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

November 16, 2021

Adrian Monninger[1]

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

---

[1]Contact: amonnin1@jhu.edu, Department of Economics, 590 Wyman Hall, Johns Hopkins University, Baltimore, MD 21218

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.

This paper: high level summary These factors are usually tested one by one using different time periods, locations, and reference groups which makes a comparison almost impossible. This paper uses data from the Bundesbank Online Panel (BOP) and asks around 2000 households to assess factors which played a role in their financial investment decision.

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.

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? The year 2020 is an interesting time period to study. Due to covid-19 restrictions in March 2020, stock market prices plummeted by **X%** and recovered to **X%** by **XXXX**. Nevertheless, 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. **Add PAPI if ready**

Economic theory gives many explanations how this period impacts 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. Do covid-cases decrease soon, will there be a vaccine available, or additional mutants which worsens the situation again? All this is reflected in the stock market, hence, **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. As background risks such as income risks increased as well, households would like to save 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. 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 based on each type. Between March 2020 (the beginning of corona 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.

Asking households directly are appealing in this context to compare the mechanisms, but have weaknesses. **ADD THEM HERE: PROS AND CONS**

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 7 discusses them.

2 Literature Review

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 the difference between stock market returns and riskfree rate cannot be explained with macroeconomic models using *reasonable numbers* for relative risk aversion parameters (See Mehra and Prescott (1985); Haliassos and Bertaut (1995); Gomes, Haliassos, and Ramadorai (2021)).[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

---

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

market (Campbell (2006)). The literature can be grouped in three categories: risks, participation costs, and social interaction.

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 HEALTH, HOUSING** 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 argue that an increase in volatility, should decrease the savings households put in the stock market. **CAPM?**

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.
  Indirect costs: No direct monetary value such as brokerage fees... But more psycological costs or barriers which need to be overcome. In line with the literature, 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 soecioeconomic 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 increases the probability of stock market participation. Information issues appear through financial illiteracy. Lusardi and Mitchell (2011) show that many households lacking knowledge of basic 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.

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.

Trust/Sociability/Peer Effect 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.

   Rewrite: Following Georgarakos and Pasini (2011) who uses the classification by **Durlauf and Fafchamps' (2004)**, the difference between the two is that interpersonal trust, sharing and reciprocity, while the latter focuses social networks or civic engagement.

Expected Return Beliefs and Stock Market Participation The second class of literature focuses on expectations of traders/ households and their financial asset investments. Arrondel, Calvo Pardo, and Tas (2014) finds that participation increases monotonically with stock market expectations. Giglio, Maggiori, Stroebel, and Utkus (2019) finds empirical evidence for retail investors 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**.

   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)). Reasons for a negative impact are central bank responses which reduce the profitability of companies **SOURCE**, increase in risks which investors might not like **SOURCE**, or failure of nominal price adjustments (Mogdiliani and Cohn, 1979)Campbell and Vuolteenaho (2004).

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.

Furthermore, this paper analyses the relationship between financial asset decisions and expectations of house prices. Sutton et al. (2002) analyses house prices changes as a response to a shock in equity prices. He finds 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. He rationalizes 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, he conjectures 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.

TBD: ADD OTHER PAPERS

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 asks 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 such as Bender, Choi, Dyson, and Robertson (2019) focus on wealthy investors

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. Here, I shift attention towards inflation and house prices which analysis is more explorative.

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

---

[2]This 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.

April 2020[3]. 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 behavior[4]. Figure 1 shows the time line of the questions. Firstly, respondents are asked if they held any financial assets (stocks, bonds, funds, others[5]) 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 question with possible reasons of their behavior, based on the literature summarized above. Individuals are asked to rank the reasons on a scale from 1 to 4 (strongly agree to strongly disagree)[6].

---

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

[4]The complete questionnaire can be found in the appendix **??** or at Bundesbank website.

[5]The questionnaire contains info boxes about each asset type.

