

Equity Premium Puzzle, Expectations and Covid-19: Evidence from Germany

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Abstract

What prevents households from investing in financial assets and what makes them overcome these factors? This paper asks respondents directly about the reasons for their decisions during the Covid-19 pandemic. Using the Bundesbank Online Pilot Survey on Consumer Expectations, I find that lack of information and interest are the biggest determinants for non-participation, while risk and time constraints prevents households to rebalance. Buyers invest either because of expected increasing asset prices or due to a pre-existing savingsplan. Additionally, I find that households who have higher expectations of property prices as well as inflation are less likely to buy.

Keywords equity premium puzzle - participation cost - adjustment costs - expectations - covid19

JEL codes D14, G11, G5

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1 Introduction

Many theories to explain equity premium puzzle The equity premium puzzle is not a new phenomenon, but a vibrant one. Household finance papers have tested empirically a variety of factors why households do not hold stocks at all and if they do, why such a small share of their portfolio. These factors are usually tested one by one using different time periods, locations, and reference groups which makes a comparison almost impossible.

A comparison gets even harder when many circumstances change simultaneously. Covid-19 offers such a period where stock markets fell dramatically and recovered vastly. Additionally, restrictions altered work, consumption, and leisure patterns.

This paper: high level summary To assess and compare factors preventing households from holding financial assets and those which make them overcome these obstacles, this paper asks households directly about the factors which lead to their decision. I use novel data from the Bundesbank Online Panel (BOP) which surveys around 2000 households in Germany. Inserting questions allows me to distinguish between non-participants, households who did not adjust their portfolio, as well as buyers and sellers. Afterwards each type ranks various reasons brought forward in the literature from very important to not important at all. Hence, I can assess which factors were more or less important and how they relate with each other.

Contributions: The contributions of this paper are threefold. Firstly, I can compare the importance of many factors and assess how they correlate with each other. Secondly, while most papers focus on the participation part, I ask why households did not adjust their portfolio, or if they did what drove their decision. Lastly, I can link financial asset investment decisions with expectations about macro-variables.

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Gap In the Literature This paper contributes to three gaps in the literature. First, it compares magnitudes or importance of participation costs. Here, it is close to Choi and Robertson (2020) who ask in 2016 around 1000 household heads what their portfolio equity share determines. One important difference to this paper is that while they ask for *general factors*, I focus on reasons concerning a fixed 6 months period which makes it more concrete. Other papers focus on wealthy investors (eg Bender, Choi, Dyson, and Robertson (2019)).

Second, adjustment costs which need to be paid when changing the portfolio haven't received much attention even though they are crucial when matching not only participation, but portfolio shares invested in equity markets. Bonaparte, Cooper, and Zhu (2012) model them solely as a proportion of income, but do not give empirical evidence. In this paper, I ask households for reasons why they did not adjust their portfolio, as well as, why they adjusted it.

Thirdly, most papers on expectations focus solely on expected stock market returns and equity investments. For example, Arrondel, Calvo Pardo, and Tas (2014) find that participation increases monotonically with stock market expectations and Choi and Robertson (2020) shows that expected higher returns are very or extremely important by a quarter of all stock market participants. **ADD MATEO**. Additionally, Giglio, Maggiori, Stroebe, and Utkus (2019) find empirical evidence for retail investors. In contrast to these clear mechanisms, I shift attention towards inflation and house prices whose analysis is more explorative.

My Results My findings are that households do not participate in financial markets due to lack of information and interest. In general, reasons can be grouped into risk aversion, lack of resources, and savings, whereas the first two have a lifecycle and the latter an income component. Second, households did not adjust their existing portfolio either because they thought it is a bad timing or due to time constraints. Thirdly, households invested either because they expected higher stock market prices - which is related to other factors such as time, information, and peer effect - or due to a pre-existing savingsplan. Additionally, households are more likely to invest in assets they already held. Fourthly, some households sold because they wanted to rebalance or prevent further losses. Finally, households are less likely to buy financial assets if their expectations of houseprices as well as inflation is larger.

Why 2020? Aka my short Literature review The year 2020 is an interesting time period to study. Due to covid-19 restrictions in March 2020, the German stock market (DAX) plummeted by almost 40%, but recovered vastly and finished with a yearly return of 3.5%. Moreover, the overall participation rate increased. The DAI (2021) reports that 2.7 mio additional people held stocks compared to 2019. Here, the biggest increase (40%) was made for Germans younger than 40. **Note to me: Add PAPI if ready**

Economic theory gives many explanations how this period could have impacted financial investment decisions. Firstly, Malmendier and Nagel (2011) would argue that the vast decline in stock prices scares people away. Additionally, the path of recovery contains a lot of uncertainty, as it depends on behavior of others and government, vaccination availability and efficacy, as well as possible mutants. All these risk assessments are reflected in the stock market, hence, standard models such as CAPM suggests that people would reduce their asset holdings.

On the contrary, the bufferstock model by Carroll and Toche (2009) suggests that higher uncertainty leads to higher savings. Due to covid, income risks increase which leads to higher savings to dampen possible shocks. Additionally, past experiences suggest that after a crash, there will be a recovery and hence, the crisis could mark a good opportunity to start investing. Hence, households with more optimistic views should invest. Lastly, covid affected everyday life in many dimensions. Consumption restrictions could have increased savings and free time for some households. Of course, this experience is extremely heterogeneous, as working remotely and home schooling

increased not only the need for digital infrastructure, but also marked a huge burden on families with small children.

Data + Survey Methodology This richness of mechanisms makes it nearly impossible to identify each factor individually. Therefore, I ask respondents directly which factors played a bigger role and which did not in their decision process. The BOP asks a representative sample of 2000 German households on a monthly basis. Next to demographics and expectations of macro-variables as well as personal income or consumption dynamics, I included 5 to 6 questions for each respondent. They investigate the main drivers of financial decisions. Between March 2020 (the beginning of covid restrictions) and August (when the interview took place), respondents could have either i) not participated ii) not adjusted, iii) bought additional assets or iv) sold assets. Each type receives a set of questions where they need to rank each possibility.

Discussion of survey methodology?!

Rest of Paper The rest of the paper is structured as follows. First, Section 2 summarizes drivers of financial decisions as well as household expectations. Afterwards, section 3 discusses the questionnaire as well as descriptions of the data. If you are just interested in results, you can forward to section 4. Lastly, section 5 assesses generality of the results and section ?? discusses them.

2 Literature Review

Keep for now, maybe erase later

Intro This paper builds upon two large literature strands. The equity premium puzzle and the growing expectations literature.

Equity Premium puzzle in general The equity premium puzzle describes the fact that too few households hold financial assets given the equity premium eg the difference between stock market returns and riskfree rate. Economic models cannot rationalize this using *reasonable numbers* for relative risk aversion parameters (See Mehra and Prescott (1985); Haliassos and Bertaut (1995) for early discussions and Gomes, Haliassos, and Ramadorai (2021) for a recent literature review).¹. The equity premium puzzle is twofold. First, the low participation in the stock market and second, the relative low share of assets invested in the stock market (Campbell (2006)). The literature added additional factors which can be grouped in three categories: risks, participation costs, and social interaction.

¹The actual size depends on measurement, time and space (see Van Ewijk, De Groot, et al. (2012) for a meta analysis)

Risk One explanation focuses on risks of households. Especially, the correlation between labor income and stocks can limit participation (e.g., Benzoni, Collin-Dufresne, and Goldstein (2007)). Other background risks such as housing (Cocco (2005)) or health (Guiso, Jappelli, and Terlizzese (1996)) reduce stock holdings as well.

When it comes to stock market volatility, Malmendier and Nagel (2011) argue that experiencing macroeconomic shocks can have long lasting effects on financial risk taking behavior and find evidence in the US. A similar study by Ampudia and Ehrmann (2017) uses European data confirms the results. Additionally, a macroeconomic shock can also increase uncertainty in the period after the shock occurred. Basic economic models (CAPM) argue that an increase in volatility, should decrease the savings households put in the stock market.

Participation Costs Early models such as Vissing-Jorgensen (2003); Haliassos and Michaelides (2003); Gomes and Michaelides (2005) impose a small participation cost to match empirical moments. As not everyone has the same resources, only a fraction of households will participate in equity markets. While direct costs such as setting up a brokerage account only makes a small part of it, a large literature explores indirect costs. The latter concerns psychological costs or barriers which need to be overcome. While these are no monetary costs such as brokerage fees, I still will call them *costs*, although it should be more thought of as *barrier*.

