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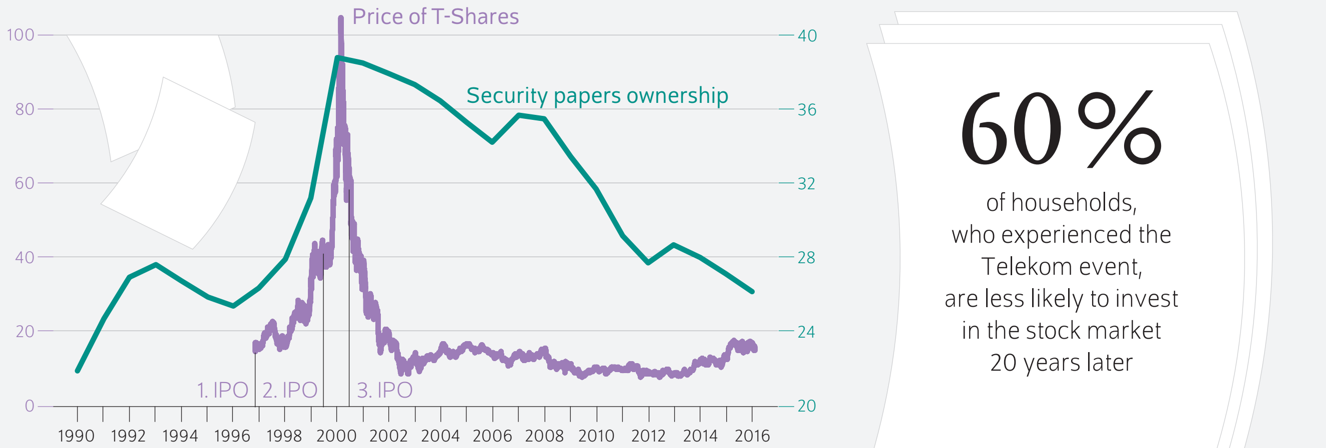
AT A GLANCE

The Case of Deutsche Telekom: How Stock Market Crashes Can Persistantly Affect Household Investment Decisions

By Chi Hyun Kim and Alexander Kriwoluzky

- Despite the long-term rise in share prices, stock market participation rate among German households is as low as it was in the 1990s
- Based on the Initial Public Offerings (IPOs) of Deutsche Telekom from 1996 to 2000, this paper examines how the crash of the Telekom shares still influences the investment behavior of Germans
- Households that experienced the Telekom share crash 20 years ago are 60 percent less likely to invest in equity than younger households, that did not directly experience the event
- Households that invested in Telekom shares (T-shares) are significantly less active in the stock market than households that experienced the crash but did not own T-shares
- Regulation by supervisory authorities as well as better financial education opportunities for retail investors could reduce negative experiences in the financial market

T-share crash still impacts investment decisions of German households to this day
Telekom shares in euro (left axis), security papers ownership in percent (right axis)



Sources: Datastream; SOEPv34, authors' own calculations.

FROM THE AUTHORS

*"Stock market crashes are apparently one important reason why German households do not invest in stocks. Since equity investment can be crucial for households' long-term financial well-being due to its high equity premia, policymakers must put effort in increasing investor protection and financial education in order to mitigate negative consequences of stock market crashes." — **Chi Hyun Kim** —*

MEDIA

Audio Interview with Alexander Kriwoluzky (in German)
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The Case of Deutsche Telekom: How Stock Market Crashes Can Persistantly Affect Household Investment Decisions

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ABSTRACT

Since decades, only one fourth of German households invest in shares. One exception was during the three IPOs from 1996 to 2000 of the Deutsche Telekom, which gave Germans a taste to enter the stock market. However, the fall in the share price shortly after the second IPO, followed by corruption scandals of the company, put an end to their enthusiasm. The present study based on SOEP data shows that the events surrounding the Deutsche Telekom IPOs led to persistently lower stock market participation—by around 60 percent, even 20 years on. This effect is greater for households that invested directly in T-shares. As a result, confidence in stock investment was permanently destroyed, which can have significantly negative impact on their long-term asset accumulation. In order to counter this loss of confidence, supervisory authorities should examine companies that issue shares to retail investors more closely, in order that cases like Deutsche Telekom and, more recently, Wirecard, do not continue to undermine confidence in the stock exchange. It is also important to provide retail investors with better access to financial education so they can evaluate stock market investments more rationally, thus safeguarding their portfolios.