[6]The order of the answers are generated randomly for each respondent to avoid that scores depend on the order of question.
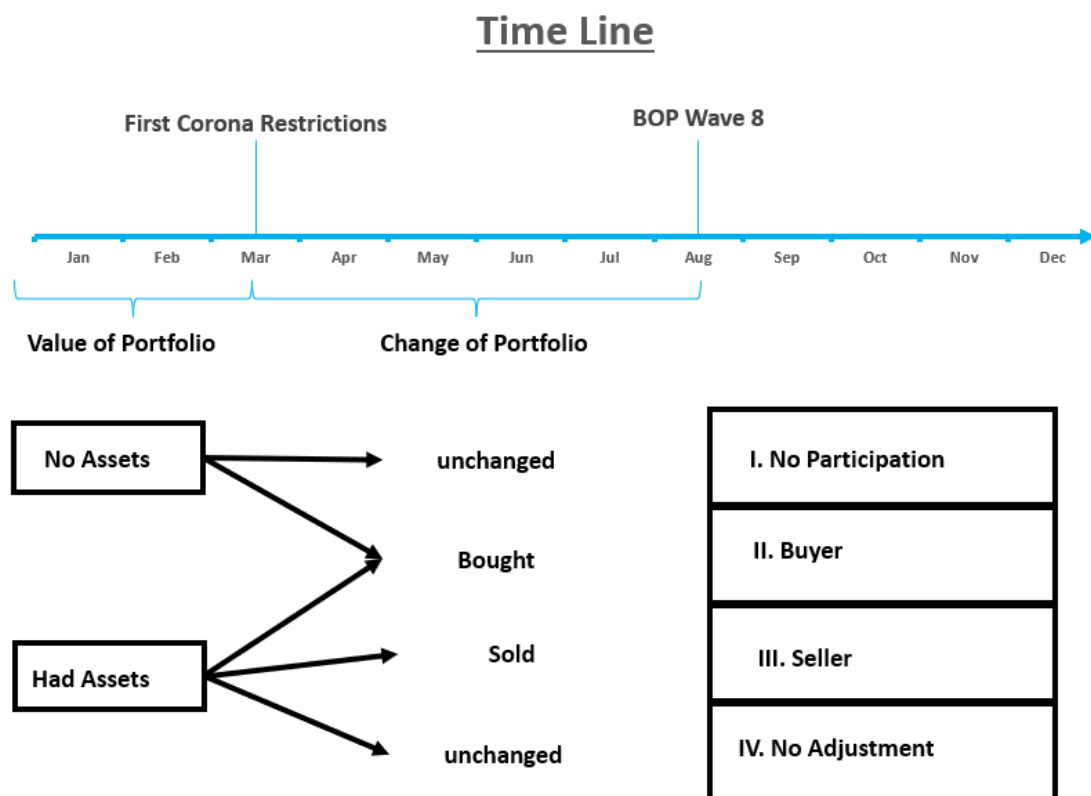
Time Line

Figure 1 Time Line of the Questionnaire
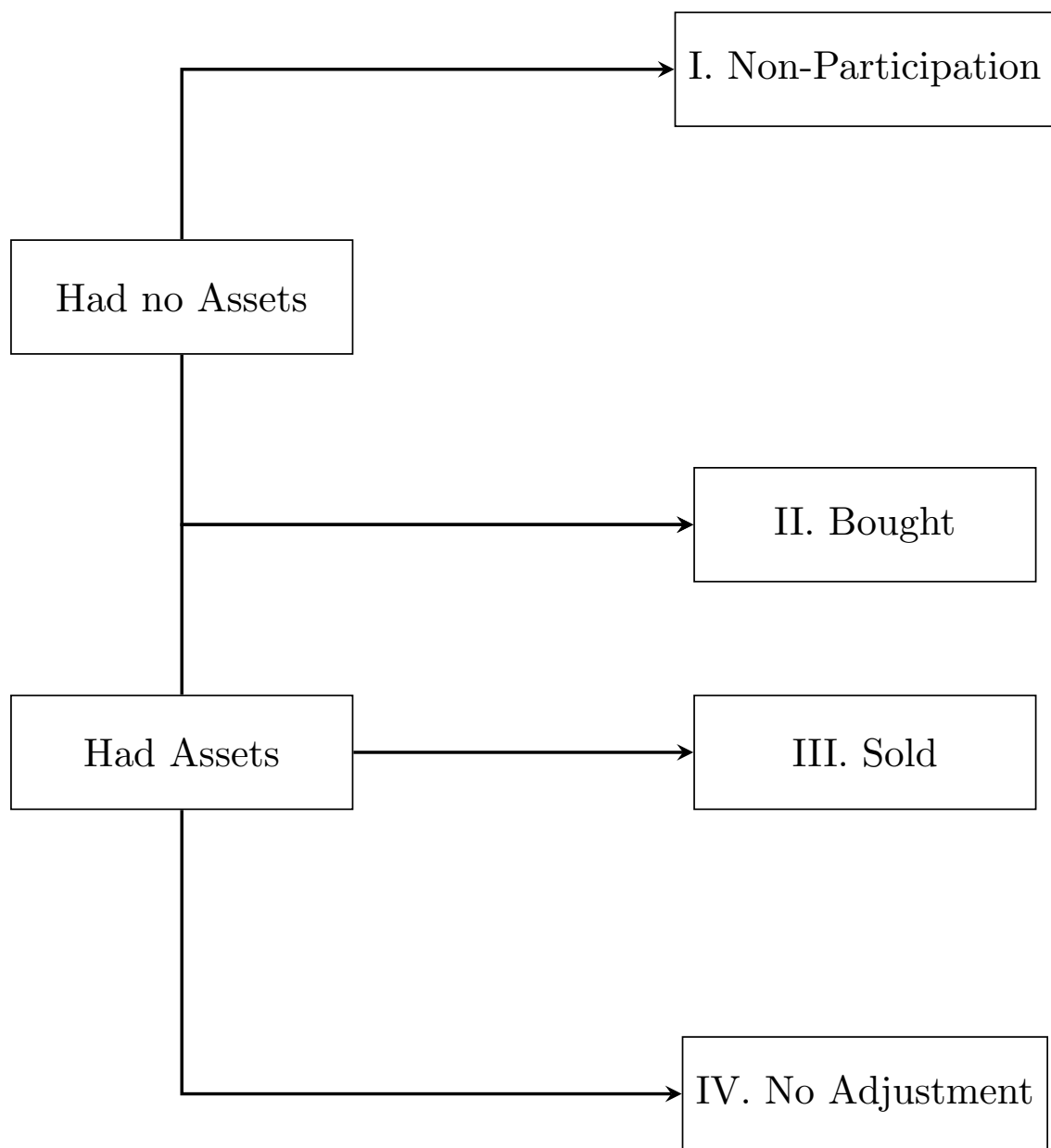
Figure 2 Types of Equity and Non-Equity Holder

