# 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 prevent households to re-balance. 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.

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# 1 Introduction

**Many theories to explain equity premium puzzle** The equity premium puzzle documents the small amount of financial asset holders given the excess return these assets yield. While this is not a new phenomenon, the literature is still growing. 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 individually using different time periods, locations, and reference groups which makes a comparison almost impossible.

A comparison gets even harder when multiple 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 overcome this identification problem, I ask households directly about their financial asset investments they made during the first six months of the pandemic and which factors led to their decision. Using novel data from the Bundesbank Online Panel (BOP) allows me to distinguish between non-participants, households who did not adjust their portfolio, as well as buyers and sellers. 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. Additionally, I can analyze how expectations affect household behavior.

**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 and therefore more accessible to answer in a survey setting.

Second, adjustment costs which need to be paid when changing the portfolio are crucial when matching shares invested in equity markets. Papers such as Giglio, Maggiori, Stroebel, and Utkus (2019) advocate for a fixed exogenous proportion of households who re-balance each period. Alternatively, Bonaparte, Cooper, and Zhu (2012) model them as fixed costs as a proportion of income. Nevertheless, there is no clear structural model nor convincing empirical evidence explaining what these adjustment costs consist of. My survey questions allow me to ask households explicitly what prevents them from adjusting and what makes them decide to buy or sell.

Third, most papers connecting financial asset decisions and 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. **NOTE TO ME: ADD MATEO**. Additionally, Giglio, Maggiori, Stroebel, and Utkus (2019)

find empirical evidence for wealthy retail investors. In contrast to the literature, I shift attention towards inflation and house prices whose influence on financial asset decisions 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. Third, 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're already holding. Fourth, some households sold to re-balance 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. On the one hand, the bufferstock model by Carroll and Toche (2009) (**CHANGE CITATION WHEN NEW PAPER IS PUBLISHED**) suggests that higher income uncertainty increases the target level of wealth Due to dampen possible shocks. Additionally, a bust is usually followed by a recovery which marks 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 which could be used to organize personal finances. Of course, this experience is extremely heterogeneous, as working remotely and home schooling marked a huge burden on families with small children.

On the other hand, multiple paper provide evidence why stock market participation should fall after a covid. Malmendier and Nagel (2011) would argue that the vast decline in stock prices scares people away. This should affect especially younger households who put more emphasize on recent periods when making financial asset decisions. 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, workhorse models such as Capital Asset Pricing Models (CAPM) suggest that people would reduce their asset holdings.

**Data + Survey Methodology**   This richness of mechanisms makes it nearly impossible to identify the importance of each factor individually. Therefore, I ask respondents directly which factors played a crucial role in their decision making process. The BOP asks a representative sample of around 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 3 to 6 questions for each respondent. They group households into four types. Between March 2020, which marks the beginning of covid restrictions, and August, when the interview took place, respondents could have either i) not participated in financial asset markets ii) not adjusted their portfolio, iii) bought additional assets or iv) sold assets. Each type receives a set of reasons which could be influential in their decision. The task is then to rank each factor from very to not important.

**TBD: Discussion of survey methodology** Asking households directly is appealing in this context as importance of factors can be identified. PROS: CONS:

**Rest of Paper**   The rest of the paper is structured as follows. First, Section 2 summarizes the literature on drivers of financial decisions as well as household expectations. Afterwards, section 3 discusses the questionnaire and describes the data. The core section 4 analyzes the role of factors and expectations on financial asset decisions. Lastly, section 5 assesses generality of the results and section 7 concludes.

# 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 is defined as the excess return on financial assets to the riskfree rate. Given this, economic models cannot rationalize the low number of stock holders 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 puzzle is twofold. First, the low participation in the stock market and second, the relative low share of risky assets of total portfolio (Campbell (2006)). The literature accumulated various factors which can be grouped in two categories: risk and participation costs

**Risk**   One explanation focuses on risks faced by 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

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

(Guiso, Jappelli, and Terlizzese (1996)) reduce stock holdings as well. Nevertheless, Catherine (2020) argues that renters do have larger idiosyncratic income risk which reduces their stock market participation.

When it comes to stock market risks, workhorse models such as CAPM argue that through macroeconomic shocks, market volatility increases which decreases the share households want to invest in risky assets. Additionally, Malmendier and Nagel (2011) argue that experiencing stock market crashes 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.

**Participation Costs**   As these risk factors are not enough to match empirical moments, another venue imposes a small participation cost for everyone who wants to enter equity markets (e.g Vissing-Jorgensen (2003); Haliassos and Michaelides (2003); Gomes and Michaelides (2005)). The idea is that financial asset decisions are costly and only a fraction of households is willing to pay that price. While direct costs such as setting up a brokerage account only make 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 cannot be directly paid with money, the household has to allocate time and effort which could have been spent otherwise on more pleasant things. While these are not *costs* in the narrow sense, but should be more thought of as *barrier* or *opportunity costs*, I still will refer to them as such.