Although stocks are attractive investments due to their high yields, most households in Germany do not invest in shares.[1] Previous studies have probed deeply into the drivers of such behavior, not least because inefficient household investment decisions can have a negative impact on the long-term financial well-being of those households. One important finding is that personal experiences are important when it comes to making investment decisions.[2] In particular, negative experiences such as stock market crashes play a decisive role: after a crash, households are likely to avoid the stock market.[3] However, there has been little research into whether households can recover from such negative events and how long this takes. Do memories of the past crash fade with new positive experiences or does the experience put investors off the stock market for good?

The stock market participation rate among German households has been falling steadily since 2000

The present paper uses data from the Socio-Economic Panel (SOEP) to investigate the stock market participation rate of German households.[4] In this household survey, which has been conducted continuously since 1984, respondents indicate whether they have invested in securities such as savings bonds, mortgage bonds, bonds or shares (see Figure 1).[5]

1 See also Michael Haliassos and Carol C. Bertaut, "Why do so few hold stocks?," *The Economic Journal* 105, no. 432 (1995): 1110–29; Luigi Guiso, Paola Sapienza, and Luigi Zingales, "Time varying risk aversion," *Journal of Financial Economics* 128, no. 3 (2018): 403–21.

2 James J. Choi et al., "Reinforcement learning and savings behavior," *The Journal of Finance* 64, no. 6 (2009): 2515–34; Ulrike Malmendier and Stefan Nagel, "Depression babies: Do macroeconomic experiences affect risk taking?" *The Quarterly Journal of Economic* 126, no. 1 (2011): 373–416.

3 Tabea Bucher-Koenen and Michael Ziegelmeyer, "Once burned, twice shy? Financial literacy and wealth losses during the financial crisis," *Review of Finance* 18, no. 6 (2014): 2215–46; Luigi Guiso, Paola Sapienza, and Luigi Zingales, "Time varying risk aversion," 403–21.

4 For the SOEP, currently around 30,000 individuals are surveyed each year in approximately 19,000 households, which are representative of the population in Germany. See Jan Goebel et al., "The German Socio-Economic Panel Study (SOEP)," *Jahrbücher für Nationalökonomie und Statistik/Journal of Economics and Statistics* 239, no. 2 (2019): 345–60 (available online, last accessed on June 10, 2021. This applies to all online sources in this report unless otherwise stated).

5 The SOEP did not distinguish between share investments and other securities until 2001. Nevertheless, it can be assumed that up to 2001 securities holdings included a large number of share investments.

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The survey reveals that between 1990 and 2000, the holding of securities doubled. While only 21 percent of German households invested in securities in 1990, this figure was just under 40 percent at the height of the dotcom boom.

When the dotcom bubble burst in 2000, however, securities holdings fell continuously, reaching 1990s levels in 2016, with no sign of an appreciable recovery.[6] In 2006 and 2012, share investments by households increased slightly but, in comparative terms, the figures tend to be small, and these recovery periods did not last long. This is striking given that, despite the global financial crisis in 2008/09, share prices have risen steadily since.[7]

In order to investigate the relationship between stock market participation rate of German households and equity price development, the leading German share index, the DAX 30 was included in the study (see Figure 2). Interestingly, German households are investing less and less in shares, even though the share price is rising steadily. This implies that German households, which usually save their money in the form of fixed-interest deposits, such as in savings accounts, are missing out on high equity premia, which are particularly important for long-term wealth accumulation. Only recently have there been signs of a trend reversal and a renewed increase in household investment activity.