3.2 Expectation data

The BOP is rich in consumer expectations questions. It does not only ask various macro variables, but in multiple formats as well. This paper uses expected houseprices and inflation. For both, respondents can answer in a qualitative statement, as well give 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 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, variance, and 10/90 percentile ratio.

4 Results

Based on the questionnaire, five types can be categorized: no participation, no adjustment, bought (only), sold (only), bought and sold. Firstly, I will describe each type and alayze demographic drivers. Afterwards, I investigate the reasons for each decision. Here, I rank them and compare which factor is most important. Afterwards I conduct a principal component analysis to reduce factors and dig into heterogeneous drivers of each. 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.The first two columns show that around half of all respondents did not hold any financial assets which is slightly less than in the PHF and a quarter did have some in their portfolio prior March 2020, but did neither buy or sell any financial assets. Hence, 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

---

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

Table 1 Summary Statistics of 5 types (weighted)

		no participation (I)	no adjustment (II)	bought (only) (III)	sold (only) (IV)	bought and sold (V)
Total	%	55.1	23.0	16.1	1.9	3.9
	€			6,100	-11,800	1,200
	sd			(15,400)	(22,500)	(11,500)
Fonds	%			71.9	53.4	59.2
	€			2,700	-5,700	0
	sd			(8,600)	(11,900)	(4,500)
Bonds	%			44.3	41.9	81.4
	€			2,400	-3,300	1,700
	sd			(8,300)	(12,200)	(11,400)
Stocks	%			7.0	12.5	13.5
	€			100	-100	-300
	sd			(1,000)	(400)	(2,400)
Other	%			14.3	23.6	32.1
	€			900	-2,700	-300
	sd			(5,600)	(10,000)	(3,500)
n		1,013	513	364	43	90

Summary statistics of 5 types in the sample. This table shows how many of each group changed their portfolio in total and by asset type. Underneath the percentage of the population, the euro amount of the portfolio difference is reported with standard deviation in parentheses.

within a two year span. Hence, this share has already adjusted their portfolio within 6 months. Arguably, 2020 was not a regular year and the turmoils on the stock market increased awareness to adjust the portfolio. GERMANY?! EUROPE?! COMPARISON 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 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.

Table 2 Summary Statistics of 5 types

	total	no participation	no adjustment	bought (only)	sold (only)	bought and sold
	(I)	(II)	(III)	(IV)	(V)	(VI)
Female	41.5	47.7	43.7	28.0	30.2	20.0
Age						
<30	9.0	10.2	4.1	12.1	7.0	12.2
31-40	11.3	12.6	9.9	10.4	9.3	8.9
41-50	16.6	15.4	15.2	19.5	16.3	26.7
51-60	18.9	18.5	19.7	20.6	14.0	15.6
60+	41.4	40.3	48.5	35.2	46.5	35.6
HH Size						
1	24.7	25.7	22.8	23.4	34.9	24.4
2	45.3	45.0	48.9	40.9	39.5	47.8
3	12.8	12.4	10.7	16.2	9.3	16.7
4	12.5	12.1	12.3	14.6	9.3	10.0
5+	4.6	4.5	5.1	4.7	7.0	1.1
College	29.1	24.0	32.0	35.7	37.2	38.9
Employment						
full-time	42.7	38.6	38.4	55.5	51.2	56.7
part-time	11.7	13.7	11.3	8.0	4.7	8.9
retired	36.1	35.8	42.3	29.7	32.6	31.1
unemployed	9.6	11.8	8.0	6.9	11.6	3.3
HH income						
<1500	12.2	16.4	9.9	4.7	11.6	8.9
1500-3000	31.9	34.8	31.2	27.7	20.9	25.6
3000-5000	37.2	35.1	39.2	42.3	34.9	30.0
5000-8000	16.0	12.1	17.0	21.2	32.6	24.4
8000+	2.7	1.5	2.7	4.1	0.0	11.1
Owner	62.4	54.0	71.7	73.6	60.5	60.0

Summary statistics of the demographics of the total sample and the 5 types. This table shows the percentage of respondents in each type.

