

DIW Weekly Report

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103 Report by Lorenz Meister and Lukas Menkhoff

Working from home facilitates stock ownership

- Study investigates relationship between working from home and stock market participation
- Working from home increases share of stock owners, especially for low-income earners
- Broader distribution of stock ownership contributes to a more equal income and wealth distribution

LEGAL AND EDITORIAL DETAILS



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AT A GLANCE

Working from home facilitates stock ownership

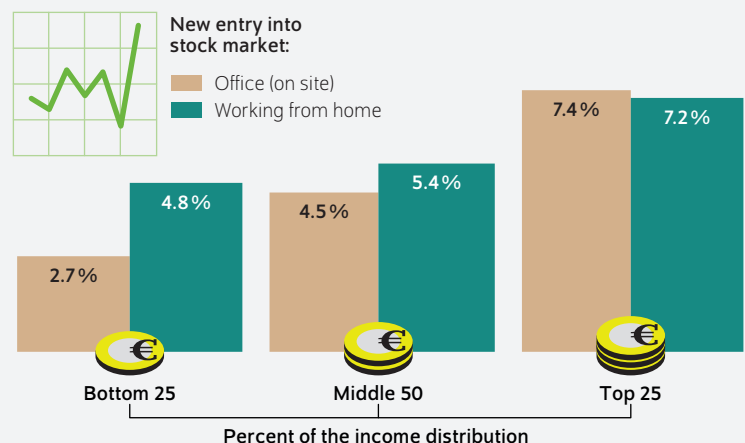
By Lorenz Meister and Lukas Menkhoff

- Socio-Economic Panel (SOEP) data show a positive effect of working from home on the share of stock owners
- Positive effect is due to the time saved and being able to use their time flexibly
- Share of stock owners increased the most for households without children when working from home
- For low-income earners, working from home has a greater effect on initial entry into the stock market than for medium- or high-income earners
- A broader stock owner base comes with positive distributional effects
- Economic policy can facilitate access to the stock market by improving financial literacy

Working from home increases the number of first-time low- and middle-income stock owners in 2020 In percent of employees



Source: SOEP, authors' own calculations.



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FROM THE AUTHORS

“More low-income earners in particular have entered the stock market as a result of working from home.”

— Lorenz Meister —

MEDIA



Audio Interview with Lorenz Meister (in German)
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Working from home facilitates stock ownership

By Lorenz Meister and Lukas Menkhoff

ABSTRACT

In 2020, there were simultaneous increases in the number of private persons participating on the stock market as well as in the number of employees working from home. Indeed, working from home is a robust determinant of stock ownership and partially explains the increase in 2020, with households without children benefiting the most in this manner. Furthermore, the effect of working from home on stock ownership is largest for low-income earners. Thus, working more from home has complex distributional consequences: It tends to expand the stock owner base by, in a broader sense, decreasing the stock market participation cost. While economic policy should not mandate working from home for the sole purpose of increasing stock ownership, it can facilitate stock market participation in other ways, such as by improving financial education.

Stock ownership is a foreign concept to many people. For the poorer 40 percent of the German population, stocks are not an issue; this group does not have money to invest, no matter in what form. There are also people who are principally opposed to owning stocks, for example due to their political or religious beliefs. Negative experiences with stock-broking, such as experiencing a stock market crash, can also keep people from investing in stocks.¹ In fact, the share of adults in Germany who own stock either directly or indirectly via funds was only around 17.5 percent in 2020. As a result, there is a large share of the population that could be stock owners, but is not.

Thus, this topic is interesting from an economy policy perspective, as stocks are a very profitable form of long-term investment. Compared to a risk-free investment, the additional return is a few percentage points more per year. Thus, investing in stocks pays off in the long run. Many people forego this additional return, while others pocket it. Both groups, stock owners and non-stock owners, are not comprised randomly. Stock owners tend to be people who are economically better off, and in this respect, stock ownership increases income and wealth inequality in the population.²

There are some possibilities as to how economic policy can counteract this phenomenon. Working from home is not actually one of these, as its mandatory use in 2020 was due to health policy concerns. However, unintentionally, working from home has significantly broadened stock ownership in Germany, which is examined in more detail below.