**Information, Awareness and Financial Literacy**   An early study by King and Leape (1987) uses the Survey of Consumer Financial Decisions and shows 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 information costs can consist of unawareness of financial products, differences within them, how financial markets work and how to invest.For the former Guiso and Jappelli (2005) find 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.

Regarding financial literacy, Lusardi and Mitchell (2011) show that many households lack knowledge of basic economic principles. Drivers are education, gender, race, and location.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.

**Time: Opportunity Costs**   Gathering information about financial products, making the decision, and implementing it takes time. Hence, the opportunity cost of doing so is either work or leisure. Bonaparte, Cooper, and Zhu (2012) models the adjustment of one's portfolio as a proportion of income. Nevertheless, Choi and Robertson (2020) find that time constraints play only an important factor for 3% of nonparticipants.

**No interest: Cost of thinking about it (disutility)** Additionally, thinking about ones finances might even entail additional disutility. Shapiro and Burchell (2012) show the importance of 'financial anxiety' or 'phobia' as a driver of financial illiteracy. 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. Hence, allocating time into these decisions can be even more costly than opportunity costs.

**Trust/Sociability/Peer Effect** On the contrary, social interaction and peer-effects can lower participation costs. 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) who argue that individuals have pleasure in discussing recent stock markets dynamics and choose it as a 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)).

**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 stock market return, inflation, and houseprice expectations.

**Return expectations** Arrondel, Calvo Pardo, and Tas (2014) find that participation among households increases monotonically with stock market expectations and Choi and Robertson (2020) show that expected higher returns are very or extremely important by a quarter of all stock market participants. **NOTE: ADD MATEO WHEN READY**. For wealthy retail investors, Giglio, Maggiori, Stroebel, and Utkus (2019) confirm the mechanism.

**Inflation** The effect of 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, inflation itself, or nominal interest rate increases by central banks, decreases profitability of companies. The former can be explained by sticky prices meaning that not all companies can adjust their prices while the latter means higher lending costs for capital. Secondly, periods of higher inflation have also higher risks which investors might not like and thirdly, investors might fail to adjust the decomposition of nominal prices into constant real rates and increasing inflation which leads to an undervaluation in high inflation periods (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 Deutsche Bundesbank since 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 August 2020 (wave 8), households were asked three to six questions regarding their stock market behavior.[4] Figure 1 shows the survey timeline. 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

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[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.

[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 A or at Bundesbank website.

[5]The 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 disagree[6].

For analyzing the responses I either use indicator variables which are one if the reason is above the respondents average of all factors or follow Choi and Robertson (2020) and construct a standardized variable based on the formula:

$$Z_i = \frac{X_i - \bar{X}}{\sigma_i} \qquad (1)$$

using mean $(\bar{X})$ and standard deviation $(\sigma_i)$ of all answers of one respondent. 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.
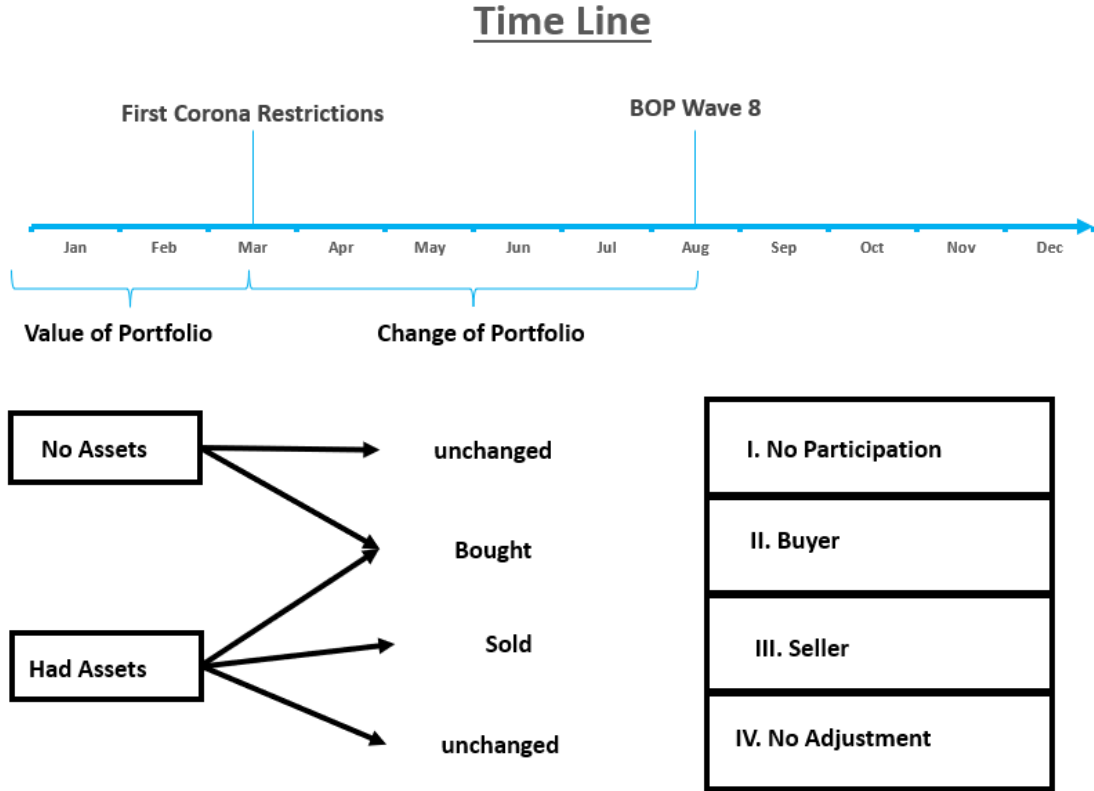