Table 3 Regression Table: Types and Demographics

	(1) No Participation	(2) No Adjustment	(3) Has Bought	(4) Has Sold
main				
college	-0.350***	0.098	0.318***	0.260**
	(0.084)	(0.091)	(0.092)	(0.122)
female	0.291***	0.066	-0.466***	-0.373***
	(0.083)	(0.098)	(0.088)	(0.122)
< 30	-0.056	-0.224	0.369***	0.170
	(0.129)	(0.177)	(0.128)	(0.174)
owner	-0.400***	0.303***	0.267***	-0.081
	(0.083)	(0.096)	(0.092)	(0.129)
fin illiterate	0.456***	-0.230	-0.565***	-0.034
	(0.150)	(0.192)	(0.157)	(0.189)
full-time	-0.236	-0.034	0.402**	0.375*
	(0.145)	(0.173)	(0.162)	(0.218)
part-time	-0.120	0.014	0.254	0.401
	(0.185)	(0.237)	(0.204)	(0.273)
retired	-0.102	0.019	0.132	0.405*
	(0.159)	(0.185)	(0.177)	(0.244)
self-employed	-0.075	-0.086	0.190	0.626**
	(0.226)	(0.245)	(0.228)	(0.289)
< 1500	0.420***	-0.279*	-0.568***	0.033
	(0.141)	(0.148)	(0.183)	(0.209)
Observations	2022	2022	2022	2022
Adjusted R^2				
Controls	Yes	Yes	Yes	Yes

Standard errors in parentheses
Dependent variable: Type.
Data source: BOP Wave 8
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

ADD: Comparison sample with PHF wave 3 (2017) sample to check representativeness

4.2 Reasons of behavior

In the previous section, we have seen that around 1,500 individuals did 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 reported answer of all reasons per person and its standard deviation. The advantage is that each reason becomes more comparable 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 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.

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)

---

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

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 adjust their portfolio between March and August 2020. The first column reports the share of individuals who rated the reason 'fully agree', while the second column doe it for 'fully agree or '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.

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		

Caption

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 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.

By including experienced stock returns using the specification of Malmendier 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

---

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

Table 6 Regression Table: Reason No Participation and Demographics

	(1) Risk Aversion	(2) Lack of Resources	(3) No Savings
1500-3000	-0.005	-0.010	-0.100**
	(0.048)	(0.047)	(0.045)
3000-5000	0.006	-0.044	-0.161***
	(0.049)	(0.045)	(0.045)
5000-8000	-0.028	-0.095	-0.263***
	(0.063)	(0.060)	(0.053)
8000+	0.014	-0.086	-0.191***
	(0.087)	(0.068)	(0.072)
31-40	0.078	-0.050	-0.055
	(0.058)	(0.062)	(0.050)
41-50	0.091	-0.073	-0.008
	(0.059)	(0.064)	(0.051)
51-60	0.167***	-0.078	-0.003
	(0.060)	(0.062)	(0.050)
60+	0.191***	-0.153**	-0.009
	(0.071)	(0.074)	(0.058)
Observations	906	926	917
Adjusted R^2	0.061	0.023	0.053
Controls	Yes	Yes	Yes

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

Additional controls are college, labor status, gender, children, home ownership

Data source: BOP Wave 8

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 doe it for 'fully agree or '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.

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]. **WHY FOCUS ONLY ON NOT BOUGHT?! 'avoid regret'**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. Hence, while a large literature focuses on participation constraints, the question which reasons prevent individuals from holding larger shares in financial assets might need further attention. Are these the same or other factors which lead to non-participation? 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.

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

Interestingly, time constraints are similarly important. While Choi and Robertson (2020) argue 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.

---

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

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

Notes

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 doe it for 'fully agree or '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.

4.2.3 Reasons bought

The first two paragraphs focused on what prevents households from holding any stocks or only to a limited amount. Now, we ask the question *What factors encourage households to purchase financial assets?*[11]

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.

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. Additionally, the regression controls for labor status, gender, if the respondent has children living in the household and home ownership status. As they do not add any value, it is suppressed in the table.

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 impor-

---

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

Standard errors in parentheses
Dependent variable: Reason bought (standardized).
Additional controls are labor status, gender, children, home ownership
Data source: BOP Wave 8
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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				

tant. This could explain the increase in stock holdings in Germany. Young households, who had more time on their hand started to invest.

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

Principal Component Analysis

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.