Information/Financial Literacy The first big bulk focuses on information costs. King and Leape (1987) uses the Survey of Consumer Financial Decisions and show that more than one third of non-participants argue that 'they did not know enough about it' as a reason of their non-participation. These can consist of unawareness of financial products such as different stocks and funds and financial literacy. For the former Guiso and Jappelli (2005) finds that socioeconomic variables such as education, wealth, income, year of birth, as well as long-term bank relations, social interaction and newspaper readership increases the awareness which then leads to a higher probability of stock market participation. Information issues appear through financial illiteracy. Lusardi and Mitchell (2011) show that many households lacking knowledge of basic economic principles. In an overview, they report that women are less financially literate – which leads to lower stock holding participation (Almenberg and Dreber (2015)) – and higher educated are also more financial literate. Additional factors are ethnic/racial and regional differences. Several papers show the strong link between financial literacy and stock market participation. For instance, Guiso, Haliassos, Jappelli, et al. (2002) use Italian data, Hochguertel, Alessie, and van Soest (2002); Van Rooij, Lusardi, and Alessie (2011) Dutch and Börsch-Supan and Eymann (2002) German data.

Trust/Sociability/Peer Effect A related channel concerns trust and peer effects. Trust is studied by Guiso, Sapienza, and Zingales (2008) who show that households with lower trust in other people are more afraid of being cheated on which lowers the expected payoffs from stock holdings. The second channel connects stock market participation

with social interaction and peer-effects (e.g. Georgarakos and Pasini (2011); Brown, Ivković, Smith, and Weisbenner (2008); Hong, Kubik, and Stein (2004)). The mechanism is that gaining information is costly and "word-of-mouth" communication can lower these costs (Brown, Ivković, Smith, and Weisbenner (2008)). Another possibility is stated in Hong, Kubik, and Stein (2004) and argues that individuals have pleasure in discussing up and downs of stock markets as casual conversation topic. Examples of these effects on stock market behavior are plenty and consist of parental transmission (**Chiteji and Stafford (2000)**), workplace (**Duflo and Saez (2002)**), neighbors and church communities (Hong, Kubik, and Stein (2004); Brown, Ivković, Smith, and Weisbenner (2008)), among others.

No interest Another factor is that households are not interested in the stock market. This "financial anxiety" or "financial phobia" (Shapiro and Burchell (2012)) is an often overlooked factor. Choi and Robertson (2020) show that in the US 37% of nonparticipants stated that 'not liking to think about one's finances' was a very or extremely important factor of their non-stock holding.

Time Lastly, gathering information, making the decision, and implementing it takes time. Bonaparte, Cooper, and Zhu (2012) models it as a proportion of income to capture opportunity costs. Choi and Robertson (2020) finds that time constraints play only a factor for 3% of nonparticipants in their sample.

Expectations and Stock Market Participation The second class of literature focuses on expectations of traders/ households and their financial asset investments. This paper relates to return beliefs, inflation, and houseprice expectations.

Return beliefs Arrondel, Calvo Pardo, and Tas (2014) find that participation increases monotonically with stock market expectations and Choi and Robertson (2020) shows that expected higher returns are very or extremely important by a quarter of all stock market participants. **ADD MATEO.** Additionally, Giglio, Maggiori, Stroebel, and Utkus (2019) find empirical evidence for retail investors.

Inflation The mechanism regarding expected inflation and the probability to buy financial assets is less clear. Empirically, higher inflation can have a short-term negative impact on stock prices, but a possible positive long term effect (eg Anari and Kolari (2001)). Campbell and Vuolteenaho (2004) list three reasons for a negative short-term correlation. Firstly, when central banks increase nominal interest rates, profitability of companies decreases. Secondly, periods of higher inflation have also higher risks which investors might not like and thirdly, companies might fail to adjust nominal prices (Modigliani and Cohn (1979)).

Nevertheless, the question how households react to higher inflation expectations can have other reasons. For instance, Candia, Coibion, and Gorodnichenko (2020) find that households have a *stagflationary view* and connect inflation with a negative impact on the economy. This contrasts the classic Phillips Curve thinking of professional forecasters, where high inflation correlates with low unemployment and high output.

House-prices and stock market Furthermore, this paper analyses the relationship between financial asset decisions and expectations of house prices. Sutton et al. (2002) analyze house price changes as a response to a shock in equity prices. They find that in the US, UK, Canada, Australia, Netherlands, and Ireland a 1% increase in equity prices leads to a 1 to 10% higher house prices within 3 years. They rationalize the finding with an increase in housing demand due to a wealth effect on equity prices and that the stockmarket reflects expectations of national income. Nevertheless, they conjecture that in the US, stock market investments might be a substitute for housing assets and finds that in years of high investments in equity markets, demand of housing decreases.

Cocco (2005) shows that household finance models with housing can explain the lower share of equity holders as poorer households have limited resources to invest in the equity market. Additionally, house price risks lead to a crowding out effect of stock holdings.

3 Data

The data source of this paper is the 'Bundesbank Online Pilot Survey on Consumer Expectations'², which is a monthly survey conducted by the Deutsche Bundesbank since April 2020³. A representative sample of around 2000 German households per wave report their expectations about the development of inflation, house prices and interest rates in Germany as well as their past and planned expenditures and socio-demographic characteristics. In addition to questions which are asked on a regular basis, each wave has room for specific research questions.

3.1 Key Variables

In wave 8 (August 2020), households were asked three to six questions regarding their stock market behavior⁴. Figure 1 shows the survey timeline. Firstly, respondents are asked if they held any financial assets (stocks, bonds, funds, others⁵) actively in their portfolio prior the covid-19 pandemic. In case one of these questions is affirmed, the amount can be selected as a categorical variable. Secondly, I document their behavior between March and August. Here, respondents report whether they bought, sold or left their portfolio unchanged with a follow up question about the market value of these changes.

Based on the answers, respondents could belong to four types: *no participation* (if they had no stocks before and haven't bought any), *no adjustment* (if they had stocks before, but haven't adjusted their portfolio), *bought* (if they bought during the period), and/or *sold* (if they sold during the period). Each type receives a specific set of additional

²This paper uses data from the Bundesbank Online Pilot Survey on Consumer Expectations. The results published and the related observations and analysis may not correspond to results or analysis of the data producers.

³The pilot phase covers the months April to June 2019, see Beckmann and Schmidt (2020) for details.

⁴The complete questionnaire can be found in the appendix A or at [Bundesbank website](#).

⁵The questionnaire contains info boxes about each asset type.

question with possible reasons for their behavior. Here, individuals are asked to rank the reasons on a scale from strongly agree to strongly disagree⁶.

⁶The order of the answers is generated randomly for each respondent to avoid that scores depend on the order of question.

