref.	Ref.	Ref.
Unemployed	-0.4528 (0.3351)	-0.4380 (0.3376)	-0.3855 (0.3390)	-0.4103 (0.3382)
Retired	-0.1880 (0.2362)	-0.2027 (0.2364)	-0.1891 (0.2363)	-0.1881 (0.2361)
Homemaker	0.1854 (0.3678)	0.1779 (0.3668)	0.1625 (0.3653)	0.1790 (0.3664)
In education or training	0.0426 (0.2943)	0.0335 (0.2939)	0.0748 (0.2918)	0.0628 (0.2928)
Other/no information	0.8168** (0.4017)	0.8057** (0.3963)	0.8317** (0.3943)	0.8511** (0.3998)
Self-employed	1.0150*** (0.3443)	1.0014*** (0.3454)	1.0212*** (0.3433)	1.0188*** (0.3440)

Regression results for the relationship between cash hoarding and tax honesty					Table 2
Dependent variable: Cash reserves (log)					
Explanatory variables:	(i)	(ii)	(iii)	(iv)	
Net household income					
€0 to below €1,000	Ref.	Ref.	Ref.	Ref.	
€1,000 to below €1,500	0.3365 (0.2601)	0.3370 (0.2606)	0.3310 (0.2604)	0.3235 (0.2599)	
€1,500 to below €2,000	0.2770 (0.3000)	0.2813 (0.2756)	0.2963 (0.2762)	0.2876 (0.2759)	
€2,000 to below €2,500	0.7079** (0.3000)	0.6877** (0.3008)	0.7145** (0.3006)	0.7102** (0.3000)	
€2,500 to below €3,000	0.7209** (0.3158)	0.7151** (0.3154)	0.7289** (0.3156)	0.7163** (0.3159)	
€3,000 to below €4,000	0.3506 (0.3186)	0.3386 (0.3189)	0.3624 (0.3197)	0.3489 (0.3189)	
€4,000 and above	0.5550 (0.3581)	0.5155 (0.3578)	0.5609 (0.3576)	0.5552 (0.3582)	
No information	-0.4693 (0.2994)	-0.4699 (0.2991)	-0.4833 (0.2989)	-0.4735 (0.2990)	
Multi-person household	0.2580 (0.1705)	0.2639 (0.1702)	0.2568 (0.1708)	0.2563 (0.1707)	
German nationality	0.7818* (0.3031)	0.7918*** (0.3028)	0.8344*** (0.3041)	0.8319*** (0.3056)	
Eastern Germany	0.2201 (0.1581)	0.2275 (0.1590)	0.1964 (0.1581)	0.2197 (0.1589)	

Regression results for the relationship between cash hoarding and tax honesty

Table 2

Dependent variable: Cash reserves (log)				
Explanatory variables:	(i)	(ii)	(iii)	(iv)
Difficulties "making ends meet"				
Strongly agree	Ref.	Ref.	Ref.	Ref.
Somewhat agree	0.3737* (0.2255)	0.3720* (0.2263)	0.3602 (0.2265)	0.3668 (0.2261)
Somewhat disagree	0.8746*** (0.2587)	0.8755*** (0.2232)	0.8473*** (0.2240)	0.8492*** (0.2248)
Strongly disagree	1.0440*** (0.2249)	1.0314*** (0.2265)	1.0093*** (0.2279)	1.0149*** (0.2278)
No information	1.2686 (0.9304)	1.2843 (0.9360)	1.2416 (0.9177)	1.2377 (0.9191)
Constant	1.2228** (0.5753)	1.1811** (0.5763)	1.2518** (0.5755)	1.2774** (0.5811)
Number of observations	1 888	1 888	1 888	1 888
R-squared	0.08	0.08	0.08	0.08

Note: The table shows estimated coefficients of a linear regression and their robust standard errors in parentheses. ***, ** and * denote statistical significance at the 1%, 5% and 10% level.

Following **Chapter 5.1**, a model extension takes into account a number of legitimate reasons for explaining cash hoarding. Using general statements on subjective self-assessment from the questionnaire (Q01), four indicator variables (0/1) were formed for individuals: (i) data protection is important for the person (42%), (ii) the person doubts the reliability of modern technology (70%), (iii) the person doubts the security of the banks' IT systems (62%), and (iv) the person is afraid of a new banking and sovereign crisis (62%). The four indicator variables were included in the model as additional regressors.

Table 3 shows the results of this model extension. The variable on technical security concerns has a very significant impact. The cash reserves held by people who have doubts as to the security of banks' IT systems are 62% higher on average ($[\exp(0.4829)-1]*100\% = 62\%$). In the direct interviews, participants relatively rarely cited technical security concerns as a reason for keeping cash reserves (5%) (see **Chapter 5.1**). However, if a person does keep cash reserves owing to such concerns, the amounts held appear to be relatively large.