**Figure 1** Time Line of the Questionnaire

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[6]The order of the answers is generated randomly for each respondent to avoid that scores depend on the order of question.
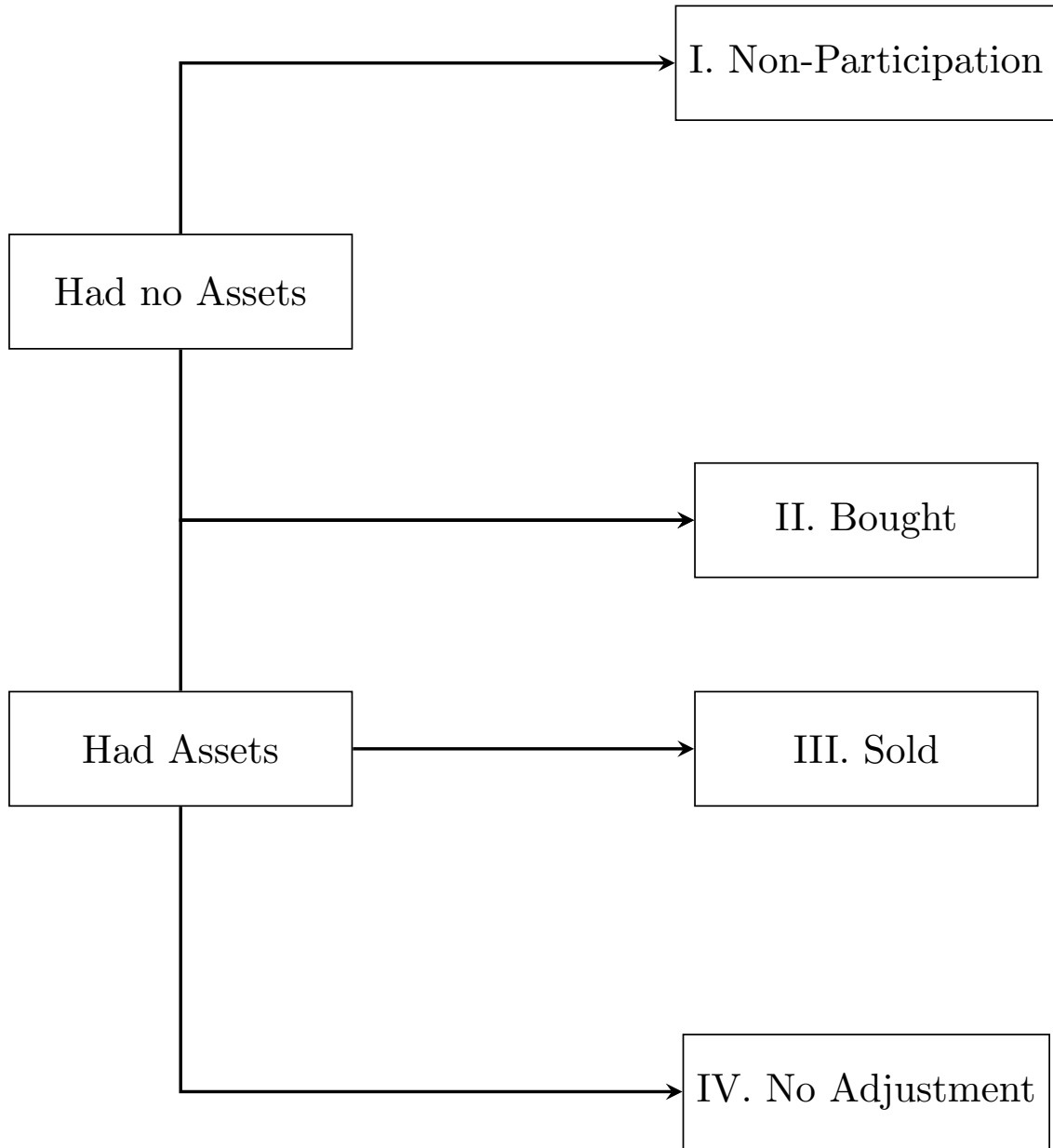
**Figure 2** Types of Equity and Non-Equity Holder

## 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. 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 erase outliers.