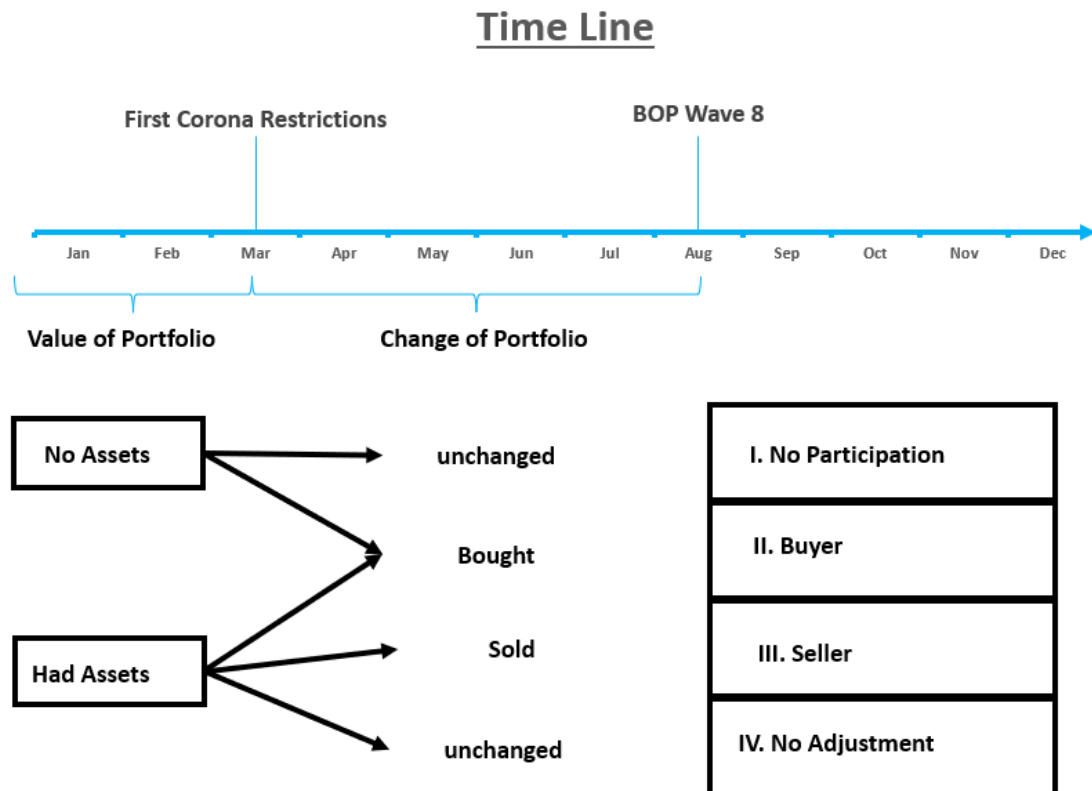


Figure 1 Time Line of the Questionnaire

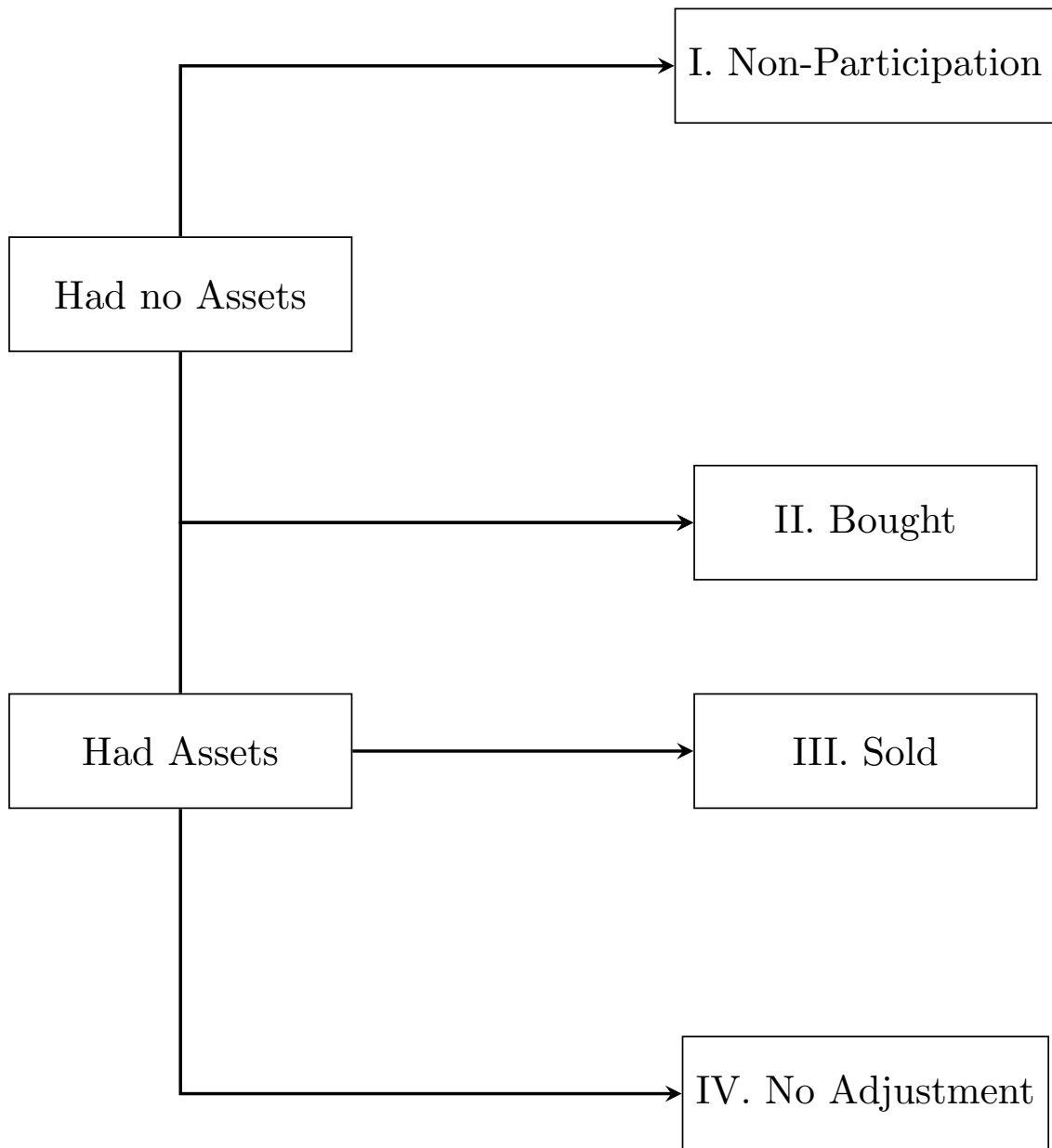


Figure 2 Types of Equity and Non-Equity Holder

3.2 Expectation data

The BOP is rich in consumer expectations questions. It asks households about various macro variables in multiple formats. This paper exploits expected houseprices and inflation and their role on buying financial assets. For both variables, respondents provide a qualitative statement, as well as a point estimate. Additionally, for inflation, respondents have to fit a distribution. Asking the same question in a different format increases robustness, as survey answers might differ substantially Potter, Del Negro, Topa, and Van der Klaauw (2017); Diercks, Tanaka, and Cordova (2021).

For house prices, the BOP asks how rents and property prices in the area of the respondent change over the next 12 months. The options to answer range from decrease significantly to increase significantly with 5 steps. The point estimate is not bounded, but I winsorize the answers to 95% in order to reduce significance of outliers.

Same holds true for inflation expectations. Here, additionally questions concern 'lending rates' and 'fuel prices'. As they correlate strongly, I group them together for the qualitative statement. For the probabilistic inflation expectation, households have to allocate 100% into 10 bins ranging from deflation will be 12% and higher to inflation will be 12% and higher. In line with Engelberg, Manski, and Williams (2009) I fit either a generalized beta, triangular or uniform distribution.⁷ As a result, I calculate mean, standard deviation, and 90-10 percentile spread to assess magnitude and uncertainty.

4 Results

This sections shows descriptive statistics of the Bundesbank Online Pilot 8th wave and compares it with the panel on household finances (PHF) to validate the representative nature of the data. Afterwards, I categorize respondents into four types: no participation, no adjustment, bought, and sold. Firstly, I will describe each type and analyze demographic drivers. Afterwards, I investigate the reasons for their decision. Here, I rank them and compare which factor is most important. Afterwards I conduct a principal component analysis to investigate how the reasons are related to each other, reduce factors and dig into heterogeneous drivers of each component. Thirdly, I focus on the decision of buying and expectations.

4.1 Description of Types

This section summarizes statistics for each type and explores the underlying factors characterizing them.

Who bought/sold/unchanged, and how much? First of all, table 1 reports summary statistics for the different types. Columns one and two show that around half of all respondents did not hold any financial assets and a quarter did have some in their portfolio prior March 2020, but did neither buy or sell any financial assets. Hence,

⁷Sample code can be found in [GitHub](#). Thanks to Tao Wang for sharing and collaborating.

Table 1 Summary Statistics of 5 types

		No Participation (I)	No Adjustment (II)	Bought (only) (III)	Sold (only) (IV)	Bought and Sold (V)
Total	%	55.2	23.1	16.1	1.7	3.9
	€			6,100	-12,700	1,200
	sd			(15,400)	(23,800)	(11,500)
Funds	%			71.9	46.8	59.2
	€			2,700	-5,800	
	sd			(8,600)	(12,500)	(4,500)
Bonds	%			44.3	43.1	81.4
	€			2,400	-3,800	1,700
	sd			(8,300)	(13,000)	(11,400)
Stocks	%			7.0	9.5	13.5
	€			100	-100	-300
	sd			(1,000)	(400)	(2,400)
Other	%			14.3	22.1	32.1
	€			900	-3,000	-300
	sd			(5,600)	(10,600)	(3,500)
n		1,013	513	364	39	90

Summary statistics of 5 types in the sample. This table shows the share of households belonging to each type, by how much they adjusted their portfolio and the corresponding standard deviation. All results are weighted.

one quarter or 497 individuals changed their portfolio between March and August 2020. Bonaparte, Cooper, and Zhu (2012) calculate for the US using the PSID that almost 50% of all stock holders adjusted their portfolio within a two year span. Hence, this share has already adjusted their portfolio within 6 months. Interestingly, about 16 % report, they only bought additional assets (column 3) where funds and bonds were the most preferred asset types. Around 2 % sold some assets, and 4% bought and sold in the same time period.

Heterogeneity in who bought/sold/unchanged Table 2 assesses the representative nature of the data. Column six shows demographics of the full sample and column seven from the Panel of Household Finance which is the standard reference when it comes to household finance data in Germany. Given that the BOP is an online survey it attracts more respondents below 30 and less above 60. Therefore, less retired and more low income households are part of the sample. Additionally, the BOP has a lower share of

self-employed respondents, but more home owner. In terms of financial assets, 44% of BOP hold financial assets while only 30% do so in Germany. Here, especially funds and bonds are part of the portfolio above German average.