Add discussion on 401K and savingsplans in Germany

Next, I use a probit model to see which demographic characteristics determine active or passive buyers, as well as the other 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 rebalanced 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
main						
owner	0.491***	0.104	0.552***	-0.395**	0.535***	-0.485**
	(0.130)	(0.100)	(0.198)	(0.192)	(0.200)	(0.203)
< 30	0.522***	0.134	0.612**	-0.262	0.416	-0.215
	(0.169)	(0.139)	(0.246)	(0.252)	(0.256)	(0.274)
first time	1.716***	0.712**	0.715**	-0.939***	0.424	-0.591*
	(0.342)	(0.342)	(0.344)	(0.341)	(0.330)	(0.324)
bought & sold	1.637***	0.885***	0.653***	-0.806***	0.767***	-0.948***
	(0.201)	(0.185)	(0.215)	(0.212)	(0.225)	(0.223)
time					0.703***	-1.152***
					(0.126)	(0.136)
information					0.206*	-0.899***
					(0.121)	(0.128)
less consumption					0.224	-0.820***
					(0.170)	(0.167)
more income					0.415**	-1.120***
					(0.172)	(0.157)
costs					0.871***	-2.069***
					(0.270)	(0.301)
peer effect					0.742***	-1.534***
					(0.166)	(0.170)
Observations	2022	2022	454	454	431	431
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses
Dependent variable: Active or Passive buyer.
Additional controls are education, labor status, gender, children
Data source: BOP Wave 8
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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

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

Standard errors in parentheses
Dependent variable: Has asset type.
Additional controls are income, age, children, labor status
Data source: BOP Wave 8
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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 doe it for 'fully agree or '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.

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 rebalance. 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?*[12] As we have seen above, this group consists only of around 4% of households in the sample (N=133) 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 quater 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.

Principal Component Anaylsis The principal component analysis (table 15) 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*

---

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

Table 15 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						

Notes

component, meaning either respondents sold because others did as well or they wanted to support friends and family. Lastly, some households *rebalanced*

REDO THIS PART

Table 16 shows the underyling heterogeneity of the components from the PCA. Column 1 consists of variables about the crisis. The large negative correlation with *bought & sold* indicates that these respondents are scared away from the stock market. The second column indicates that respondents who need the money are more likely to be non-college graduates. The third column shows interestingly that *kurzarbeit* is important for having solds due to *peer effects* or *need support friends and family*. Lastly, *rebalancing* is obviously most important for respondents who bought as well.

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

4.3 Expectations and behavior

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?*

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:

$$y_i = \beta X + \gamma Z + \epsilon \tag{1}$$

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.

Table 16 Regression Table: Reason sold and Demographics

	(1) prices fall	(2) no time	(3) shock	(4) too risky	(5) need consumption	(6) need debt obligation	(7) no time	(8) peer-effect	(9) need support friends and family
college	0.295	0.122	-0.250	0.279*	-0.539**	-0.347*	0.070	0.525***	-0.156*
	(0.270)	(0.282)	(0.183)	(0.167)	(0.228)	(0.177)	(0.156)	(0.162)	(0.092)
part-time	0.513	-0.217	0.239	0.001	-0.278	0.325	-0.103	-0.426	-0.054
	(0.707)	(0.821)	(0.440)	(0.535)	(0.641)	(0.659)	(0.458)	(0.338)	(0.284)
retired	0.647	-0.663	0.137	-0.338	0.337	0.106	-0.443	0.032	0.186
	(0.596)	(0.701)	(0.480)	(0.455)	(0.545)	(0.572)	(0.485)	(0.377)	(0.316)
self-employed	-0.036	0.010	0.332	-0.269	0.661	0.065	-0.797*	-0.196	0.230
	(0.546)	(0.740)	(0.441)	(0.473)	(0.719)	(0.544)	(0.437)	(0.332)	(0.277)
female	0.331	0.521	-0.306	-0.336*	0.050	-0.178	-0.223	0.085	0.056
	(0.329)	(0.323)	(0.252)	(0.186)	(0.243)	(0.193)	(0.136)	(0.102)	(0.090)
kurzarbeit	0.038	-0.317	-0.635	0.021	0.223	-0.090	-0.430	0.933**	0.256
	(0.397)	(0.934)	(0.483)	(0.348)	(0.813)	(0.696)	(0.308)	(0.432)	(0.505)
children	0.159	-0.480	-0.200	-0.010	0.276	0.070	-0.011	-0.024	0.220**
	(0.297)	(0.343)	(0.224)	(0.211)	(0.258)	(0.256)	(0.162)	(0.140)	(0.105)
1500-3000	0.136	0.487	-0.200	0.105	0.529	0.366	-0.609	-0.666*	-0.147
	(0.467)	(0.495)	(0.489)	(0.431)	(0.498)	(0.365)	(0.406)	(0.366)	(0.267)
3000-5000	-0.095	0.531	-0.178	0.117	0.614	0.544	-0.776*	-0.554	-0.203
	(0.422)	(0.530)	(0.473)	(0.422)	(0.506)	(0.425)	(0.400)	(0.338)	(0.269)
5000-8000	0.508	0.346	-0.401	0.090	0.319	0.154	-0.278	-0.606*	-0.131
	(0.480)	(0.542)	(0.490)	(0.448)	(0.523)	(0.404)	(0.425)	(0.362)	(0.285)
8000+	0.096	-0.063	-0.162	0.348	0.574	0.483	-0.682	-0.597	0.003
	(0.552)	(0.634)	(0.550)	(0.504)	(0.519)	(0.403)	(0.439)	(0.376)	(0.273)
owner	0.211	-0.109	0.197	-0.156	-0.095	-0.099	0.164	-0.015	-0.098
	(0.274)	(0.350)	(0.188)	(0.180)	(0.243)	(0.195)	(0.137)	(0.124)	(0.104)
age	0.000	-0.004	0.015*	0.020**	-0.014	-0.009	-0.001	-0.006	-0.000
	(0.013)	(0.018)	(0.008)	(0.009)	(0.012)	(0.009)	(0.006)	(0.006)	(0.005)
fin illiterate	-0.353	0.717	0.408	-0.100	-0.422	0.166	0.306	-1.172***	0.451
	(0.380)	(0.692)	(0.469)	(0.306)	(0.643)	(0.561)	(0.365)	(0.361)	(0.381)
bought & sold	0.215	1.361***	-0.355	-0.570***	-0.226	-0.445**	-0.192	0.110	0.101
	(0.259)	(0.278)	(0.220)	(0.191)	(0.251)	(0.218)	(0.158)	(0.166)	(0.128)
Observations	120	120	120	120	120	120	120	120	120
Adjusted R^2	0.075	0.192	0.095	0.148	0.028	0.059	0.236	0.256	0.092