The T-share: How it earned its reputation as the "people's share"

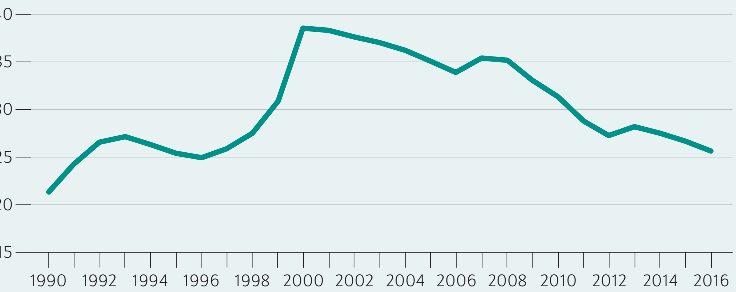
Why has the stock participation rate of German households been falling steadily since 2000? Why are German households still hesitant to invest in the stock market, despite equity prices maintaining an upward trajectory since 2009? The present study examines to what extent personal experiences of Deutsche Telekom's IPOs (Initial Public Offering) between 1996 and 2000 played a role in this.

Deutsche Telekom AG, formerly part of the German federal post office (Deutsche Bundespost), was privatized in 1995 and was about to go public in November 1996. However, at the beginning of 1996, the company was struggling with their negative reputation among the general public due to its new tariff structure, its poor service, and high cost of local calls.[8] Deutsche Telekom acknowledged that its IPOs would only be successful if the company was able to improve its image.

In order to achieve this, the company launched a broad media campaign to attract the attention of potential retail investors. This strategy to make the Telekom share a "people's share" was successful: around 1.9 million retail investors purchased

Figure 1

Security papers[1] ownership of German households
Share of total German households



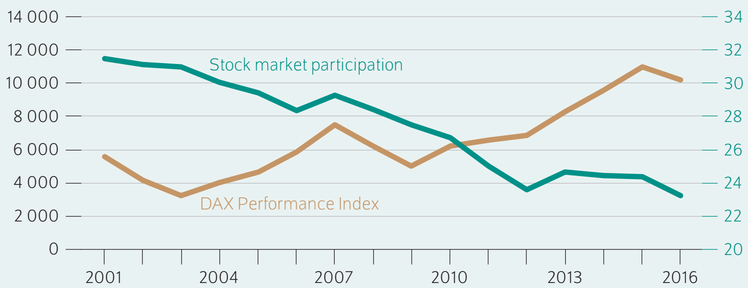
1 Security papers ownership includes fixed-interest securities (including saving bonds issued by banks, mortgage-backed bonds, and government bonds) together with stock holdings.

Quelle: SOEP v34; authors' own calculations.

Security papers ownership of German households increased during the 2000s, but gradually decreased to the levels of the 1990s since then.

Figure 2

Stock market participation[1] and the DAX performance index
Index in points (left axis) and stock participation in percent of German households (right axis)



1 Stock ownership includes ownership of stocks and funds.

Sources: SOEPv34; authors' own calculations; Datastream.

Stock market participation of German households gradually decreased since 2000, despite flourishing stock prices.

285 million T-shares worth a total of 4.2 billion euros.[9] The T-share price skyrocketed after the first IPO (see Figure 3).

Further investment in the T-share following the 2000 dotcom stock market crash

Unfortunately, this boom did not last long, however. In 2000, the dotcom bubble, which refers to the extremely high share prices of Internet and tech-based companies, burst, sending the global stock markets crashing.

6 SOEP figures up to 2016 were included in the study. Figures from the Deutsche Aktieninstitut indicate that the participation rate remained at this level up to 2019 and did not increase again until the pandemic hit. See Deutsches Aktieninstitut, "Deutschland entdeckt 2020 die Liebe zu Aktien," February 2021 (in German; available online).