Regression results for the relationship between cash hoarding and various personality traits			Table 3
Dependent variable: Cash reserves (log)			
Explanatory variable:	Coefficient	Standard error	
Reluctant to pay taxes	0.1688	(0.1758)	
Data protection important	0.0517	(0.1367)	
Fear of technical failure	0.0681	(0.1468)	
Fear of sovereign or banking crisis	0.1846	(0.1363)	
Fear of cyber attacks	0.4829***	(0.1382)	
Other explanatory variables: Age, gender, level of education, household size, net household income, employment status, nationality, eastern Germany, assessment of financial situation			
Number of observations	1,888		
R-squared	0.08		
Note: The table shows estimated coefficients of a linear regression and their robust standard errors in parentheses. ***, ** and * signify statistical significance at the 1%, 5% and 10% level.			

The opposite situation applies where concerns about the reliability of electronic systems are involved. In the interviews, such fears were cited relatively often as the reason for cash reserves (41%), but they have no impact in the regression of the amounts held. People with a low level of confidence in technology may hold a back-up cash reserve in case electronic payment instruments temporarily stop

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working and purchases have to be paid for in cash. However, since these amounts are likely to be relatively small, they have little impact in the regression.

Data protection considerations and worries about government or bank insolvencies play no role in the regression of the hoarded amounts. The majority of respondents also did not cite them as reasons in the interviews.

■ 6 Conclusion

6.1 Summary of results

The aim of this study was to directly estimate the cash reserves held by individuals in Germany. Alongside the average level of holdings, their distribution and socio-demographic differences were also of interest. Another objective was to search for indications of tax motives for storing cash.

To this end, the survey entitled “Cash use in Germany” was conducted at the beginning of 2018. Given the extremely sensitive nature of the questions, producing a representative sample was the main challenge. A wide range of confidence-building measures ultimately resulted in data quality that is approximately as good as in other established socio-scientific studies.

According to the survey results, individuals in Germany stored an average of €1,364 in 2018, although the distribution was very uneven. Older and higher-earning individuals tended to have high cash holdings. Interest in cash as a means to store value has tended to decline over the past ten years.

The remainder of the analysis did not provide any specific indications that the cash reserves recorded could be related to tax morale. While 88% of those who kept cash reserves said that tax motives were not a key factor in the storage of cash in society nowadays, 12% did identify tax motives, but the study was unable to reveal whether they themselves acted on these motives. A regression of individuals’ cash reserves on various indicators of individuals’ tax morale did not show any significant correlation, however. Based on the available data, the hypothesis that the German public keeps cash reserves primarily for legitimate purposes cannot be rejected. Instead, the factors that appear to play a role in the storage of cash are concerns about the security and reliability of technical systems as

well as the fact that cash is one of the most common and simplest means of payment.

6.2 Discussion

Looking at the assets of the German population as a whole, cash plays a rather minor role. According to the Bundesbank, households' total financial assets (cash, deposits, securities, other equity, mutual fund shares and claims on insurance corporations) amounted to €6,023 billion in 2018, with cash (hoarding and transaction balances) accounting for no more than 3.8% of this figure (Deutsche Bundesbank, 2019b). However, comparing cash reserves according to the survey (€1,364 on average) with the amounts of cash that participants reported carrying in their wallets for transaction purposes (€107 on average), it becomes clear that the general public sees cash not only as a means of payment, but also to a large extent as a store of value (Deutsche Bundesbank, 2018b).

Overall, the results provide important insights into the debate on the use of cash for illegal and illicit purposes. Previous estimates put the amount of cash in Germany not being used for payments in the official economic cycle at around €200 billion. The economic model classifies this cash as long-term storage by firms and households (hoarding). As there has not yet been a reliable empirical study exploring this issue, these amounts are suspected in the economic policy debate of being part of an illegal economic cycle or of being kept secret from government authorities. The study shows that a very large proportion of this cash – €94 billion – may be attributed to households. The fact that information on these amounts was provided voluntarily and that no links between attitudes towards tax and behaviour were established within the study also suggests that households are largely holding these cash amounts for legitimate reasons. As a result, this casts a critical light on suggestions that previously unexplained amounts of hoarded cash in Germany could be used to gauge the extent of tax evasion and criminal activity.

Overall, the present study provides plausible results that are consistent with previous macroeconomic findings. Nevertheless, the final discussion ought to revisit some methodological weaknesses which are typical when extrapolating assets on the basis of surveys. The aim is to allow the reader to deal critically with the results on the one hand and to provide impetus for future research on the other. For example, the study underestimates cash holdings if participants in the study have hidden, underestimated or forgotten cash amounts (underreporting). People with very high cash holdings may also participate in a survey less frequently (self-selection). By contrast, there is a possibility of overestimation if, for example, people state not only their personal cash holdings but also those of the entire household, and these are then assigned to only one individual person in the extrapolation.