Additionally, the table reports a demographic breakdown for each type and 3 confirms multiple results from the literature. Characteristics such as college degree, male, higher income and home ownership increase not only the likelihood to hold financial assets, but to trade as well. Interestingly, younger households eg the cohort below 30 years, were more likely to buy than older. **This is in line with reports such as from the DAI (2021) Add PAPI if ready.** Another noticable fact is that self-employed were more likely to sell as well.

4.2 Reasons of behavior

In the previous section, we have seen that around 1,500 individuals did not adjust their financial asset holdings, while a quarter of all observations bought and/or sold some assets. This section investigates the underlying reasons of the respective behavior.

4.2.1 Reasons No Participation

First, I will focus on the question: *what prevents individuals from holding stocks?*⁸

Table 4 reports the answers of individuals who did not hold any financial assets prior March 2020 and decided not to buy any afterwards. Individuals could rate each reason from 1 'strongly disagree' to 4 'strongly agree'. The first column reports the share of individuals who rated the reason 'fully agree', while the second column adds respondents who also 'rather agree'd. The third column shows the mean and the fourth column reports the mean of the standardized variable. The latter was constructed similar to Choi and Robertson (2020), where each answer is standardized using the average of all reported answers per person and its standard deviation. The advantage is that each reason becomes more comparable within and across observations as the standardization takes care of the fact that perception of 'agreement' might differ among participants. Additionally, observations where all answers receive the same score are filtered out.

While there is not one or two dominant reasons, a conglomeration of factors seem to be important. The two most important factors which are supported by around 70% of respondents and almost half say they fully agree are *lack of information* and *no interest*, followed by distrust in the stock market, time constraints and peer-effects (around 60% agree). Interestingly, *no savings* plays still for more than 50% a larger role, but ranks relatively low. In contrast to Choi and Robertson (2020), where 'Wealth too small to invest in stocks' is the most important reason which is interpreted as 'participation costs'. By rephrasing it and asking about savings which could be invested in all sort of asset classes, a lack of such seems to to be less important.

Looking at the lower end of the scale, the shock of the stock market break due to covid-19, which would be in line with Malmendier and Nagel (2011) is still for almost a

⁸The question reads: 'Why did you decide not to buy any asset(s) during the coronavirus pandemic?'

Table 2 Summary Statistics of 5 types

	No Participation (I)	No Adjustment (II)	Bought (only) (III)	Sold (only) (IV)	Bought and Sold (V)	Total (VI)	PhF (VII)
Female	54.9	50.3	29.9	33.5	28.6	48.4	46.7
Age							
<30	23.2	15.8	27.6	20.0	29.8	22.4	12.2
31-40	16.5	17.8	16.4	16.3	8.6	16.5	16.9
41-50	14.9	14.5	17.3	15.2	26.1	15.6	16.7
51-60	18.9	21.4	18.1	7.6	15.9	19.0	18.5
60+	26.5	30.6	20.6	41.0	19.6	26.5	35.7
HH Size							
1	26.1	21.1	24.7	29.8	27.5	24.8	40.6
2	38.2	40.4	32.1	40.1	42.6	37.9	34.2
3+	35.7	38.5	43.2	30.1	29.9	37.3	25.2
College	16.5	23.3	29.9	32.4	33.8	21.2	21.8
Employment							
full-time	36.8	40.8	56.6	37.7	51.8	41.5	35.3
part-time	14.4	13.7	7.8	3.2	14.6	13.0	13.7
retired	25.8	27.6	18.3	34.9	20.6	25.0	30.8
self-employed	3.5	3.6	3.2	6.9	6.9	3.7	7.1
unemployed	19.5	14.2	14.1	17.4	6.1	16.8	13.1
HH income							
<1500	15.2	6.7	3.1	21.5	7.1	11.1	18.1
1500-3000	35.2	33.4	31.0	12.9	32.8	33.6	26.0
3000-5000	32.6	37.8	38.5	35.8	32.2	34.8	26.8
5000-8000	10.1	16.2	18.9	26.8	17.7	13.5	17.5
8000+	6.9	5.9	8.4	3.0	10.1	7.0	11.6
Owner	47.4	66.7	65.3	43.6	51.9	54.9	43.9
Financial Assets							
Total	-	100.0	93.0	100.0	97.2	43.5	30.3
Funds	-	77.8	75.0	69.6	69.2	33.9	15.6
Bonds	-	47.2	54.5	47.8	81.9	23.7	3.1
Stocks	-	28.5	15.1	13.0	21.9	10.1	10.9
Other	-	19.3	18.4	27.7	44.4	9.6	15.3

Summary statistics of the demographics of the 5 types. Column six shows the full sample and column seven gives a comparison with the Panel of Household Finance wave 3. This table shows the percentage of respondents in each type. All results are weighted.

Table 3 Regression Table: Types and Demographics

	(1) No Participation	(2) No Adjustment	(3) Has Bought	(4) Has Sold
college	-0.351*** (0.084)	0.096 (0.091)	0.316*** (0.092)	0.279** (0.123)
female	0.285*** (0.083)	0.063 (0.097)	-0.469*** (0.088)	-0.347*** (0.123)
< 30	-0.062 (0.130)	-0.227 (0.176)	0.365*** (0.128)	0.209 (0.176)
owner	-0.400*** (0.083)	0.304*** (0.096)	0.269*** (0.092)	-0.097 (0.131)
fin illiterate	0.463*** (0.151)	-0.229 (0.192)	-0.565*** (0.157)	-0.046 (0.194)
full-time	-0.236 (0.145)	-0.034 (0.173)	0.402** (0.162)	0.373* (0.220)
part-time	-0.122 (0.185)	0.012 (0.237)	0.252 (0.204)	0.417 (0.274)
retired	-0.107 (0.159)	0.015 (0.185)	0.126 (0.177)	0.453* (0.246)
self-employed	-0.062 (0.227)	-0.083 (0.246)	0.192 (0.229)	0.609** (0.294)
< 1500	0.417*** (0.141)	-0.280* (0.148)	-0.570*** (0.183)	0.043 (0.209)
Observations	2018	2018	2018	2018
Controls	Yes	Yes	Yes	Yes

Probit model with Type as dependent variable on demographics. Additional controls are: has children and kurzarbeit.
Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4 Summary Statistics: Reasons No Participation

	Fully agree (I)	At least rather agree (II)	Mean (III)	Standardized (III)
information	51%	73%	3.3	0.6
no interest	47%	70%	3.2	0.5
distrust	38%	63%	3.0	0.3
too risky	35%	59%	2.9	0.2
no time	33%	58%	2.8	0.1
peer-effect	30%	51%	2.7	-0.1
no savings	30%	54%	2.7	-0.1
high valuations	18%	52%	2.6	-0.2
shock	24%	46%	2.5	-0.2
costs	20%	43%	2.4	-0.3
moral	16%	32%	2.2	-0.7

Summary statistics of reasons why households did not participate in the financial asset market between March and August 2020. The first column reports the share of individuals who rated the reason 'fully agree', while the second column adds the answer 'rather agree'. The third column shows the mean (1-4 with 4 'fully agree') and the fourth column reports the mean of the standardized variable. The latter is constructed by using the average and standard deviation of all questions by each respondent.

quarter important, but seems not to play a predominant role. Similarly, costs such as bank fees and transaction costs and moral issues are only important for a small fraction of households.

Regression of demographics on each reason can be found in table 22 in Appendix B

Principal Component Analysis Next, I conduct a principal component analysis to show how many factors are relevant and how they relate to each other. Table 5 shows the result following Choi and Robertson (2020); Tabachnick, Fidell, and Ullman (2007) and considering components with an eigenvalue of more than 1 as well as focusing on variables with a loading factor of more than 0.32.⁹

Three factors explain 47.45% of the variance in the data. The first factor captures *risk aversion* of households. It consists of four variables: 'Financial assets are too risky for me at the moment', 'I do not trust the stock market', 'The recent collapse in financial market prices puts me off', and 'Prices will fall again or fall lower'.

The second factor captures *lack of resources*. It consists of 'lack of interest', 'lack of information', 'lack of time', and 'lack of savings'. While the first component is about

⁹The results do not change if rotated factors are used.

Table 5 Principal Component Analysis: Reasons No Participation

Comp 1 risk aversion		Comp 2 lack of resources		Comp 3 no savings	
too risky	0.42	no interest	0.47	no savings	0.64
distrust	0.42	information	0.40	moral	-0.60
shock	0.37	no time	0.40		
high valuations	0.35	no savings	0.34		
		shock	-0.33		

Principal component analysis of all factors from table 4. I use for each variable an indicator if the reason ranks above their own average and varimax rotation (no or promax rotation give similar results). Loadings above 0.32 are shown.