7 Deutsches Aktieninstitut, "Deutschland entdeckt 2020 die Liebe zu Aktien. "

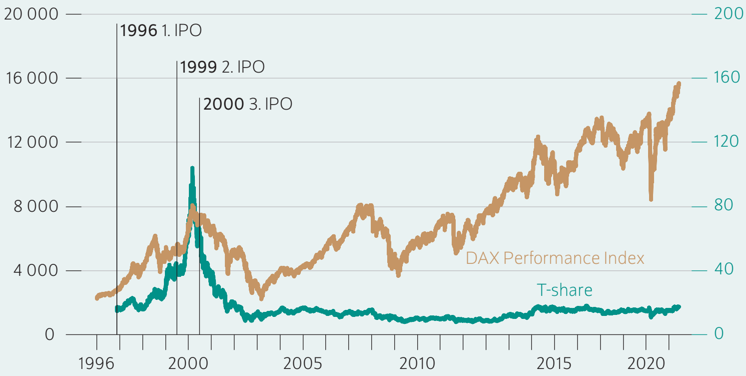
8 Johann-Günther König, *Global Player Telekom. Der Kampf um die Marktmacht: Wer verliert, wer profitiert* (Reinbek: Rowohlt, 1997).

9 The euro exchange rate was calculated at DM 1.96. The figures were taken from Johann-Günther König, *Global Player Telekom*.

Figure 3

Price of the Telekom shares

Index in points (left axis) and Telekom shares in euro (right axis)



Source: Datastream.

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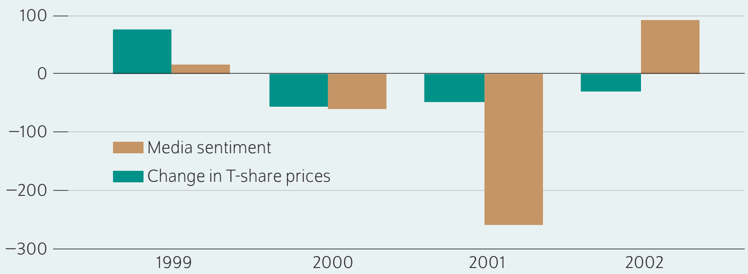
Price of the Telekom shares continues to be around 20 Euros after the crash, while the stock market in general experienced a steady increase.

Figure 4

Media sentiment with regard to the Telekom shares in comparison to its price development

Change in percentage, yearly average



Source: Datastream; authors' own calculations (media sentiment).

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Media sentiment dropped more strongly than the drop in Telekom shares after the revelation of the corruption scandals in 2001.

Table

Keydata about Telekom IPOs

	1. IPO	2. IPO	3. IPO
Date	November 18, 1996	June 28, 1999	June 19, 2000
Total revenues (in euro)	10 billion	10,8 billion	13 billion
Share of retail investors	43 percent	54 percent	70 percent
Share of institutional investors	57 percent	46 percent	30 percent

Source: Deutsche Telekom Investor Relations.

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T-shares, which was part of the new economy stocks trading on the German stock market, were also affected by the crash. In March 2000, share prices plummeted within a short period of time (see Figure 3). Interestingly, during the third IPO in June 2000, i.e., after the crash, a large number of investors still bought T-shares (see Table). A total of 70 percent of the issue volume goes to retail investors, suggesting that, despite the overall crash, T-shares are still considered a safe investment, i.e., retail investor confidence remains high. The behavior of institutional investors, on the other hand, is more restrained.

The real end of what was dubbed the Telekom era was not heralded until 2001 when it comes to light that Deutsche Telekom had overvalued its real estate portfolio and published inaccurate figures during the second and third IPOs. Telekom's real estate portfolio was estimated to be overvalued by some 1.7 to 2.1 billion euros. In July 2002, then CEO of Deutsche Telekom, Ron Sommer, was forced to step down—a clear message and the end of the T-share's heyday. [10] After Ron Sommer's resignation, Deutsche Telekom launched a radical cost-cutting strategy.