Whilst it was not possible to find any specific indications of these sources of error mentioned above when checking data quality, they are possible in principle. Underreporting and self-selection are likely to play a major role, especially regarding the question of whether cash is held for tax reasons. As a result, it should not be in any way concluded from these results that cash is stored solely for legal reasons.

6.3 Outlook

An important starting point for future research is firms' cash holdings. While this study allocated around half of the unexplained domestic hoarding stocks to the household sector, it is unclear whether the remaining amount is entirely attributable to the corporate sector or whether households' cash holdings were significantly underestimated by the study (due to underreporting, especially in the case of illicit reasons for storing cash). The extent to which cash in Germany has been lost or destroyed over time was not clarified either. A survey among firms about their longer-term cash reserves could shed more light on this issue, although there is a considerable risk of self-selection and underreporting here, too.

Furthermore, future research in the household sector should focus on finding out more about the motives for private cash reserves as a whole. It would be useful to survey smaller groups of people in qualitative interviews focused on enquiring about certain behavioural patterns and motives rather than quantitatively recording amounts of cash. The link to technical security concerns identified by the study could be used as a starting point for further research.

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Questionnaire of the study "Cash use in Germany" (excerpt)

Q01 – Key characteristics

I will now read you a number of statements designed to define your current circumstances and concerning social issues. Please state whether you strongly agree, somewhat agree, somewhat disagree or strongly disagree with each of these statements.

- A: Germany's tax and social contributions system is too complex.
- B: Investments in shares or the purchase of real estate are currently out of the question for myself/my family for financial reasons.
- C: The internet makes life easier in many ways, thus making it possible to adopt a more relaxed attitude to data protection.
- D: It's unwise to depend solely on electronic aids as technology can let you down at any moment.
- E: I fear there may be another banking and sovereign crisis in the not too distant future.
- F: Existing online banking systems are not sufficiently equipped to fend off attacks by hackers.
- G: There are months when I and my family find it hard to make ends meet.
- H: I'm perfectly happy to pay my taxes in Germany as I know that the government finances a lot of important things with this money.
- J: Income and wealth are unfairly distributed in Germany.

(Only one answer possible!)

- 1: Strongly agree
- 2: Somewhat agree
- 3: Somewhat disagree

4: Strongly disagree

98: Don't know (*INT: Do not read out loud!*)

99: No answer (*INT: Do not read out loud!*)

Q08 – Motivation for keeping cash in reserve

Cash can not only be used to make payments but can also be kept in reserve at home, in a safe deposit box at a commercial bank or a savings bank.

What are the three key reasons prompting you to keep cash in reserve?

Please note that this does not refer to cash kept in your wallet or on your person for daily needs.

INT: When required: Just EUR, no old DM or foreign currency

Max. 3 answers possible.

1: For unforeseen situations (e.g. no time or opportunity to go and withdraw cash)

2: To be able to make a cash gift

3: Saving up for a major purchase or a holiday

4: Saving money without a specific aim

5: Savings plan to build up wealth

6: As an emergency reserve

7: As a long-term guarantee against future events/pension supplement

8: For collector purposes

9: I do not keep any cash in reserve

98: Don't know (*INT: Do not read out loud!*)

99: No answer (*INT: Do not read out loud!*)

Q09 – Change in investment preferences during the last ten years

Please think back over the past ten years. How has your attitude to the following forms of financial investment or store of value evolved over this period? Are there any options that you regard as more attractive now than you did before and/or any that you find less attractive?

- A: Money "parked" in my current account or in multiple such accounts
- B: Money deposited on a short-term basis in an overnight account or a fixed-term deposit account, i.e. with an investment term of up to one year
- C: Money put into savings deposits with an investment term of more than one year (e.g. a savings account, a savings book, savings plans)
- D: Money invested in securities (funds, shares, fixed-income securities like bonds)
- E: Money invested in real estate
- F: Money invested in gold or precious metals
- G: Money invested in jewellery, precious gems, art or antiques
- H: Cash savings/putting money aside

INT: Present list for question 9! Only one answer possible!

- 1: More attractive than ten years ago
- 2: Less attractive than ten years ago
- 3: My attitude has not changed
- 98: Don't know (*INT: Do not read out loud!*)
- 99: No answer (*INT: Do not read out loud!*)

Q10 – Advantages of cash as an investment

Why do you think that some people today choose to keep their savings in the form of cash? Please outline the three key reasons for this from your viewpoint.

Max. 3 answers possible.