Table 6 Regression Table: Principal Component of Reason No Participation and Demographics

	(1) Risk Aversion	(2) Lack of Resources	(3) Lack of Savings
age	0.006*** (0.002)	-0.009*** (0.002)	-0.002 (0.003)
< 1500	-0.073 (0.058)	0.029 (0.064)	0.261*** (0.096)
Observations	811	823	827
Adjusted R^2	0.073	0.103	0.059
Controls	Yes	Yes	Yes

OLS model with principal component as dependent variable on demographics. Additional controls are: college, gender, has children, home owner, financial literacy, labor status, and kurzarbeit.
Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

risk preferences which are not easy to change, this factor opens up the opportunity to increase stock holdings by focusing on these variables.

The third factor consists of 'lack of savings' and 'moral issues', while the latter is negatively correlated. Hence, these households would like to invest, but the lack of additional money prevents them from doing it.

In another step, a regression analysis evaluates driving factors of each component. For this, the mean value of all standardized variable is used to calculate the average value for each component. The resulting indicator is then regressed on demographics.

Table 6 shows that the first component or *risk aversion* increases with age, while the second one (*lack of resources*) has the opposite dynamic. Lastly, *no savings* depends on the work status and income level. Table 23 in appendix B shows all controls.

By including experienced stock returns using the specification of Mal-

Table 7 Summary Statistics: Reasons No Adjustment

	Fully agree (I)	At least rather agree (II)	Mean (III)	Standardized (III)
too risky	20%	56%	2.5	0.3
high valuations	9%	49%	2.4	0.1
no time	17%	49%	2.4	0.1
no savings	18%	42%	2.3	-0.1
peer-effect	17%	36%	2.1	-0.2
costs	11%	32%	2.1	-0.3

Summary statistics of reasons why households did not adjust their portfolio between March and August 2020, but held stocks before. The first column reports the share of individuals who rated the reason 'fully agree', while the second column adds the answer 'rather agree'. The third column shows the mean (1-4 with 4 'fully agree') and the fourth column reports the mean of the standardized variable. The latter is constructed by using the average and standard deviation of all questions by each respondent.

mendier and Nagel (2011) Only the second component is still driven by age. The risk aversion has no demographic factor which is significant.

Take away #1 A result of this exercise is that many factors play an important role in the decision of no participation. Lack of information and interest seems very important, followed by risk factors and time constraints. To reduce number of factors, these reasons can be grouped into three components which are driven by either a lifecycle pattern or by income levels.

4.2.2 Reasons No Adjustment

Next, I focus on individuals who held some financial assets, but did not buy or sell between March and August. I focus on the question why they did not buy any assets^{10, 11}. These reasons refer more to 'adjustment costs', meaning these households overcame the 'participation costs' already, but some factors prevent them from investing *more*.

Table 7 reports the results. As a general note, the reasons in question did not score as high compared to the table above, where the most important reason had a mean of 3.25 compared to 2.53 here. One caveat is that I miss the reasons of why households did not sell, meaning if a household wanted to sell, but some factor held them back, they might score very low on the questions asking why they did not buy.

¹⁰The question reads: 'Why did you decide not to buy any more assets during the coronavirus pandemic'

¹¹I focus on buying rather than selling, because households are more likely to adjust by buying rather than selling if they have expectations of falling prices. Eg people sit out a crisis rather than sell now. **'avoid regret': Add some psycho fact paper** Additionally, the interview takes place in August when the stock market already recovered strongly.

Table 8 Principal Component Analysis: No Adjustment

Comp 1 bad timing		Comp 2 time constraint	
too risky	0.63	no savings	-0.70
high valuations	0.58	peer effect	0.55
costs	0.49	no time	0.45

Principal component analysis of all factors from table 7. I use for each variable an indicator if the reason ranks above their own average and varimax rotation (no or promax rotation give similar results). Loadings above 0.32 are shown.

What can be seen is that uncertainty and the risk of a downturn of the stock market prevented households to buy any additional assets.

Interestingly, time constraints are similarly important. While Choi and Robertson (2020) find that only 3% of his sample report that time issues play a role over a long period (he asks for participation over all without specifying a time period), choosing the 6 month span shows that household do argue that time constraints are important. Of course, this could be due to living in a pandemic, where home office and schooling puts an additional burden on households. Contrarily, households could also have more time on their hand due to restrictions on activities with friends (eating in a restaurant, meeting in a bar or going on vacations).

Regression of demographics on each reason can be found in table 24 in Appendix B

Principal Component Analysis By conducting a PCA, two factors explain 60.20% of the variation. They divide the reasons why people did not adjust their portfolio in two groups. The first captures *bad timing*. It consists of 'too risky', 'high valuation', and 'costs'. All of them indicate that the person is aware of the stock market, but did not change the portfolio as the timing of investment is bad. Either because the market is too volatile or because they think the market will go down soon.

The second factor captures *time constraints* and consists of 'lack of savings' (negative), 'peer effects' and 'time'. Here, the household might be willing to buy and actually had savings, but time constraints and/or lack of advice from friends and family prevents them.

Take away #2 Based on the findings, households waited to invest further either because they thought the timing is bad, or other obligations prevented them from allocating time into investment decisions. As a note, these factors did not score very high and open up future research questions.

Table 9 Summary Statistics: Reasons Bought

	Fully agree (I)	At least rather agree (II)	Mean (III)	Standardized (III)
low valuations	39%	64%	2.8	0.9
plan	44%	62%	2.8	0.9
time	8%	27%	1.8	-0.1
information	8%	24%	1.7	-0.1
less consumption	4%	19%	1.6	-0.3
more income	4%	20%	1.6	-0.3
peer-effect	4%	14%	1.5	-0.4
bank fees	0%	4%	1.2	-0.6

Summary statistics of reasons why households bought financial assets between March and August 2020. The first column reports the share of individuals who rated the reason 'fully agree', while the second column adds the answer 'rather agree'. The third column shows the mean (1-4 with 4 'fully agree') and the fourth column reports the mean of the standardized variable. The latter is constructed by using the average and standard deviation of all questions by each respondent.

4.2.3 Reasons bought

The first two paragraphs focused on what prevents households from holding any financial assets or only to a limited amount. Now, we ask the question *What factors encourage households to purchase financial assets?*¹²

Table 9 reports a much clearer picture. More than 60% at least rather agreed and around 40% fully agreed with two statements. First, *low valuation*, meaning expecting higher stock market values in the future led to their investment decision, and second, households bought assets using a (pre-existing) *savings plan*.

Looking at the lower end, additional time and information played for around a quarter of respondents an important role, while bank fees which are the only physical cost, do not play a role.

By focusing on household heterogeneity in table 10, we add a dummy for first time buyers and if the individual bought and sold as well to capture re-balancing effects. Most variation can be captured by either an income or cohort effect. Column 1 shows that *low valuation* is more important for respondents with a monthly income of less than 1500€, while having a *savings plan* or more savings due to *less consumption* has the opposite effect. For the cohort effect, the reasons *more time* and *peer-effect* are more prominent for people below 30.

Interestingly, looking at first time buyers, having *more time* (column 3) is very important. This could explain the increase in stock holdings of young households in Germany reported by the DAI (2021).

¹²The question reads 'Why did you decide to buy the asset(s) after the coronavirus pandemic began?'