Stock ownership more widespread in Germany in 2020

Using data from the German Socio-Economic Panel (SOEP) on the stock owner spread in Germany since 2015,

¹ Chu Hyun Kim and Alexander Kriwoluzky, "Der Fall der T-Aktie: Börsencrashes können Investitionsentscheidungen von Haushalten dauerhaft negativ beeinflussen," *DIW Wochenbericht*, no. 25 (2021): 423–429 (in German; available online, accessed on March 9, 2023. This applies to all other online sources in this report unless stated otherwise).

² Laurent Bach, Laurent E. Calvet, and Paolo Sodini, "Rich pickings? Risk, return, and skill in household wealth," *American Economic Review* 110, no. 9 (2020): 2703–2747 (available online).

a five-percentage-point increase to around 22 percent from 2019 to 2020 can be seen (Figure 1). Due to the focus on working from home, the data only include information on working adults, namely the primary respondent in the household in the case that multiple household members are working.³ Such a large change is very unusual; the last time there was a large increase was in the late 1990s in the wake of the price bubble on the *Neuer Markt*. Otherwise, the values tend to move up or down by around one percentage point from year to year.

Working from home was frequently mandated in 2020

In parallel with the rising share of stock owners, the amount of employees working from home increased much more with the onset of the coronavirus pandemic in spring 2020 compared to previous years. Protecting workers from the coronavirus was one main driver of this development and working from home was oftentimes mandated if logistically possible.

While it is striking that these two developments—increasing shares of stock owners and of employees working from home—occurred simultaneously, they do not provide information on a possible cause. First, it must be clarified if working from home can explain stock ownership. To find this out, the most significant determinants of stock ownership are reviewed, which is comparatively easy due to the rich SOEP data. This procedure is based on one of the most cited studies by Hong, Kubik, and Stein in this area of research.⁴

SOEP data explain German stock ownership similarly well as a US reference study

In their work, Hong, Kubik, and Stein use an explanatory variable for stock ownership that is widely accepted in the literature and also introduce social interaction as an additional variable whose effect has since been widely confirmed.⁵ Standard determinants of stock ownership include higher wealth, higher income, and a higher level of education. Further common socio-demographic characteristics are considered, such as age, gender (female vs. others), marital status (married vs. others), urban residence (vs. rural), migration background, and the individual's level of risk tolerance.⁶ The authors measure social interaction through various measures, of which the following indicates the strongest effect:

³ Using this definition, the share of stock owners is significantly higher than in the adult population as a whole, as used by the *Deutsches Aktieninstitut*, for example. According to them, stock ownership was only 17.5 percent in 2020. *Deutsches Aktieninstitut, Aktienärzszahlen* (in German; available online).

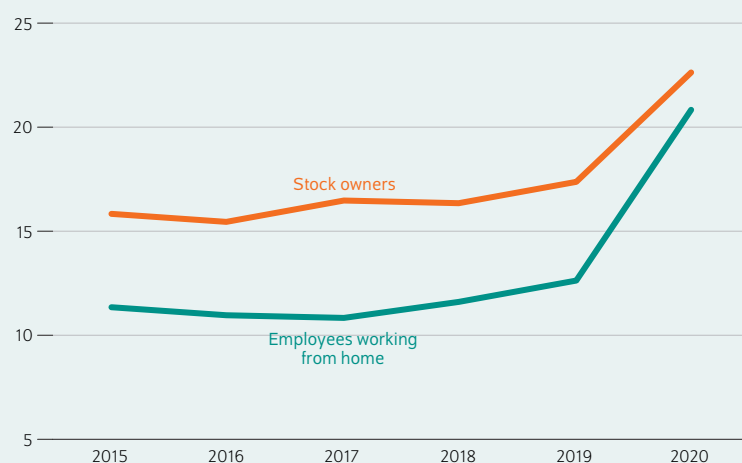
⁴ Harrison Hong, Jeffrey D. Kubik, and Jeremy C. Stein, "Social Interaction and Stock Market Participation," *Journal of Finance* 59, no. 1 (2004): 137–163 (available online).

⁵ Hong, Kubik, and Stein, "Social Interaction and Stock Market Participation."