Same holds true for inflation expectations. For the qualitative indicator, I add questions concern 'lending rates' and 'fuel prices' as they all relate to price increases. 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 wave 8 and compares it with the Panel on Household Finances (PHF) to validate the representative nature of the sample. Afterwards, I categorize respondents into four types: no participation, no adjustment, bought, and sold. First, I will describe each type and analyze demographic drivers. Second, 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. Lastly, 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.

**Summary Statistics of Types** First of all, table 1 reports summary statistics for the different types. Columns one and two show that around half of all respondents do not hold any financial assets and a quarter did have some in their portfolio prior covid, but did neither buy nor sell any until the interview took place. Hence, one quarter or 50% of all stock holders adjusted their portfolio between March and August 2020. This is the same share as Bonaparte, Cooper, and Zhu (2012) calculate for the US using the PSID and a two year span. About 16 % report to have bought additional assets (column 3). Here, funds and bonds were the most preferred asset types. Around 2 % sold some assets, and 4% bought and sold in the same time period.

Hence, during this six month period, one fifth of German households invested more money into risky assets.

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[7]Sample 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.

**Heterogeneity of Types** Table 2 assesses the representative nature of the data. Column six shows demographics of the full sample and column seven from the PHF 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 fewer above 60. Therefore, fewer retired and more low income households are part of the sample. Additionally, the BOP has a lower share of self-employed respondents, but more homeowner. In terms of financial assets, 44% of BOP hold financial assets while only 30% do so in Germany. Here, especially funds and bonds holdings are above German average. Therefore, the sample is relatively representative, but the mentioned differences have to be taken into account. Nevertheless, thanks to higher financial asset holdings, I have a larger share of buyers and sellers to analyze.

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 adjust as well. Interestingly, respondents younger than 30 were more likely to buy than older cohorts. This is in line with the DAI (2021) reporting a large increase of especially this group. **NOTE: Add PAPI if ready**. Another noticeable fact is that self-employed were more likely to sell as well.

**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)<br>No<br>Participation | (2)<br>No<br>Adjustment | (3)<br>Has<br>Bought | (4)<br>Has<br>Sold |
|---|---|---|---|---|
| college | -0.351*** | 0.096 | 0.316*** | 0.279** |
| | (0.084) | (0.091) | (0.092) | (0.123) |
| female | 0.285*** | 0.063 | -0.469*** | -0.347*** |
| | (0.083) | (0.097) | (0.088) | (0.123) |
| < 30 | -0.062 | -0.227 | 0.365*** | 0.209 |
| | (0.130) | (0.176) | (0.128) | (0.176) |
| owner | -0.400*** | 0.304*** | 0.269*** | -0.097 |
| | (0.083) | (0.096) | (0.092) | (0.131) |
| fin illiterate | 0.463*** | -0.229 | -0.565*** | -0.046 |
| | (0.151) | (0.192) | (0.157) | (0.194) |
| full-time | -0.236 | -0.034 | 0.402** | 0.373* |
| | (0.145) | (0.173) | (0.162) | (0.220) |
| part-time | -0.122 | 0.012 | 0.252 | 0.417 |
| | (0.185) | (0.237) | (0.204) | (0.274) |
| retired | -0.107 | 0.015 | 0.126 | 0.453* |
| | (0.159) | (0.185) | (0.177) | (0.246) |
| self-employed | -0.062 | -0.083 | 0.192 | 0.609** |
| | (0.227) | (0.246) | (0.229) | (0.294) |
| < 1500 | 0.417*** | -0.280* | -0.570*** | 0.043 |
| | (0.141) | (0.148) | (0.183) | (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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

## 4.2 Reasons of behavior

In the previous section, we have seen that around 75% of the sample 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. Columns three and four report mean and standardized variable.

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

In line with the literature, a conglomeration of reasons prevent households from participating in financial asset markets. The two most important factors which are supported by around 70% of respondents are *lack of information* and *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. COMPARE WITH CHOI: WHAT IS THE MOST STRIKING DIFFERENCE?!

Looking at the lower end of the scale, the shock of the stock market crash due to covid-19, which would be in line with Malmendier and Nagel (2011) is still for almost a quarter important, but seems to play a relatively minor role. Similarly, monetary costs such as bank fees and moral issues are only important for a small fraction of households.