Table 10 Regression Table: Reason bought and Demographics

	(1)	(2)	(3)	(4)	(5) less	(6) more	(7)	(8)
	savingsplan	prices rise	time	information	consumption	income	peer-effect	bank fees
college	0.085 (0.149)	-0.049 (0.120)	-0.178* (0.103)	-0.057 (0.112)	0.047 (0.083)	-0.043 (0.085)	0.203** (0.090)	-0.008 (0.050)
part-time	0.138 (0.348)	0.079 (0.268)	-0.608*** (0.230)	0.300 (0.324)	0.236 (0.202)	0.040 (0.216)	-0.065 (0.227)	-0.113 (0.127)
retired	-0.526 (0.400)	0.771** (0.313)	-0.200 (0.285)	0.035 (0.324)	0.323 (0.225)	-0.193 (0.238)	0.129 (0.241)	-0.330** (0.162)
self-employed	0.084 (0.346)	0.307 (0.284)	-0.367 (0.269)	0.162 (0.296)	0.132 (0.201)	-0.164 (0.218)	-0.022 (0.229)	-0.125 (0.157)
female	0.203 (0.151)	-0.151 (0.128)	-0.025 (0.103)	0.052 (0.135)	-0.081 (0.086)	-0.172** (0.082)	0.155 (0.097)	0.017 (0.044)
kurzarbeit	-0.111 (0.363)	-0.288 (0.298)	0.118 (0.255)	-0.034 (0.176)	0.558** (0.229)	-0.018 (0.287)	-0.075 (0.213)	-0.149 (0.100)
children	0.140 (0.177)	-0.029 (0.151)	-0.043 (0.105)	0.156 (0.146)	-0.100 (0.080)	0.016 (0.110)	-0.168* (0.093)	0.028 (0.053)
1500-3000	0.674* (0.375)	-0.801** (0.319)	0.051 (0.275)	-0.035 (0.386)	0.506*** (0.161)	0.204 (0.277)	-0.593* (0.335)	-0.003 (0.214)
3000-5000	0.917** (0.403)	-0.592* (0.333)	0.101 (0.282)	-0.124 (0.384)	0.366** (0.149)	-0.064 (0.260)	-0.558* (0.334)	-0.044 (0.219)
5000-8000	0.551 (0.406)	-0.254 (0.333)	0.113 (0.294)	-0.255 (0.381)	0.337** (0.170)	0.098 (0.267)	-0.499 (0.338)	-0.090 (0.227)
8000+	0.249 (0.434)	-0.233 (0.359)	-0.144 (0.293)	-0.284 (0.426)	0.385* (0.207)	0.117 (0.297)	0.109 (0.368)	-0.197 (0.216)
owner	-0.309* (0.173)	0.148 (0.133)	0.190 (0.125)	-0.075 (0.131)	0.005 (0.091)	0.049 (0.104)	-0.033 (0.087)	0.021 (0.054)
age	0.012* (0.007)	-0.015*** (0.005)	-0.006 (0.006)	0.005 (0.006)	-0.002 (0.004)	0.002 (0.004)	-0.008** (0.004)	0.012*** (0.002)
fin illiterate	-0.110 (0.395)	0.042 (0.312)	0.182 (0.243)	-0.093 (0.176)	-0.271 (0.202)	-0.060 (0.214)	0.196 (0.328)	0.113 (0.089)
first time	-0.884*** (0.279)	0.176 (0.205)	0.696*** (0.185)	0.053 (0.237)	-0.265** (0.105)	0.381* (0.217)	-0.050 (0.260)	-0.109 (0.093)
bought & sold	-0.956*** (0.171)	0.541*** (0.127)	0.250* (0.141)	0.416** (0.171)	-0.158 (0.097)	-0.036 (0.097)	0.027 (0.099)	-0.092* (0.050)
Observations	438	435	438	437	438	438	434	436
Adjusted R^2	0.191	0.105	0.115	0.043	0.057	0.024	0.153	0.125

OLS model with standardized version of reason as dependent variable on demographics.
Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11 Principal Component Analysis: Has Bought

Comp 1 additional resources		Comp 2 active vs passive		Comp 3 TBD?	
costs	0.57	plan	-0.69	less consumption	0.70
more income	0.51	low valuations	0.58	peer effect	0.67
information	0.49				
time	0.37				

Principal component analysis of all factors from table 9. I use for each variable an indicator if the reason ranks above their own average and varimax rotation (no or promax rotation give similar results). Loadings above 0.32 are shown.

Lastly, households who rebalanced did so because of the *low valuation*, and additional *time* and *information*. These households are less likely to be guided by *savings plans*.

Principal Component Analysis Will drop this paragraph. Keep it for completeness of this first draft

Active vs Passive Buyers Interestingly, the two reasons with the highest scores are part of the same component with opposite sign. Hence, respondents were either active or passive buyers. To dig deeper, I group everyone who reported a *savings plan* was an above average reason as *passive buyer*, while grouping everyone who does the same with *low valuation* and is not a passive buyer, as *active*. Around 64% account as passive, 30% as active and a remainder of 6% is neither.

TBD: discussion on 401K and savingsplans in Germany or refer to a different paper?

Next, I use a probit model to see which demographic characteristics determine active or passive buyers, as well as the remaining reasons for buying. Table 12 shows the results. The first two columns contain the full sample, while the others condition on having bought. This exercise shows that younger (below 30), wealthier (home owner) households are more likely to be active buyers. Additionally, they are more likely to be first time buyers or re-balanced during the 6 month period.

Columns 5 and 6 show that active buyers were also more likely to state that additional time, information, income and a peer-effect led them to the decision to buy. Contrarily, passive buyers are less responsive to these factors.

By Asset type Table 13 highlights which asset types respondents bought. One striking result is that if households already held an asset type before, they were much more likely to invest in the same asset type again. Additionally, the value held predicts a higher probability of investing in the same asset type. This at least holds true for funds and bonds.

Table 12 Regression Table: Active vs Passive buyers (Probit)

	(1) active	(2) passive	(3) active	(4) passive	(5) active	(6) passive
owner	0.492*** (0.130)	0.106 (0.100)	0.552*** (0.198)	-0.395** (0.192)	0.535*** (0.200)	-0.485** (0.203)
< 30	0.520*** (0.169)	0.131 (0.139)	0.612** (0.246)	-0.262 (0.252)	0.416 (0.256)	-0.215 (0.274)
first time	1.715*** (0.342)	0.710** (0.342)	0.715** (0.344)	-0.939*** (0.341)	0.424 (0.330)	-0.591* (0.324)
bought & sold	1.636*** (0.201)	0.883*** (0.185)	0.653*** (0.215)	-0.806*** (0.212)	0.767*** (0.225)	-0.948*** (0.223)
time					0.703*** (0.126)	-1.152*** (0.136)
information					0.206* (0.121)	-0.899*** (0.128)
less consumption					0.224 (0.170)	-0.820*** (0.167)
more income					0.415** (0.172)	-1.120*** (0.157)
costs					0.871*** (0.270)	-2.069*** (0.301)
peer effect					0.742*** (0.166)	-1.534*** (0.170)
Observations	2018	2018	454	454	431	431
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Probit model with active (no savingsplan, but expects rising stock market) or passive (has savingsplan) as dependent variable on demographics and other reasons. Additional controls are: college, gender, labor status, kurzarbeit, has children, and income.

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 13 Regression Table: Has bought by asset type (Probit)

	(1) Funds	(2) Bonds	(3) Stocks	(4) Other
female	0.276 (0.241)	-0.099 (0.200)	0.479 (0.340)	-0.503* (0.297)
owner	-0.761*** (0.258)	0.720*** (0.254)	-0.524 (0.380)	0.263 (0.288)
has funds	2.527*** (0.317)	-0.699** (0.327)	1.219** (0.553)	-0.771* (0.408)
has bonds	0.063 (0.341)	1.432*** (0.263)	0.538 (0.399)	0.036 (0.382)
has stocks	-0.241 (0.380)	0.203 (0.389)	2.192*** (0.395)	-0.057 (0.490)
has other	-0.321 (0.329)	0.901*** (0.325)	0.150 (0.427)	2.027*** (0.349)
value funds	0.108** (0.047)	-0.085* (0.051)	-0.127* (0.070)	-0.021 (0.059)
value bonds	-0.143** (0.061)	0.206*** (0.051)	-0.040 (0.075)	-0.191*** (0.067)
value stocks	0.010 (0.079)	-0.032 (0.079)	0.045 (0.067)	-0.035 (0.104)
value other	-0.088 (0.062)	-0.142** (0.062)	-0.170 (0.112)	0.193*** (0.071)
first time	0.570 (0.414)	1.098*** (0.379)	0.000 (.)	0.900* (0.461)
bought & sold	-0.419* (0.222)	0.452 (0.276)	-0.598* (0.326)	-0.139 (0.316)
Observations	454	454	430	454
Controls	Yes	Yes	Yes	Yes

Probit model with has bought asset type as dependent variable on demographics and portfolio prior to the covid-19 pandemic. Additional controls are: college, labor status, kurzarbeit, has children, income, cohort, and financial literacy.
Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 14 Summary Statistics: Reasons Sold

	Fully agree (I)	At least rather agree (II)	Mean (III)	Standardized (III)
high valuations	12%	41%	2.3	0.8
rebalancing	24%	44%	2.3	0.7
shock	7%	27%	1.8	0.2
too risky	7%	23%	1.7	0.1
need consumption	7%	18%	1.5	-0.2
need debt obligations	6%	13%	1.4	-0.3
no time	4%	12%	1.4	-0.3
peer-effect	0%	11%	1.3	-0.4
need support friends/family	2%	7%	1.2	-0.5

Summary statistics of reasons why households sold any assets between March and August 2020. The first column reports the share of individuals who rated the reason 'fully agree', while the second column adds the answer 'rather agree'. The third column shows the mean (1-4 with 4 'fully agree') and the fourth column reports the mean of the standardized variable. The latter is constructed by using the average and standard deviation of all questions by each respondent.

Take away #3 German households either bought because they had a pre-existing savingsplan or they seized the opportunity. The latter were younger, richer and more likely to enter the market as well as re-balance. Interestingly, only they also reported that additional time, information, income, or peer-effects influenced their decision. Lastly, households seem to stick with the asset category they already held and are familiar with.