Standard errors in parentheses
Dependent variable: Reason sold (standardized).
Additional controls are income, age, labor status, gender, home ownership
Data source: BOP Wave 8
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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. This effect is similar for owners and renters (columns 2 and 3) and captures a crowding out effect for home owners/ expected higher rent payments for renter.

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		-0.146*** (0.055)				
rent quali			-0.150* (0.079)			
house price wins				-0.026*** (0.008)	-0.011 (0.010)	-0.049*** (0.014)
Observations	2019	1263	759	1880	1176	704
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses

Dependent variable: Has assets bought.

Controls are income, age, gender, home owner, children, labor status, college

Data source: BOP Wave 8

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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

	(1) All	(2) Owner	(3) Renter	(4) All	(5) Owner	(6) Renter
housing quali	-0.196*** (0.068)					
prop quali		-0.132* (0.068)				
rent quali			-0.119 (0.112)			
house price wins				-0.029*** (0.011)	0.000 (0.013)	-0.083*** (0.020)
Observations	1010	716	294	952	677	275
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses

Dependent variable: Has assets bought.

Controls are income, age, gender, home owner, children, labor status, college

Data source: BOP Wave 8

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

holds only true for passive buyers!

These findings suggest a crowding out effect. For owners this could mean that they want to invest more into housing and hence have less savings for other liquid assets. Alternatively, if one asset category is expect to realize high gains, there is no need to also increase investments in other categories. Lastly, higher expected houseprices could also 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.

For renters, there is no wealth effect. As the magnitude is similar as for owners, we can rule out a wealth effect also for home owner. Here, the effect might have a different reason. One possibility is that if renters expect rents to increase, they might expect higher rent payments for themselves in the future which leads to lower investments. Alternatively, 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.

Things I did, but didn't add much value To understand the underyling reasoning of households, multiple channels are possible. a) crowding out b) Houseprice risk c) Investment into real estate

Findings: 1. If spending less on housing: –> less likely to buy –> only true for active buyers 2. net wealth –> more likely to buy 3. renting and owning –> no effect

For owner: crowding out effect: more investing in housing, less in other assets Not a wealth effect: eg higher wealth, more investing as renters do the same

For renter: a) rent prices increase: more consumption in the future b) want to buy sooner and reduce risk of stockmarket volatility

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 *interest of credit*, *inflation rate*, and *fuel prices*. All of them measure increases in prices to some degree. The results are similar to house price expectations and show 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% (2) or even 10% (5). 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.

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

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
inflation quali	-0.235***							
	(0.073)							
inflation PE wins		-0.098***	-0.097***	-0.093***				
		(0.019)	(0.018)	(0.020)				
fin illiterate: inflation > |30|			-0.366					
			(0.227)					
fin illiterate: inflation > |10|				-0.183				
				(0.214)				
0 < inflation < 10					-0.116***			
					(0.025)			
0 < inflation < 5						-0.141***		
						(0.034)		
inflation prob exp							-0.048***	-0.085***
							(0.016)	(0.019)
inflation prob sd								-0.535***
								(0.180)
Observations	2018	1883	1883	1883	1827	1663	1720	1720
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses

Dependent variable: Has assets bought.