- 1: Cash is the most common means of payment.
- 2: Savings at a bank yield little interest these days.
- 3: Cash does not involve fees.
- 4: Cash is a good way of protecting your money should banks collapse, or in the event of a sovereign default.
- 5: Cash can be used even if technology fails.
- 6: Cash reserves are a good way of keeping your money secret, and safe from the hands of government.
- 7: Cash reserves are a good way of keeping your money secret, and safe from the hands of other family members and friends.
- 8: Banks' IT systems are not secure enough.
- 9: Cash is anonymous. Now that an increasing volume of personal data are collected, cash has become more important.
- 98: Don't know (*INT: Do not read out loud!*)
- 99: No answer (*INT: Do not read out loud!*)

Q12 – Approval for keeping cash in reserve

Do you approve or disapprove of the idea of keeping cash in reserve?

Only one answer possible!

- 1: It's a good idea to keep cash in reserve
- 2: It's not a good idea to keep cash in reserve
- 98: Don't know (*INT: Do not read out loud!*)
- 99: No answer (*INT: Do not read out loud!*)

Q13 – Recommended amount of cash reserves

How much cash should one put aside as a reserve, in your view?

€ _____

- 98: Don't know (*INT: Do not read out loud!*)
- 99: No answer (*INT: Do not read out loud!*)

Q14 – Size of personal cash reserves

It's possible to keep cash in a piggy bank, a jam jar, under your mattress or in a safe at home, as well as in a safe deposit box at a regular bank or a savings bank. Taking into account all the above possible places where you may store your cash, if you add everything up: What is the total amount of cash you currently keep in reserve?

Please note that this does not refer to cash kept in your wallet or on your person for daily needs.

Feel free to give a rough estimate.

€ _____

98: Don't know (*INT: Do not read out loud!*)

99: No answer (*INT: Do not read out loud!*)

Q14a – Size of personal cash reserves (additional question if the first response is "no answer")

Filter: If question 14=98,99 ("Don't know", or no amount of cash assets is specified)

Please select one of the following categories to broadly define the amount you keep in reserve.

Only one answer possible!

- 1: Less than €100
- 2: €100 and more, but less than €500
- 3: €500 and more, but less than €1,000

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Questionnaire of the study "Cash use in Germany" (excerpt)

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- 4: €1,000 and more, but less than €5,000
- 5: €5,000 and more, but less than €10,000
- 6: €10,000 and above
- 98: Don't know (*INT: Do not read out loud!*)
- 99: No answer (*INT: Do not read out loud!*)

Q15 – Denominational structure of the cash reserves

Which denomination of euro banknotes do you use for the bulk of your cash reserves?

Multiple answers possible.

- 1: In €5, €10 and €20 banknotes
- 2: In €50 banknotes
- 3: In €100 banknotes
- 4: In €200 banknotes
- 5: In €500 banknotes
- 6: Coins (*INT: Do not read out loud!*)
- 7: In other currencies (US dollar, Swiss franc, DM etc.) (*INT: Do not read out loud!*)
- 98: Don't know (*INT: Do not read out loud!*)
- 99: No answer (*INT: Do not read out loud!*)

Q20 – Undeclared work in my circle of acquaintances

Briefly turning to another matter:

Undeclared work is a frequent subject of media reports. Experts define undeclared work (off the books) as any work rendered for someone else where both parties agree to only partially declare that income for tax purposes, or not to declare it at all, thus breaking the law.

Do you know of anyone close who, in the past twelve months, has engaged in undeclared work?

1: Yes, I know someone close who engaged in undeclared work

2: No, I don't know anyone close who engaged in undeclared work

98: Don't know (*INT: Do not read out loud!*)

99: No answer (*INT: Do not read out loud!*)

Q21 – Extent to which undeclared work is a standard practice in the respondent's circle of acquaintances

Is this instance/are these instances basically the norm or more an exception to the norm?

1: Such behaviour is basically the norm

2: Such behaviour is more an exception to the norm

98: Don't know (*INT: Do not read out loud!*)

99: No answer (*INT: Do not read out loud!*)

Q22 – Openness to engaging in undeclared work

Have you ever considered engaging in illicit work yourself?

1: Yes

2: No

98: Don't know (*INT: Do not read out loud!*)

99: No answer (*INT: Do not read out loud!*)

Q23 – Actual provision of undeclared work

Have you, in the past twelve months or prior to that, engaged in undeclared work or topped up your income illegally? Which of the following most closely applies to you?

Only one answer possible!

1: Yes, in the course of the past twelve months.

2: Yes, in the course of the past ten years.

3: Yes, but quite a long time ago.

4: No, never.

5: I would prefer not to answer this question.

98: Don't know. (*INT: Do not read out loud!*)

99: No answer. (*INT: Do not read out loud!*)

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