**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.

By looking at demographic drivers in table 23 (Appendix B), we can see that respondents give sensible answers. For instance, the factor *no information* plays a larger role for households who reported that inflation will be above 30% which I use as a proxy for financial illiteracy. Additionally, respondents with a monthly income of 1.500€were

more likely to report that *no savings* hindered them investing compared to households who earn between 3.000 and 8000€. Interestingly, *no time* scored higher for female respondents and self-employed. For the latter, *prices fall* was a more important reason than unemployed showing that they might have had a more pessimistic outlook of the economy.

**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) andTabachnick, Fidell, and Ullman (2007) 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 component captures *lack of resources*. It consists of 'lack of interest', 'lack of information', 'lack of time', and 'lack of savings'. Here, households would like to participate in the stockmarket, but the participation costs or hurdles are too large to overcome.

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.

**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.

In another step, a regression analysis evaluates driving factors of each component. For this, I take the mean value of corresponding standardized variable and regress them 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 income level. Table 24 in appendix B shows all controls.

Using a more parsimonious model, table 7 shows that risk aversion is increasing in age, while *lack of resources* decreases with age and is higher for female respondents. *Lack of savings* is more prominent for unemployed and low income households.

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[9]The results do not change if unrotated factors or different rotation methods are used.

**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*** | -0.009*** | -0.002 |
| | (0.002) | (0.002) | (0.003) |
| | | | |
| < 1500 | -0.073 | 0.029 | 0.261*** |
| | (0.058) | (0.064) | (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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

**Table 7**  Regression Table: Principal Component of Reason No Participation and Demographics (Parsimonious model)

| | (1) Risk Aversion | (2) Lack of Resources | (3) Lack of Savings |
|---|---|---|---|
| age | 0.007*** | -0.009*** | |
| | (0.001) | (0.001) | |
| | | | |
| female | | 0.094** | |
| | | (0.044) | |
| | | | |
| unemployed | | | 0.323*** |
| | | | (0.086) |
| | | | |
| < 1500 | | | 0.294*** |
| | | | (0.089) |
| Observations | 812 | 823 | 828 |
| Adjusted $R^2$ | 0.071 | 0.105 | 0.059 |

OLS model with principal component as dependent variable on demographics.
Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

**Take away #1**  In summary, multiple factors play an important role in the decision of no participation for different types of people. Overall, Lack of information and interest are the foremost reasons, followed by risk factors and time constraints. To reduce number of factors, they can be grouped into a *risk*, *lack of resources* and *lack of savings* component which are driven by either a life-cycle pattern or income levels.

*4.2.2 Reasons No Adjustment*

Next, I focus on individuals who held some financial assets, but did not buy nor sell between March and August. Here, I phrase the question why they did not buy any assets,

as this seemed to be the more relevant decision of households compared to selling.[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 8** 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.

Table 8 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 factor had a mean of 3.25 compared to only 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.

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 in their decision making, choosing a specific and short span shows that household do consider this a significant factor. However, the pandemic could have strengthen this reasoning, as covid restrictions increased the burden of many households through working remotely and often home schooling.

**Regression of demographics on each reason can be found in table 25 in Appendix B ANY STRIKING STORIES HERE? MIGHT HAVE USED TOO MANY CONTROLS AGAIN TO FIND ANYTHING MEANINGFUL...**

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

[11]I don't include separate questions for buying and selling to reduce the number of questions. Choosing buying rather than selling has two reasons. First, based on **'avoid regret': Add some psycho fact paper**, households are more likely to adjust by buying rather then selling, even if they have expectations of falling prices. Eg people sit out a crisis rather than sell now. The larger number of buyers than sellers in my sample supports that view. Additionally, the interview takes place in August when the stock market already recovered strongly which makes the question why people did not take advantage of the situation more appealing.

**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.

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.

**Table 9**  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 8. 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.

**Take away #2**  Households postponed further investments either because they thought the timing is bad, or other obligations prevented them from allocating time and effort into investment decisions.

*4.2.3 Reasons bought*

The first two paragraphs focused on what prevents households from holding or adjusting any financial assets. Now, I ask the question *What factors make households overcome these impediments?*[12]

Table 10 reports a much clearer picture, as 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.*

Moreover, additional time and information played an important role for around a quarter of respondents, while a reduction in bank fees, which are the only physical cost, is a minor factor.

By focusing on demographic drivers in table 11, 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€compared to 1500-5000€, while

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

**Table 10** 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.

having a *savings plan* or more savings due to *less consumption* has the opposite effect. The reasons *more time* and *peer-effect* are more prominent for people below 30.