4.2.4 Reasons sold

Lastly, we focus on the question *Why do households sell their financial assets?*¹³ As we have seen above, this group consists only of around 4% of households in the sample (N=129) which indicates that the results should be received with caution.

Table 14 shows that around 40% of households either wanted to cash in their profits (or prevent further losses) and invest in other vehicles (*re-balancing*). These reasons are followed by risk assessment. A quarter of individuals state that the recent shock scared them away from the stockmarket or because they dislike the increased uncertainty. Lastly, a need for liquidity due to debt obligations or consumption played only a limited role over all.

Table 15 shows the underlying heterogeneity of the factors. **ANY STRIKING PUNCHLINE?!** Some points: Re-balancing is interesting: more likely to buy as well (obvious), but more financial illiterate.... Would have expected the opposite. Shock: more important for old than young, same as risk. They might be driven out

¹³The question reads: 'Why did you decide to sell the asset(s) after the coronavirus pandemic began'

Table 15 Regression Table: Reason sold and Demographics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	prices fall	re-balancing	shock	too risky	need consumption	need debt obligation	no time	peer-effect	need support friends and family
college	0.296 (0.273)	0.117 (0.278)	-0.255 (0.185)	0.300* (0.166)	-0.549** (0.228)	-0.354* (0.180)	0.094 (0.155)	0.510*** (0.161)	-0.160* (0.085)
part-time	0.546 (0.712)	-0.049 (0.825)	0.304 (0.425)	0.012 (0.537)	-0.407 (0.599)	0.213 (0.637)	-0.173 (0.455)	-0.323 (0.310)	-0.123 (0.286)
retired	0.638 (0.603)	-0.758 (0.656)	0.094 (0.470)	-0.269 (0.445)	0.347 (0.519)	0.122 (0.535)	-0.324 (0.457)	-0.064 (0.340)	0.214 (0.282)
self-employed	-0.027 (0.546)	0.077 (0.681)	0.359 (0.433)	-0.288 (0.462)	0.631 (0.670)	0.037 (0.508)	-0.850** (0.420)	-0.143 (0.320)	0.204 (0.261)
female	0.320 (0.338)	0.451 (0.327)	-0.336 (0.254)	-0.314* (0.189)	0.085 (0.246)	-0.145 (0.196)	-0.167 (0.136)	0.028 (0.098)	0.077 (0.083)
kurzarbeit	-0.258 (0.491)	-1.644* (0.889)	-1.127* (0.632)	-0.353 (0.489)	1.479** (0.729)	0.982 (0.605)	-0.183 (0.484)	0.261 (0.381)	0.842 (0.585)
children	0.139 (0.304)	-0.583* (0.337)	-0.241 (0.220)	-0.014 (0.214)	0.355 (0.250)	0.140 (0.261)	0.034 (0.164)	-0.089 (0.136)	0.258** (0.104)
1500-3000	0.170 (0.478)	0.652 (0.445)	-0.136 (0.480)	0.128 (0.431)	0.386 (0.463)	0.243 (0.333)	-0.664* (0.390)	-0.570 (0.372)	-0.210 (0.264)
3000-5000	-0.087 (0.442)	0.522 (0.483)	-0.184 (0.460)	0.177 (0.425)	0.558 (0.459)	0.501 (0.387)	-0.707* (0.386)	-0.589* (0.345)	-0.192 (0.255)
5000-8000	0.539 (0.504)	0.436 (0.504)	-0.370 (0.484)	0.181 (0.457)	0.167 (0.481)	0.029 (0.366)	-0.225 (0.413)	-0.592 (0.372)	-0.165 (0.269)
8000+	0.111 (0.567)	-0.027 (0.608)	-0.149 (0.540)	0.398 (0.505)	0.495 (0.482)	0.419 (0.367)	-0.646 (0.419)	-0.598 (0.381)	-0.003 (0.264)
owner	0.194 (0.294)	-0.159 (0.352)	0.172 (0.195)	-0.181 (0.186)	-0.003 (0.249)	-0.023 (0.193)	0.157 (0.132)	-0.038 (0.128)	-0.118 (0.075)
age	0.001 (0.013)	0.000 (0.017)	0.017** (0.009)	0.019** (0.008)	-0.017 (0.011)	-0.012 (0.009)	-0.005 (0.006)	-0.002 (0.006)	-0.002 (0.004)
fin illiterate	-0.203 (0.462)	1.387*** (0.500)	0.654 (0.472)	0.097 (0.334)	-1.056** (0.493)	-0.375 (0.444)	0.188 (0.427)	-0.837** (0.376)	0.145 (0.277)
bought & sold	0.237 (0.298)	1.409*** (0.266)	-0.343 (0.232)	-0.475** (0.216)	-0.339 (0.249)	-0.536** (0.236)	-0.115 (0.161)	0.094 (0.171)	0.068 (0.081)
Observations	117	117	117	117	117	117	117	117	117
Adjusted R^2	0.073	0.205	0.100	0.123	0.091	0.109	0.248	0.229	0.216

OLS model with standardized version of reason as dependent variable on demographics.
Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 16 Principal Component Analysis: Sold

Comp 1 Crisis		Comp 2 Lack of Resources		Comp 3 Social Component		Comp 4 Rebalancing	
too risky	0.59	need debt obligations	0.66	peer effect	0.75	rebalancing	0.94
shock	0.56	need consumption	0.65	need support friends and family	0.56		
no time	0.44						
high valuation	0.34						

Principal component analysis of all factors from table 14. I use for each variable an indicator if the reason ranks above their own average and varimax rotation (no or promax rotation give similar results). Loadings above 0.32 are shown.

Principal Component Analysis The principal component analysis (table 16) indicates that four factors are important. The first one consists of reasons related to the *crisis*. Either the increase in risk or even the stock market fall let them to sell assets. The second factor consists of reasons with *personal consumption*. The third concerns a *social component*, meaning either respondents sold because others did as well or they wanted to support friends and family. Lastly, some households *re-balanced*

Take away #4 The key insights of this exercise is that most households sold to prevent future losses and/or re-balance their portfolio. Additionally, some households reduced their risk exposure due to an increase of risk or the recent shock experience.

4.3 Expectations and Investing

In this section, I want to capitalize other questions of the survey on consumer expectations. The particularly focus here is on the question *How do expectations influence financial asset decisions of households?* Previously, we have looked at demographics as well as explicitly stated reasons of behavior.

Most papers analyzed expectations of stock returns on stock holdings/trading (eg Dominitz and Manski (2011); Giglio, Maggiori, Stroebel, and Utkus (2019)). Here, I analyze property price and inflation expectations.

I run probit regressions of the form:

$$y_i = \beta X + \gamma Z + \epsilon \quad (1)$$

where y_i is a dummy variable indicating if a person bought, X is a vector of controls capturing household demographics and Z contains expectations.

Buying financial assets and house price expectations Table 17 shows the regression results of the probit model. The first three columns have qualitative statements. Here, respondents were asked if they expect houseprices or rents in their area to decrease

significantly, decrease slightly, stay roughly the same, increase slightly or increase significantly which translates to values 1-5. The first column takes the average of property prices and rent for all respondents. It shows that having a more optimistic outlook for housing prices, reduces the probability of buying by 20% points. Interestingly, this effect is similar for owners and renters (columns 2 and 3), hence it is not a pure wealth effect for home owners.

The remaining columns capture quantitative statements. Here, respondents were asked about a point estimate of house prices. After winsorizing at 95% the variable ranges from -5 to +30. Note here that the questionnaire asks about house price developments in the area of the respondent which justifies substantial heterogeneity. The output shows that stating an increase of 1% higher reduces the probability of buying financial assets by 2.6% points. Interestingly, here the effect is stronger for renters than owners.

Table 17 Regression Table: Has bought and Expectations of Property Prices (Probit)

	(1) All	(2) Owner	(3) Renter	(4) All	(5) Owner	(6) Renter
housing quali	-0.195*** (0.050)					
prop quali		-0.144*** (0.055)				
rent quali			-0.150* (0.079)			
house price wins				-0.026*** (0.008)	-0.011 (0.010)	-0.049*** (0.014)
Observations	2015	1261	757	1876	1174	702
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Probit model with has financial assets bought as dependent variable on property price expectations. Controls are college, gender, labor status, kurzarbeit, has children, income, home ownership, cohort, and financial literacy.