Controls are income, age, gender, home owner, children, labor status, college

Data source: BOP Wave 8

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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 4 and 5). Therefore, other explanations might be important which the literature has missed so far.

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

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
inflation quali	-0.260***							
	(0.100)							
inflation PE wins		-0.092***	-0.092***	-0.084***				
		(0.022)	(0.022)	(0.026)				
fin illiterate: inflation > |30|			-0.050					
			(0.335)					
fin illiterate: inflation > |10|				-0.274				
				(0.388)				
0 < inflation < 10					-0.119***			
					(0.030)			
0 < inflation < 5						-0.145***		
						(0.047)		
inflation prob exp							-0.081***	-0.104***
							(0.021)	(0.027)
inflation prob sd								-0.376
								(0.257)
Observations	1008	968	968	968	952	885	896	896
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses

Dependent variable: Has assets bought.

Controls are income, age, gender, home owner, children, labor status, college

Data source: BOP Wave 8

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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		0.452** (0.221)	0.451** (0.216)		-0.103* (0.060)
inflation PE wins				-0.097*** (0.018)	-0.098*** (0.019)
Observations	1883	1881	1881	1883	1881
Controls	Yes	Yes	Yes	Yes	Yes

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

TBD

6 Extension

7 Discussion

Limitation

1. Random person from household. Doesn't have to be the head

2. For non-adjustment: don't know if they had a savingsplan before and intermitted

References

ALMENBERG, JOHAN, AND ANNA DREBER (2015): "Gender, stock market participation and financial literacy," *Economics Letters*, 137, 140–142.

AMPUDIA, MIGUEL, AND MICHAEL EHRMANN (2017): "Macroeconomic experiences and risk taking of euro area households," *European Economic Review*, 91, 146–156.

ANARI, ALI, AND JAMES KOLARI (2001): "Stock prices and inflation," *Journal of Financial Research*, 24(4), 587–602.

ARRONDEL, LUC, HECTOR F CALVO PARDO, AND DERYA TAS (2014): "Subjective return expectations, information and stock market participation: evidence from France," *Information and Stock Market Participation: Evidence from France (March 14, 2014)*.

BECKMANN, ELISABETH, AND TOBIAS SCHMIDT (2020): "Bundesbank online pilot survey on consumer expectations 01/2020," .

BENDER, SVETLANA GHERZI, JAMES J CHOI, DANIELLE DYSON, AND ADRIANA Z ROBERTSON (2019): "Rich investors speak: What drives their personal investment decisions," Discussion paper, Working paper, Yale University.

BENZONI, LUCA, PIERRE COLLIN-DUFRESNE, AND ROBERT S GOLDSTEIN (2007): "Portfolio choice over the life-cycle when the stock and labor markets are cointegrated," *The Journal of Finance*, 62(5), 2123–2167.

BONAPARTE, YOSEF, RUSSELL COOPER, AND GUOZHONG ZHU (2012): "Consumption smoothing and portfolio rebalancing: The effects of adjustment costs," *Journal of Monetary Economics*, 59(8), 751–768.

BÖRSCH-SUPAN, AXEL, AND ANGELIKA EYMANN (2002): "Household portfolios in Germany," in *Household Portfolios*. MIT Press.

BROWN, JEFFREY R, ZORAN IVKOVIĆ, PAUL A SMITH, AND SCOTT WEISBENNER (2008): "Neighbors matter: Causal community effects and stock market participation," *The Journal of Finance*, 63(3), 1509–1531.

CAMPBELL, JOHN Y (2006): "Household finance," *The journal of finance*, 61(4), 1553–1604.

CAMPBELL, JOHN Y, AND TUOMO VUOLTEENAHO (2004): "Inflation illusion and stock prices," *American Economic Review*, 94(2), 19–23.

CANDIA, BERNARDO, OLIVIER COIBION, AND YURIY GORODNICHENKO (2020): "Communication and the beliefs of economic agents," Discussion paper, National Bureau of Economic Research.

CARROLL, CHRISTOPHER D, AND PATRICK TOCHE (2009): "A tractable model of buffer stock saving," Discussion paper, National Bureau of Economic Research.

CHOI, JAMES J, AND ADRIANA Z ROBERTSON (2020): "What Matters to Individual Investors? Evidence from the Horse's Mouth," *The Journal of Finance*.

COCCO, JOAO F (2005): "Portfolio choice in the presence of housing," *The Review of Financial Studies*, 18(2), 535–567.