I include dummies for first time buyers as well as individuals who bought and sold to see which reasons make households participate or re-balance. For the former, having *more time* (column 3) is very important as well as an increase in income.

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

**Principal Component Analysis**   NOTE: Will drop this paragraph. Keep it for completeness of this first draft. Corresponding table is 12.

**Active vs Passive Buyers**   Interestingly, the two most relevant reasons (low valuation and savingsplan) are almost mutual exclusive. Hence, respondents were either passive buyers, if a savingsplan is an above average reason, or active, if they expected prices to rise. By grouping them as such, 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? If yes, were to do it? Here in a footnote or own section above?**

Next, I use a probit model to see which demographic characteristics as well as the remaining reasons for buying determine active or passive buyers. The first two columns in table 13 contain the full sample, while the others condition on having bought. This exercise shows that younger (below 30), wealthier (home owner) households are more

**Table 11** Regression Table: Reason bought and Demographics

| | (1) prices rise | (2) savingsplan | (3) time | (4) information | (5) less consumption | (6) more income | (7) peer-effect | (8) bank fees |
|---|---|---|---|---|---|---|---|---|
| college | -0.067 | 0.100 | -0.164 | -0.060 | 0.042 | -0.052 | 0.196** | 0.005 |
| | (0.121) | (0.150) | (0.102) | (0.110) | (0.084) | (0.086) | (0.089) | (0.051) |
| full-time | 0.096 | 0.229 | -0.345* | 0.127 | 0.094 | -0.117 | 0.021 | -0.103 |
| | (0.215) | (0.303) | (0.209) | (0.236) | (0.152) | (0.177) | (0.201) | (0.119) |
| part-time | 0.036 | 0.037 | -0.480** | 0.350 | 0.203 | -0.034 | 0.048 | -0.158 |
| | (0.268) | (0.361) | (0.233) | (0.337) | (0.198) | (0.225) | (0.224) | (0.125) |
| retired | 0.557* | -0.492 | -0.190 | -0.126 | 0.421** | -0.096 | 0.165 | -0.236* |
| | (0.328) | (0.360) | (0.272) | (0.298) | (0.210) | (0.202) | (0.238) | (0.134) |
| self-employed | 0.251 | -0.057 | -0.231 | 0.223 | 0.107 | -0.224 | 0.118 | -0.183 |
| | (0.284) | (0.361) | (0.270) | (0.297) | (0.196) | (0.215) | (0.229) | (0.156) |
| female | -0.163 | 0.187 | -0.028 | 0.075 | -0.084 | -0.166** | 0.163* | 0.016 |
| | (0.129) | (0.155) | (0.101) | (0.136) | (0.085) | (0.082) | (0.094) | (0.044) |
| kurzarbeit | -0.297 | -0.082 | 0.079 | -0.007 | 0.549** | -0.016 | -0.096 | -0.130 |
| | (0.301) | (0.376) | (0.242) | (0.172) | (0.226) | (0.275) | (0.218) | (0.102) |
| children | -0.026 | 0.038 | 0.067 | 0.194 | -0.126 | -0.038 | -0.081 | -0.030 |
| | (0.166) | (0.188) | (0.105) | (0.170) | (0.083) | (0.111) | (0.096) | (0.055) |
| 1500-3000 | -0.801** | 0.695* | 0.092 | -0.073 | 0.503*** | 0.174 | -0.590* | 0.001 |
| | (0.316) | (0.376) | (0.267) | (0.377) | (0.161) | (0.283) | (0.346) | (0.211) |
| 3000-5000 | -0.594* | 0.903** | 0.142 | -0.126 | 0.357** | -0.094 | -0.534 | -0.055 |
| | (0.329) | (0.403) | (0.272) | (0.376) | (0.149) | (0.270) | (0.345) | (0.215) |
| 5000-8000 | -0.264 | 0.531 | 0.127 | -0.245 | 0.335* | 0.093 | -0.480 | -0.097 |
| | (0.327) | (0.402) | (0.286) | (0.374) | (0.171) | (0.276) | (0.347) | (0.224) |
| 8000+ | -0.214 | 0.276 | -0.139 | -0.323 | 0.392* | 0.110 | 0.093 | -0.193 |
| | (0.359) | (0.431) | (0.286) | (0.419) | (0.208) | (0.305) | (0.374) | (0.212) |
| owner | 0.152 | -0.340** | 0.182 | -0.050 | 0.005 | 0.054 | -0.010 | 0.004 |
| | (0.134) | (0.171) | (0.122) | (0.130) | (0.089) | (0.102) | (0.087) | (0.054) |
| 31-40 | -0.191 | 0.323 | -0.493*** | 0.146 | 0.028 | 0.258 | -0.340** | 0.274*** |
| | (0.213) | (0.249) | (0.168) | (0.231) | (0.162) | (0.171) | (0.145) | (0.073) |
| 41-50 | -0.236 | 0.650*** | -0.355* | -0.135 | 0.021 | 0.111 | -0.475*** | 0.421*** |
| | (0.164) | (0.244) | (0.190) | (0.175) | (0.134) | (0.142) | (0.138) | (0.074) |
| 51-60 | -0.523*** | 0.463* | -0.282 | 0.140 | -0.035 | 0.161 | -0.379*** | 0.453*** |
| | (0.194) | (0.275) | (0.206) | (0.207) | (0.138) | (0.156) | (0.140) | (0.085) |
| 60+ | -0.499* | 0.544* | -0.264 | 0.440* | -0.223 | -0.039 | -0.434** | 0.473*** |
| | (0.270) | (0.288) | (0.243) | (0.230) | (0.186) | (0.152) | (0.175) | (0.093) |
| fin illiterate | 0.033 | -0.129 | 0.176 | -0.080 | -0.267 | -0.043 | 0.200 | 0.110 |
| | (0.323) | (0.420) | (0.237) | (0.176) | (0.200) | (0.208) | (0.341) | (0.090) |
| first time | 0.195 | -0.868*** | 0.688*** | 0.045 | -0.266*** | 0.382* | -0.070 | -0.107 |
| | (0.202) | (0.271) | (0.185) | (0.236) | (0.102) | (0.223) | (0.251) | (0.091) |
| bought & sold | 0.518*** | -0.957*** | 0.217 | 0.461*** | -0.165* | -0.017 | 0.013 | -0.079 |
| | (0.131) | (0.175) | (0.132) | (0.172) | (0.092) | (0.094) | (0.100) | (0.049) |
| Observations | 435 | 438 | 438 | 437 | 438 | 438 | 434 | 436 |
| Adjusted $R^2$ | 0.098 | 0.197 | 0.136 | 0.054 | 0.054 | 0.033 | 0.174 | 0.148 |