⁶ Francisco Gomes, Michael Haliassos, and Tarun Ramadorai, "Household finance," *Journal of Economic Literature* 59, no. 3 (2021): 919–1000 (available online); Natalia Barasinska and Dorothea Schäfer, "Gender role asymmetry and stock market participation – evidence from four European household surveys," *European Journal of Finance* 24, no. 12 (2018): 1026–1046 (available online); Markku Kaustia, Andrew Conlin, and Niilo Luotonen, "What drives stock market participation? The role of institutional, traditional, and behavioral factors," *Journal of Banking and Finance* 148 (2023): 106743 (available online).

Figure 1

Share of stock owners and of employees working from home among the working population In percent



Notes: The time series show the share of people in the working population who own stocks (orange line) and those who at least sometimes work from home (green line).

Source: SOEP and Eurostat; authors' own calculations.

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Stock ownership and working from home increased significantly between 2019 and 2020.

"How many of your immediate neighbors do you know?" This question is not included in the SOEP, but can be replaced by "How many close friends do you have?" To capture the effect of social interaction more closely, the authors control for individuals' optimism and openness.

If their linear regression model is applied to German data from 2019 and 2020 instead of US data from the late 1990s, very similar relationships emerge: The signs and statistical significances of the coefficients are in line with theoretical expectations as well as the "old" results from the United States (Table 1, column 1). In many cases, the coefficients are even very similar, which emphasizes that these results are robust. The coefficients also show that wealth and income are positively correlated with stock ownership,⁷ while women and men with migration backgrounds are more rarely stock owners. Further control variables are also estimated (see the description of Table 1) but not included in the table.⁸

⁷ Stock ownership is defined categorically. The dependent variable is 1 if someone owns stocks and 0 otherwise. Probit and logit models are also suitable and are also estimated to check the robustness of the results for binary dependent variables. The results are the same.

⁸ For a more in-depth look, see Lorenz Meister, Lukas Menkhoff, and Carsten Schröder, *Remote work, stock market participation, and inequality* (mimeo).

Table 1

Stock ownership and working from home

Effects in percentage points

	(1) Regression with- out WFH variable	(2) Regression with WFH as an explanatory variable for 2020	(3) Regression with WFH as a variable for 2014	(4) Stock ownership in 2019 as an ex- planatory variable for 2020
Working from home (WFH)		5.7***	2.4**	2.1**
Stock ownership in 2019				70.7***
Wealth	2.1***	2.0***	1.5***	0.6***
Income	3.3***	3.4***	2.8***	1.0**
Education (in years)	2.1***	1.8***	2.0***	0.5***
Gender (female)	-6.0***	-5.5***	-5.8***	-2.5***
Migration background	-4.4***	-5.1***	-4.2***	-2.4***
Observations	8,954	8,259	8,508	8,243

Note: The relationship between working from home and stock ownership is estimated using linear regression models with control variables. The dependent variable is stock ownership in 2020. The control variables include wealth, income, education, age, gender, marital status, urban residence, migration background, risk tolerance, number of close friends, optimism, openness, and federal state. The asterisks denote the significance level, which indicates the statistical precision of the estimate. The more asterisks, the lower the probability of error: ***, **, and * indicate significance at the one-, five-, and ten-percent levels, respectively.

Legend: Wealth and income are positively associated with stock ownership, while women and men with a migration background are stock owners less frequently (column 1). The probability of being a stock owner is 5.7 percentage points higher in 2020 for people working from home than for people working on site (column 2). In 2014, the difference was only 2.4 percentage points (column 3). The probability to enter the stock market for the first time in 2020 was 2.1 percentage points higher for people working from home than for the rest of the working population (column 4).

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Working from home explains stock ownership beyond previously used determinants

In the next step, a new variable, working from home, is added, which shows if the respective individual worked from home in the past 12 months. When viewed in isolation, working from home increases stock ownership by 5.7 percentage points (Table 1, column 2).

To test if this relationship only applies to 2020, the same calculation for an earlier year, 2014, is repeated (Table 1, column 3). While the influence of working from home is lower but still statistically significant, the rest of the coefficients change less. Therefore, working from home generally contributes to explaining stock ownership.