DAI (2021): "Aktionärszahlen des Deutschen Aktieninstituts 2020," Discussion paper.

DIERCKS, ANTHONY M, HIROATSU TANAKA, AND PAUL CORDOVA (2021): "Asymmetric Monetary Policy Expectations," *Available at SSRN 3930267*.

DOMINITZ, JEFF, AND CHARLES F MANSKI (2011): "Measuring and interpreting expectations of equity returns," *Journal of Applied Econometrics*, 26(3), 352–370.

ENGELBERG, JOSEPH, CHARLES F MANSKI, AND JARED WILLIAMS (2009): "Comparing the point predictions and subjective probability distributions of professional forecasters," *Journal of Business & Economic Statistics*, 27(1), 30–41.

GEORGARAKOS, DIMITRIS, AND GIACOMO PASINI (2011): "Trust, sociability, and stock market participation," *Review of Finance*, 15(4), 693–725.

GIGLIO, STEFANO, MATTEO MAGGIORI, JOHANNES STROEBEL, AND STEPHEN UTKUS (2019): "Five facts about beliefs and portfolios," Discussion paper, National Bureau of Economic Research.

GOMES, FRANCISCO, MICHAEL HALIASSOS, AND TARUN RAMADORAI (2021): "Household Finance," *Journal of Economic Literature*, 59(3), 919–1000.

GOMES, FRANCISCO, AND ALEXANDER MICHAELIDES (2005): "Optimal life-cycle asset allocation: Understanding the empirical evidence," *The Journal of Finance*, 60(2), 869–904.

GUISO, LUIGI, MICHAEL HALIASSOS, TULLIO JAPPELLI, ET AL. (2002): *Household portfolios*. MIT press.

GUISO, LUIGI, AND TULLIO JAPPELLI (2005): "Awareness and stock market participation," *Review of Finance*, 9(4), 537–567.

GUISO, LUIGI, PAOLA SAPIENZA, AND LUIGI ZINGALES (2008): "Trusting the stock market," *the Journal of Finance*, 63(6), 2557–2600.

HALIASSOS, MICHAEL, AND CAROL C BERTAUT (1995): "Why do so few hold stocks?," *the economic Journal*, 105(432), 1110–1129.

HALIASSOS, MICHAEL, AND ALEXANDER MICHAELIDES (2003): "Portfolio choice and liquidity constraints," *International Economic Review*, 44(1), 143–177.

HOCHGUERTEL, STEFAN, RJM ALESSIE, AND A VAN SOEST (2002): "Household portfolios in the Netherlands," in *Household Portfolios*. MIT Press.

HONG, HARRISON, JEFFREY D KUBIK, AND JEREMY C STEIN (2004): "Social interaction and stock-market participation," *The journal of finance*, 59(1), 137–163.

KING, MERVYN A, AND JONATHAN I LEAPE (1987): "Asset accumulation, information, and the life cycle," Discussion paper, National Bureau of Economic Research.

LUSARDI, ANNAMARIA, AND OLIVIA S MITCHELL (2011): "Financial literacy around the world: an overview," Discussion paper, National Bureau of Economic Research.

MALMENDIER, ULRIKE, AND STEFAN NAGEL (2011): "Depression babies: do macroeconomic experiences affect risk taking?," *The Quarterly Journal of Economics*, 126(1), 373–416.

MEHRA, RAJNISH, AND EDWARD C PRESCOTT (1985): "The equity premium: A puzzle," *Journal of monetary Economics*, 15(2), 145–161.

POTTER, SIMON, MARCO DEL NEGRO, GIORGIO TOPA, AND WILBERT VAN DER KLAAUW (2017): "The advantages of probabilistic survey questions," *Review of Economic Analysis*, 9(1), 1–32.

SHAPIRO, GILLA K, AND BRENDAN J BURCHELL (2012): "Measuring financial anxiety.," *Journal of Neuroscience, Psychology, and Economics*, 5(2), 92.

SUTTON, GREGORY D, ET AL. (2002): "Explaining changes in house prices," *BIS quarterly review*, 32(1), 46–60.

TABACHNICK, BARBARA G, LINDA S FIDELL, AND JODIE B ULLMAN (2007): *Using multivariate statistics*, vol. 5. Pearson Boston, MA.

VAN EWIJK, CASPER, HENRI LF DE GROOT, ET AL. (2012): "A meta-analysis of the equity premium," *Journal of Empirical Finance*, 19(5), 819–830.

VAN ROOIJ, MAARTEN, ANNAMARIA LUSARDI, AND ROB ALESSIE (2011): "Financial literacy and stock market participation," *Journal of Financial Economics*, 101(2), 449–472.

VISSING-JORGENSEN, ANNETTE (2003): "Perspectives on behavioral finance: Does" irrationality" disappear with wealth? Evidence from expectations and actions," *NBER macroeconomics annual*, 18, 139–194.