Retail investors feel betrayed

Although at this time the entire German share market had crashed, the demise of the T-share was particularly significant for German households. Telekom's strong media presence, including an unprecedented advertising campaign with the back-then popular actor Manfred Krug, had raised high hopes of a stabile investment opportunity for everyone. The fact that Deutsche Telekom had previously been a public enterprise also created a feeling of confidence and made T-shares seem like a particularly safe investment for the future. The emotional fallout of these shares collapsing is, therefore, likely to have been significant. The Germans feel they have been betrayed and deceived.

The media reports at that time spoke volumes about the prevailing sentiment.[11] To examine how this sentiment developed in more detail, this study will look at examples of articles on the T-share published in the German newspaper *Handelsblatt* after the crash using a dictionary-based sentiment analysis. The online dictionary SentiWS assesses the sentiment in numerous German words using a scale of -1 (very negative sentiment) to 1 (very positive sentiment).[12] Next, the media sentiment is calculated as the average sentiment among all articles on the T-share published in the *Handelsblatt* during a given year. Comparisons are carried out to examine how the sentiment in the media changes

10 See for example "Klage gegen Ron Sommer," *Der Spiegel*, February 27, 2001 (in German; available online); Frank Dohmen et al., "T wie Tiefpunkt," *Der Spiegel*, July 14, 2002 (in German; available online).

11 See for example Frank Hornig, "Laute Wut, stiller Triumph," *Der Spiegel*, June 2, 2001 (in German; available online); Georg Bönisch and Frank Dohmen, "Start mit falschen Zahlen," *Der Spiegel*, July 9, 2001; Wolfgang Koch, "Volksaktie auf Tiefstand," *Stuttgarter Zeitung*, September 11, 2001; Martin Reim, "Die falsche Aktie zur richtigen Zeit," *Süddeutsche Zeitung*, November 17, 2001.

12 Robert Remus, Uwe Quasthoff, and Gerhard Heyer: "SentiWS-A Publicly Available German-language Resource for Sentiment Analysis," LREC (2010).

during this period parallel to the development of Telekom share prices. The development of the Telekom share price serves as an objective benchmark (see Figure 4).

Directly after the crash in 2000, the share price plummeted, causing a plunge in media sentiment, too. In fact, an approximately 50 percent decline was seen for both during this year. The following year, the share price fell by a further 50 percent, while sentiment took a massive nosedive, falling by a further 250 percent. These negative trends were primarily a result of the mismanagement and corruption that was exposed impacted media sentiment more than share price.

T-share crash still impacts investment decisions of German households to this day

This report looks at how these events impacted and continue to impact stock market participation. To do so, we shall be looking at household heads who were ages 20 and above in 2000, i.e., those who saw the events surrounding T-shares unfold firsthand (see Box).

Our analysis showed that today, 20 years after the first IPO of T-shares, stock market participation of those households that were old enough to actively acknowledge the Telekom crash is 60 percent lower than that of those who were younger than 20 years of age at the time of the crash (see Figure 5). Another interesting finding is that households who had experienced the Telekom crash enter and exit the stock market less frequently. This points toward less active investment behavior as a whole.

Direct experience plays an important role

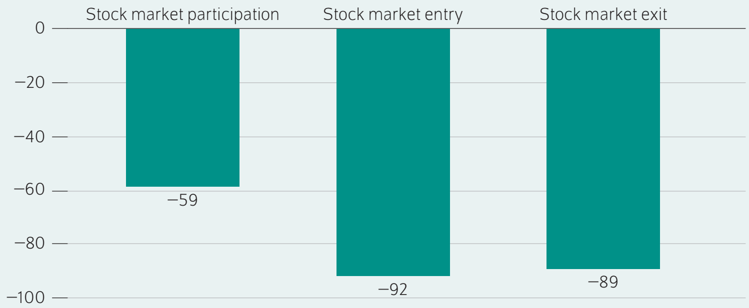
Studies show that formative experiences in the past can impact future investment decisions.[13] Using this hypothesis, we shall examine whether the investment decisions of those directly impacted by the events surrounding T-shares are more strongly affected. Households that had invested in T-shares (and potentially suffered losses after the crash) are more likely to have an emotional stake in the events surrounding the T-shares. These households are therefore less likely to invest in shares than those households that followed the events through the media only.