To examine this correlation from a different perspective, stock ownership in the previous year is included as a further variable so that the calculation focuses more on the change in stock ownership. Less surprisingly, this variable explains stock ownership more than all other variables combined. The coefficient for stock ownership in the previous year is around 70.7. From that alone, it can be expected that the other coefficients in column 4 are only about one third of those in column 2. In fact, this is true for many coefficients, such as those for wealth, income, or education, which roughly decrease to one third. Interestingly, this also applies to working from home, although its coefficient remains highly statistically significant. In this respect, this calculation confirms the importance of working from home for first-time stock ownership.⁹

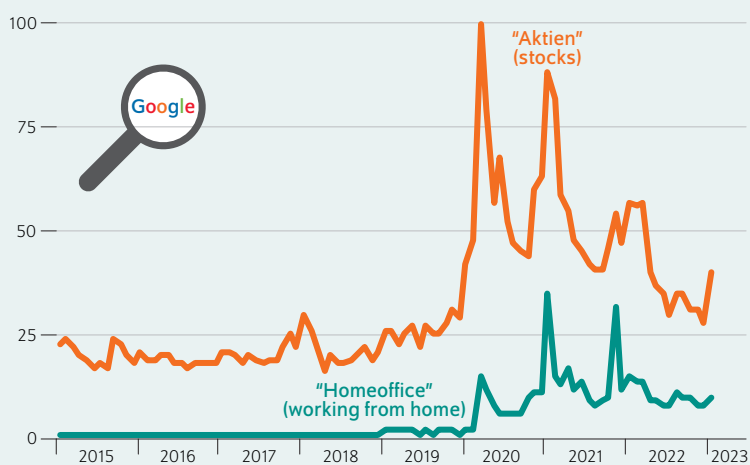
Interest in stocks and working from home increased during the pandemic

In line with the observations, interest in stocks and working from home follow similar cycles. This is shown by the frequency of Google searches for the German words “Homeoffice” (working from home) and “Aktien” (stocks) from 2015 to 2020 (Figure 2). While the term “Homeoffice” was barely Googled before the coronavirus pandemic, search queries increased rapidly in early 2020, reaching several peaks during periods of high coronavirus incidence during winter 2020–2021. Similarly, searches for “Aktien” from 2015–2021 remained relatively constant until the beginning of the pandemic, when there was a substantial increase. Several different peaks were reached; noticeably, these lasted longer but occurred at the same time as the peaks for “Homeoffice” searches. One possible explanation is that people working from home have more time to spend on the computer, which they use in part to educate themselves about stocks.

Figure 2

Google search queries for German terms “Homeoffice” and “Aktien” in Germany since 2015

Relative to the highest number of searches for “Aktien” (March 2020)



Notes: The lines show the frequency of Google search queries relative to the highest number of searches (“Aktien,” March 2020). The orange line shows searches for “Aktien,” the green line shows searches for “Homeoffice.”

Source: Google Trends.

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Interest in working from home and stocks increased rapidly at the beginning of the coronavirus pandemic and reached various peaks during lockdowns.

⁹ Most determinants of stock ownership mentioned are considered exogenous. However, it can be argued that the determinants of working from home are similar to those of stock ownership, so that working from home may not have a causal influence on stock ownership. In contrast, an estimation with instrumental variables can be performed, which largely confirms the result here.

Households without children in particular purchased stocks while working from home

It is argued that working from home has a positive impact on stock ownership because workers save time and can use it more flexibly. In particular, employees save time by not having to travel to and from an office or work site. According to a study, people working from home in Germany save 65 minutes per day, of which they use an average of 31 percent for work, 46 percent for leisure activities, and eight percent for child care (Figure 3).¹⁰

It is understandable that households with children often had problems working from home due to time allocation conflicts. Thus, the hypothesis is that the effect on stock ownership is stronger for households without children than for those with children.

To test this, the entire sample is divided into groups according to household type: households with or without children. For each group, the main regression is calculated again. The split-sample results clearly confirm the hypothesis: The coefficient for working from home is twice as large in households without children as in households with children, and only in the first case is it statistically significant (Table 2).

New and old stockholders differ

The following section takes a broader look at what characterizes new stock owners, i.e., individuals who acquired stocks for the first time in 2020. To do so, this group can be compared with those who were stock owners in 2019 (and 2020) as well as those who were not stock owners in 2020.