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 12**  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 10. 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.

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 indicate 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. For them, having a savingsplan is the only important reason for their decision.

**TBD: DISCUSSION BASED ON LITERATURE**

**By Asset type**    Table 14 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. Note that the results hold true even if we only look at active buyers.

This result highlights the importance of information costs. Researching investment alternatives is costly, while sticking with known asset types reduces effort and time.

**Take away #3**    German households either bought because they had a (pre-existing) savingsplan or they seized the opportunity and expected prices to rise. 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, I focus on the question *Why do households sell their financial assets?*[13] As we have seen above, this group consists only of around 6% of households in the sample (N=129) which indicates that the results should be received with caution.

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

**Table 13** Regression Table: Active vs Passive buyers (Probit)

| | (1) active | (2) passive | (3) active | (4) passive | (5) active | (6) passive |
|---|---|---|---|---|---|---|
| owner | 0.492*** | 0.106 | 0.552*** | -0.395** | 0.535*** | -0.485** |
| | (0.130) | (0.100) | (0.198) | (0.192) | (0.200) | (0.203) |
| < 30 | 0.520*** | 0.131 | 0.612** | -0.262 | 0.416 | -0.215 |
| | (0.169) | (0.139) | (0.246) | (0.252) | (0.256) | (0.274) |
| first time | 1.715*** | 0.710** | 0.715** | -0.939*** | 0.424 | -0.591* |
| | (0.342) | (0.342) | (0.344) | (0.341) | (0.330) | (0.324) |
| bought & sold | 1.636*** | 0.883*** | 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 | 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 15 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

**Table 14**  Regression Table: Has bought by asset type (Probit)

| | (1)<br>Funds | (2)<br>Bonds | (3)<br>Stocks | (4)<br>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 |

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

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 16 shows the underlying heterogeneity of the factors. Two interesting points can be made here. First, financial illiterate households, defined as respondents who expect inflation to be above 30%, are more likely to re-balance, but less likely to be affected by their peers. The second point is that households who need money to repay debt (column 6) or find the current situation too risky (column 4) were driven out and did not buy other financial assets. **ANY OTHER STRIKING PUNCHLINE?! SEEMS WEAK**

**Principal Component Anaylsis**   The principal component analysis (table 17) indicates that four factors explain 68% in variation. The first one consists of reasons related

**Table 15** 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.

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 survey questions. The particularly focus here is on the question *How do expectations on property prices and inflation influence financial asset decisions of households?*

**Buying financial assets and houseprice expectations** Table 18 shows the results of the probit model regressing an indicator variable which is one if the person bought on expectations and controls. The first three columns use 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[14]. It shows that having a more optimistic outlook for

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[14]I use qualitative statements on rent developments for renter and property prices for homeowner as they might be more aware of these varaibles