The dataset does not provide exact data on household investment in T-shares, however, which is why a proxy variable for Telekom investment activity was developed (see Box).[14] In addition, a control group is identified, which has similar characteristics to the Telekom investors, but who had not invested in the stock market during the Telekom IPOs. The events confirm the relevance of being directly affected by the T-share crash for long-term investment decisions (see Figure 6). Twenty years on, households that had invested in T-shares at the time not only invest 12 percent less in shares than households that experienced the Telekom affair firsthand but had not actively invested in T-shares. These households have an 18 percent lower probability of entering the stock market.

Figure 5

The effect of direct experience of the Telekom event on stock market participation behavior of German households in 2016

In percentage points



Notes: The values are estimated with a probit model and are significant at the one percent level (error probability is one percent)

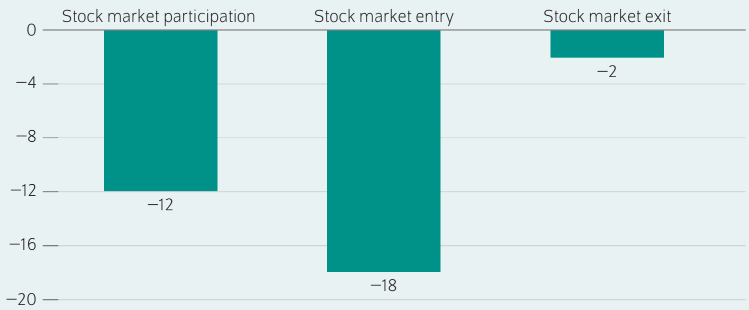
Source: SOEPv34; authors' own calculations.

Households, who experienced the Telekom event, are 60 percent less likely to participate in the stock market than households, who did not experience the event, even 20 years afterwards.

Figure 6

The effect of direct investment in the Telekom shares on stock market investment behavior in the year 2016

In percentage points



Notes: The values are estimated with a probit model. The result for stock market participation is significant at the five percent level, the result for stock market entry is significant at the one percent level.

Source: SOEP v34; authors' own calculations.

Households, who invested in the Telekom shares, are 12 percent less likely to participate in the stock market than households, who only experienced the Telekom event in media.

13 One study shows, for example, how an emotional attachment to communism can affect investment decisions on the part of German households. See Christine Laudenbach, Ulrike Malmendier, and Alexandra Niessen-Ruenzi, "The long-lasting effects of experiencing communism on attitudes towards financial markets" (available online) (2020).

14 For more details on the methodology, see Chi Hyun Kim, "Optimism gone bad? The persistent effects of traumatic experiences on investment decisions". *DIW-Discussion Paper*, no. 1952 (2021) (available online, last accessed on June 18, 2021).

Box

Data basis and methodology

Variables

This report is based on data from the Socio-Economic Panel (SOEP). The representative household survey, which has been conducted annually since 1984, asks households whether they own securities. Before 2001, the study did not differentiate between shares and other securities. Using this information, three dummy variables were constructed for the analysis: stock market participation, when a household started investing in the stock market, and when it stopped.

Methodology

A probit model was used for the statistical analysis with household-level fixed effects for the survey year 2016:[1]

$$y_i = \alpha + \beta_1 TE_i + \beta_2 A_i(\lambda) + \gamma' x_i + \delta_i + \varepsilon_i,$$

where y_i represents either participation or start and end of household i investing in the stock market. Our main interest is the effect of TE_i—the variable representing experience with Telekom—on these variables.

First, it is assumed that household heads who were at least 20 years old in the year of the crash (2000) has had direct experience of the events surrounding T-shares. Household heads under the age of 20, however, were too young to have been actively aware of the seriousness of the situation at the time.