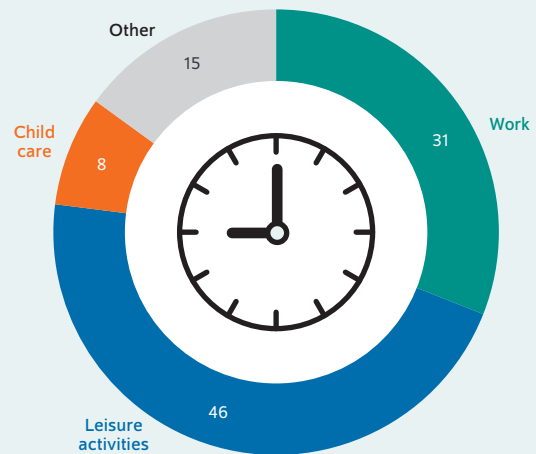
Average values for various socio-demographic characteristics in the respective groups are compared (Table 3). Essentially, new stock owners are always in between the two other groups. For example, their net income is around 2,700 euros per month; old stock owners have a net income of 3,300 euros and new stock owners of 1,900 euros. This indicates that people from various social layers are joining the stock owner base, meaning a broader population benefits from the higher returns on stock ownership and the group of stock owners is less exclusive than before. However, the available data only provide information that stocks were purchased and not on how many shares were purchased by the respective groups.

Working from home facilitates first-time stock ownership for low-income earners

As the stock owner base broadens to include lower-income groups, the question of the role played by working from home arises. To investigate further, all new stock owners are divided into two groups: those who work from home and those who do not. These two groups are then again divided into income

Figure 3

Use of time saved from working from home In percent



Source: Authors' depiction based on Cevat Aksoy et al., "Time savings when working from home," *American Economic Association Papers & Proceedings* (2023, forthcoming).

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The majority of the time saved by working from home is used for leisure activities, followed by work, other activities, and child care.

Table 2

Households with and without children Effects in percentage points

	(1) Households without children	(2) Households with children
Working from home	4.2***	0.7
Wealth	0.5***	0.7***
Income	1.3**	0.9
Education (in years)	0.6**	0.5**
Gender (female)	-4.1***	-1.1
Migration background	-2.5	-2.1*
Observations	3,407	4,683

Note: The relationship between working from home and stock ownership is estimated using linear regression models with control variables. Column 1 shows the results for households without children and column 2 for households with children. The control variables include wealth, income, education, age, gender, marital status, urban residence, migration background, risk tolerance, number of close friends, optimism, openness, and federal state. The asterisks denote the significance level, which indicates the statistical precision of the estimate. The more asterisks, the lower the probability of error: ***, **, and * indicate significance at the one-, five-, and ten-percent levels, respectively.

Legend: For households without children, working from home is positively associated with stock ownership (column 1), while this association does not exist for households with children (column 2).

Source: SOEP; authors' own calculations.

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groups. For each of these income groups, the share of new stock owners of all group members in the respective income groups is measured. The expectation is that—in line with the socio-demographic characteristics of the stock owners—the higher the income group is, the larger the share of new stock owners is likely to be.

¹⁰ Cevat Aksoy et al., "Time savings when working from home," *American Economic Association Papers & Proceedings* (2023, forthcoming). The share of time spent on child care is an average across all households and is correspondingly much higher in households with children.

Table 3

Demographics of stock owners in 2020

	(1) Old stock owners	(2) New stock owners	(3) Non-stock owners	(4) Old vs. new stock owners	(5) Non-stock owners vs. new stock owners
Net wealth (euros)	824,348	453,549	159,446	370,799**	-294,103***
Net income (euros)	3,270	2,673	1,931	-596**	-742***
Education (in years)	14.59	13.83	12.86	0.76***	-0.97***
Age	49.68	46.49	45.88	3.20***	-0.61
Women (percent)	41	44	54	-3	10***
Married (percent)	64	56	61	8***	5**
Migration background (percent)	11	15	22	-4*	7***
Observations	1,802	663	6,578	2,465	7,241

Note: The table maps average characteristics of people in the working population depending on their stock ownership: In column (1), people who were stock owners in 2019 and 2020; in column (2), people who were new stock owners in 2020; in column (3), people who were not stock owners in 2019 or 2020. The last two columns show the mean differences between the groups; data is in euros, years, and percentage points. The asterisks indicate whether the differences in the mean values are statistically significant: ***, **, and * indicate significance at the one-, five-, and ten-percent levels, respectively.