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Rationalizing There are multiple reasons to explain this behavior. For owners, there is either a crowding out effect or higher house price risks. The former would mean that as the revenue of housing investment is high households want to invest more into housing and save less in other liquid assets. Alternatively, higher expected houseprices could also

Table 18 Regression Table: Has bought and Expectations of Property Prices:
Conditional on Participation (Probit)

	(1)	(2)	(3)	(4)	(5)	(6)
	All	Owner	Renter	All	Owner	Renter
housing quali	-0.196*** (0.068)					
prop quali		-0.127* (0.068)				
rent quali			-0.122 (0.113)			
house price wins				-0.029** (0.011)	0.001 (0.013)	-0.084*** (0.020)
Observations	1006	714	292	948	675	273
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Probit model with has financial assets bought as dependent variable on property price expectations. Controls are college, gender, labor status, kurzarbeit, has children, income, home ownership, cohort, and financial literacy.

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

lead to an increase in houseprice risk if the household perceives it as a bubble. Therefore, to reduce houseprice risk exposure, no additional stock market risk is wanted.

A wealth effect could be ruled out, as the estimates for owner and renter are of similar magnitude. Higher house price expectations do not increase the wealth of renters, but might lead to higher rent payments in the future.

Moreover, if we see renters as a transition towards buyers, higher expected house prices could mean they want to buy sooner. Assuming that for the downpayment financial assets are going to be liquidated, the household could start to reduce risk of stockmarket volatility and liquidate early.

Even though the BOP consists of multiple questions which could be used as proxies for some explanations, results are not meaningful.

Buying financial assets and inflation expectations The second relationship connects expected inflation with the probability to buy financial assets. Table 19 shows the effect of expected inflation and the probability to buy using a variety of expectation forms. All indicating that higher expected inflation reduces the probability of buying financial assets.

The first column uses qualitative statements of *inflation rate*, *interest of credit*, and *fuel prices*. All of them measure increases in prices to some degree. The results indicate that an increase in one category decreases the probability of buying financial assets decreases by 23.4% points. Columns 2-6 use point estimates. Here, columns 3 and 4 control for financial illiteracy measured as an indicator variable which is 1 if respondents expected inflation/deflation to be larger than 30% or even 10%. Column 5 and 6 only keep answers which range between 0 and 10% or 0 and 5% respectively. This is done so financial illiterate respondents who might state substantially higher inflation expectations do not drive the results.

Columns 7 and 8 make use of probabilistic statements. Here, respondents were asked to state how likely each inflation bin is, ranging from -12 to +12%. Column 7 uses the expected inflation estimate, while column 8 adds the standard deviation of each probability distribution. What can be seen is that not only the point estimate is important, but uncertainty about inflation reduces the probability to buy as well.

Rationalization The literature offers two explanations for this finding. First, Candia, Coibion, and Gorodnichenko (2020) find that households have a 'stagflationary' view and connect high inflation with low output. Hence, if growth expectations are connected with stock market returns, households might not want to buy. Second, higher inflation expectations could lead to higher interest rates through monetary intervention. As this increases costs for firms, profitability decreases and share prices as well.

To test these two explanations, I use a proxy for a pessimistic economic outlook as well as expected increase in interest rates. Table 21 show that both explain higher inflation expectations. Nevertheless, they cannot explain why inflation expectations reduce the probability to buy (column 5). Therefore, other explanations might be important which the literature has missed so far.

Table 19 Regression Table: Has bought and Expectations of Inflation (Probit)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
inflation quali	-0.235*** (0.074)							
inflation PE wins		-0.098*** (0.018)	-0.097*** (0.018)	-0.092*** (0.020)				
fin illiterate: inflation > 30			-0.369 (0.227)					
fin illiterate: inflation > 10				-0.184 (0.214)				
0 < inflation < 10					-0.115*** (0.025)			
0 < inflation < 5						-0.141*** (0.034)		
inflation prob exp							-0.047*** (0.016)	-0.084*** (0.019)
inflation prob sd								-0.534*** (0.180)
Observations	2014	1880	1880	1880	1825	1662	1716	1716
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Probit model with has financial assets bought as dependent variable on inflation expectations. Controls are college, gender, labor status, kurzarbeit, has children, income, home ownership, and cohort.

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 20 Regression Table: Has bought and Expectations of Inflation: Conditional on Participation (Probit)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
inflation quali	-0.262*** (0.101)							
inflation PE wins		-0.090*** (0.022)	-0.090*** (0.022)	-0.082*** (0.026)				
fin illiterate: inflation > 30			-0.060 (0.335)					
fin illiterate: inflation > 10				-0.274 (0.388)				
0 < inflation < 10					-0.117*** (0.030)			
0 < inflation < 5						-0.144*** (0.047)		
inflation prob exp							-0.077*** (0.020)	-0.099*** (0.026)
inflation prob sd								-0.354 (0.247)
Observations	1004	965	965	965	950	884	892	892
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Probit model with has financial assets bought as dependent variable on inflation expectations. Controls are college, gender, labor status, kurzarbeit, has children, income, home ownership, and cohort.
Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 21 Regression Table: Inflation expectations:
Stagflation vs Central bank intervention

	(1) inflation	(2) inflation	(3) inflation	(4) Bought	(5) Bought
pess economy	0.280*** (0.070)		0.279*** (0.071)		-0.003 (0.022)
inc interest rates		0.468** (0.223)	0.469** (0.217)		-0.109* (0.061)
inflation PE wins				-0.097*** (0.018)	-0.098*** (0.019)
Observations	1880	1878	1878	1880	1878
Controls	Yes	Yes	Yes	Yes	Yes

Columns 1-3: OLS model with point estimate of inflation expectations as dependent variable and columns 4-5: Probit model with has financial assets bought as dependent variable. Controls are college, gender, labor status, kurzarbeit, has children, income, home ownership, cohort, and financial literacy.
Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Take away #5 This exercise showed a robust relationship between higher inflation expectations and a reduced likelihood to buy. Similarly, higher house price expectations crowd out financial asset investments.

5 Robustness: TBC

All Tables can be found in Appendix [B](#).

Experienced Stock market Returns One caveat of looking at demographic drivers of the Principal Component of Risk Aversion is that it might not be a pure age effect, but that experienced stock market returns matter. Hence, I construct these variables based on [Malmendier and Nagel \(2011\)](#) and add them to the regression. Table [25](#) shows that the relationship breaks down...

Table [26](#) splits the principal component up and investigates each reason explicitly...

Alternative construction of PCA components Another objection could occur due to the construction of the principal components. In the baseline results, I use indicator variables for each reason which is 1 if the reason is above average. This reduces clutter and makes the PCA more reliable, as the standardized variable inherits correlation across factors by construction. Nevertheless, when bundling the reasons to one component, I use the standardized variables. In table ?? I take the mean of all above average reasons. While the main story is the same. I find two deviations. Firstly, for the first component

'risk aversion' age remains significant even after adding experienced stock market returns. Secondly, the relationship with 'lack of resources' and age breaks down.

Inflation Distribution Estimation The baseline calculation uses the mean of each bin to construct mean and standard deviation. A more sophisticated version is using Engelberg, Manski, and Williams (2009) and fitting a distribution. The benefit is that standard errors and especially a 90 to 10 percentile spread can be calculated. Table 28 shows the results. While mean inflation expectations is still negatively correlated with the probability of being a buyer, the standard error as well as the spread is no significant. **BUT: Missing many observations, plus some weird 'not convergence cases'.**

6 Extension

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7 Conclusion

High level summary This paper analyzes financial asset decisions made by German households during the early stages of the covid-19 pandemic. As this period is characterized by multiple changing factors simultaneously, I ask respondents directly about their reasoning.

Findings Using the BOP-HH survey wave 8, I find that lack of information and interest play a significant role in preventing households from investing in the first place. In case they already held some financial assets, risk factors as well as time constraints prevents further investments. This study shows that buyers can be split into active ones who are driven by stock market expectations and other factors and passive investors who primarily bought due to a (pre-existing) savingsplan. Interestingly, higher house price and inflation expectations reduces the likelihood to invest in financial assets.

Discussion of Findings The results can be used to compare the importance of factors preventing households from investing as well as making them buy financial assets.

Limitation Some limitations need to be taken into consideration. First, the respondent of the interview might not be the household head in charge of financial decisions. Hence, the household might have acted differently than the reported. Additionally, only reasons can be compared which were part of the questionnaire. So, factors such as relationships with financial advisors or information such as if they interrupted their savingsplan can not be taken into consideration.

Future Research There are multiple ways this paper can be used as a starting point for future research. First, respondents who did not adjust their portfolio scored relatively low at the reasons brought up in the literature. Hence, a closer look at what prevents households from rebalancing or purchasing additional assets is a worthy exercise. In particular, what are the differences from participation costs which the literature focuses most on.

Second, while the study investigates household behavior during covid, it is interesting to see how much the pandemic affected each reason. Hence, conducting the same interview in *non-pandemic* times could shed light on how investment behavior changed. Therefore, we could see if this period has a permanent effect on stock market participation.

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