Second, we examined whether having an emotional stake in the events surrounding T-shares amplified the effect on the future investment behavior of households. For this analysis, it is assumed that households that had actively invested in T-shares were likely to be more emotionally attached to the event as they may have suffered losses. Unfortunately, the SOEP lacks detailed information about the composition of households' portfolios and investments in individual stocks. An approximation (proxy) was therefore constructed: it assumes that households were highly likely to have invested in T-shares if they bought shares on the stock market for the first time during the first three IPOs.

Furthermore, variable $A_i(\lambda)$ is included in the analysis, which uses a weighting function to include all the information about past share yields achieved by household heads since the year they were born. The inclusion of these variables as controls is important in order to properly isolate the Telekom effect from the general stock market situation. Since the IPOs and the downward slide of the T-share took place at the same time the dot-com bubble burst, care must be taken to ensure that the consequences of the Telekom event were not driven by other factors on the stock exchange.

The demographic and financial characteristics of households are used as control variables *(x)*. This is important to assess the effect of having had experience with Telekom. These characteristics include age of the household heads, gender, level of education, household size, income, and wealth. Households' subjective assessment of their willingness to take financial risks was also taken into account.

Control group

In order to clearly identify the effect of being emotionally affected, Telekom investors were compared to a control group of households who had experienced the Telekom event (i.e., were at least 20 years old during the crash in 2000) and had similar socio-economic characteristics (such as age, gender, education, and income) to the Telekom investors, but had not invested in T-shares.

1 For further details on the methodology, see Chi Hyun Kim, "Optimism gone bad? The persistent effects of traumatic experiences on investment decisions," *DIW-Discussion Paper*, no. 1952 (2021) (available online).

Conclusion: More regulation in the financial market, more financial education opportunities for retail investors

In reality, retail investors that make investment decisions on the basis of a gut feeling are not so infrequent. And stock market crashes are (unfortunately) not such a rare occurrence either. The present analysis has shown that for retail investors, who are particularly emotionally invested, a negative development could potentially mean their exit from the financial market for good; something which can prevent them from continually growing their assets, including provision for old age. These factors play a more important role for retail investors because they will often have less experience with the stock market and tend to own less diversified portfolios than institutional investors.[15] This is the reason why they are more strongly affected by stock market crashes.

Today, where everyone has easy access to information and entry and trading costs for shares have fallen due to online banking, the number of retail investors in the financial markets is on the rise once again.[16] The pandemic, in particular, drove massive gains in retail investment in shares in companies such as the videogame retailer GameStop, but also

15 Brad M. Barber and Terrance Odean, "Boys will be boys: Gender, overconfidence, and common stock investment," *The Quarterly Journal of Economics* 116, no. 1 (2001): 261–92; William N. Goetzmann and Alok Kumar, "Equity portfolio diversification," *Review of Finance* 12, no. 3 (2008): 433–63.

16 Sirio Aramonte and Fernando Avalos, "The rising influence of retail investors," *BIS Quarterly Review* (March 2021).

in the cryptocurrency market. For many private households, these new dynamics may have their benefits—i.e., capital gains. The potential risks, however, must not be overlooked. In fact, significant losses can have a lasting effect on investment behavior, as shown in the present study.

It would therefore be advisable for supervisory boards to scrutinize market development and trading volatility in order for them to be able to respond to improper and manipulative trading activities. If nothing else, this would help reduce the frequency of such negative emotional experiences on the financial market. Furthermore, supervisory boards and auditors/accountants must use their due diligence to ensure nothing like the Wirecard scandal ever happens again. More importantly, retail investors should have opportunities to learn more about finance or finance could incorporated into the school curriculum, for instance. Retail investors that have a better understanding of the stock market and the type of strategies that can help reduce investment risk (e.g., portfolio diversification) will be able to gain a better grasp of market behavior and make more rational investment decisions.

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