Legend: With a net monthly income of 3,270 euros, people who were already stock owners in 2020 (row 3) earn 596 euros (column 4) more than people who were new stock owners in 2020 (column 2). The income difference to people who were not stock owners in 2019 or 2020 is 742 euros (column 5).

Source: SOEP; authors' own calculations.

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In the lowest income group, the share of new stock owners working from home is around five percent, significantly larger than for people not working from home (nearly three percent; Figure 4). This difference is markedly smaller for the medium income group and working from home plays no role in the increase in stock ownership in the highest income group. In short, lower-income earners are more likely to become stock owners if they work from home, unlike high-income earners.

Conclusion: Working from home facilitates stock market access

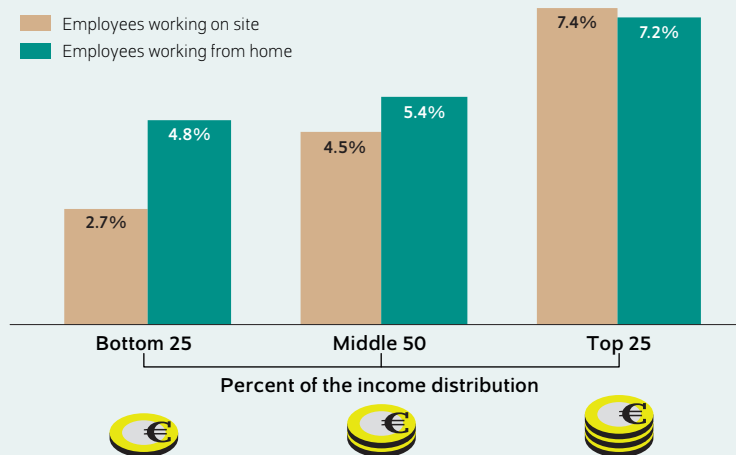
Working from home saves employees time, which they are then able to use more flexibly, partially to handle and purchase stocks. Access to the stock market has been made easier for many people because they are able to handle their financial affairs from home. This observation is the result of an analysis using data from the German Socio-Economic Panel. The effect was presumably reinforced by the increasing availability of neobrokers, online platforms for low-threshold and low-cost trading of stocks. The increase in the savings rate in 2020 and the resulting enforcement of custodial fees also likely contributed to the rise in stock ownership, as they created incentives to invest more in risky investments instead of fixed-interest investments.

The stock owner base in the general population is expanding; new stock owners do not have the same socio-demographic characteristics as old stock owners. In addition, more people from the lower income groups are entering the stock market due to working from home. Both effects suggest that a broadening of the stock owner base contributes to a more equal income and wealth distribution.

Of course, economic policy cannot afford to mandate working from home in order to make stock ownership more widespread. However, the effect of working from home emphasizes once more that reducing costs—in a broader sense—facilitates stock ownership. One starting point for government action involves stock ownership information, which has been shown to improve access.¹¹ Here, action can be taken as needed by introducing the *Aktienrente*¹² (equity pension) or other funded forms of old-age provision, or, more generally, by improving financial education, for example at schools.

Figure 4

Share of new stock owners on the stock market of employees In percent



Notes: The bars show the share of the employed who became first-time stock owners in 2020. Brown bars indicate employees who worked only on site, green bars employees who at least partially worked from home.

Legend: The first bar shows that just under three percent of people in the bottom 25 percent of the income distribution who were exclusively working on site entered the stock market for the first time. For people in the same income group who worked partially or entirely from home, the share of first-time stock owners was much higher at about five percent (second bar). While working from home also makes a difference for first-time entry into the stock market for the middle income group, it does not for the top income group.

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In 2020, low-income earners in particular entered the stock market more frequently if they worked from home.

¹¹ Marten van Rooij, Annamaria Lusardi, and Rob Alessie, "Financial literacy and stock market participation," *Journal of Financial Economics* 101, no. 2 (2011): 449–472 (available online).

¹² Compare with Laurent Calvet et al., "Can security design foster household risk-taking?" *Journal of Finance* (2023, forthcoming).

STOCK OWNERSHIP

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