**Table 16** Regression Table: Reason sold and Demographics

| | (1)<br>prices fall | (2)<br>re-balancing | (3)<br>shock | (4)<br>too risky | (5)<br>need<br>consumption | (6)<br>need<br>debt obligation | (7)<br>no time | (8)<br>peer-effect | (9)<br>need support<br>friends and family |
|---|---|---|---|---|---|---|---|---|---|
| college | 0.296 | 0.117 | -0.255 | 0.300* | -0.549** | -0.354* | 0.094 | 0.510*** | -0.160* |
| | (0.273) | (0.278) | (0.185) | (0.166) | (0.228) | (0.180) | (0.155) | (0.161) | (0.085) |
| full-time | 0.801* | -0.240 | 0.630* | -0.160 | -0.181 | -0.162 | -0.639* | -0.290 | 0.240 |
| | (0.418) | (0.376) | (0.354) | (0.366) | (0.474) | (0.507) | (0.380) | (0.284) | (0.239) |
| part-time | 0.546 | -0.049 | 0.304 | 0.012 | -0.407 | 0.213 | -0.173 | -0.323 | -0.123 |
| | (0.712) | (0.825) | (0.425) | (0.537) | (0.599) | (0.637) | (0.455) | (0.310) | (0.286) |
| retired | 0.638 | -0.758 | 0.094 | -0.269 | 0.347 | 0.122 | -0.324 | -0.064 | 0.214 |
| | (0.603) | (0.656) | (0.470) | (0.445) | (0.519) | (0.535) | (0.457) | (0.340) | (0.282) |
| self-employed | -0.027 | 0.077 | 0.359 | -0.288 | 0.631 | 0.037 | -0.850** | -0.143 | 0.204 |
| | (0.546) | (0.681) | (0.433) | (0.462) | (0.670) | (0.508) | (0.420) | (0.320) | (0.261) |
| female | 0.320 | 0.451 | -0.336 | -0.314* | 0.085 | -0.145 | -0.167 | 0.028 | 0.077 |
| | (0.338) | (0.327) | (0.254) | (0.189) | (0.246) | (0.196) | (0.136) | (0.098) | (0.083) |
| kurzarbeit | -0.258 | -1.644* | -1.127* | -0.353 | 1.479** | 0.982 | -0.183 | 0.261 | 0.842 |
| | (0.491) | (0.889) | (0.632) | (0.489) | (0.729) | (0.605) | (0.484) | (0.381) | (0.585) |
| children | 0.139 | -0.583* | -0.241 | -0.014 | 0.355 | 0.140 | 0.034 | -0.089 | 0.258** |
| | (0.304) | (0.337) | (0.220) | (0.214) | (0.250) | (0.261) | (0.164) | (0.136) | (0.104) |
| 1500-3000 | 0.170 | 0.652 | -0.136 | 0.128 | 0.386 | 0.243 | -0.664* | -0.570 | -0.210 |
| | (0.478) | (0.445) | (0.480) | (0.431) | (0.463) | (0.333) | (0.390) | (0.372) | (0.264) |
| 3000-5000 | -0.087 | 0.522 | -0.184 | 0.177 | 0.558 | 0.501 | -0.707* | -0.589* | -0.192 |
| | (0.442) | (0.483) | (0.460) | (0.425) | (0.459) | (0.387) | (0.386) | (0.345) | (0.255) |
| 5000-8000 | 0.539 | 0.436 | -0.370 | 0.181 | 0.167 | 0.029 | -0.225 | -0.592 | -0.165 |
| | (0.504) | (0.504) | (0.484) | (0.457) | (0.481) | (0.366) | (0.413) | (0.372) | (0.269) |
| 8000+ | 0.111 | -0.027 | -0.149 | 0.398 | 0.495 | 0.419 | -0.646 | -0.598 | -0.003 |
| | (0.567) | (0.608) | (0.540) | (0.505) | (0.482) | (0.367) | (0.419) | (0.381) | (0.264) |
| owner | 0.194 | -0.159 | 0.172 | -0.181 | -0.003 | -0.023 | 0.157 | -0.038 | -0.118 |
| | (0.294) | (0.352) | (0.195) | (0.186) | (0.249) | (0.193) | (0.132) | (0.128) | (0.075) |
| age | 0.001 | 0.000 | 0.017** | 0.019** | -0.017 | -0.012 | -0.005 | -0.002 | -0.002 |
| | (0.013) | (0.017) | (0.009) | (0.008) | (0.011) | (0.009) | (0.006) | (0.006) | (0.004) |
| fin illiterate | -0.203 | 1.387*** | 0.654 | 0.097 | -1.056** | -0.375 | 0.188 | -0.837** | 0.145 |
| | (0.462) | (0.500) | (0.472) | (0.334) | (0.493) | (0.444) | (0.427) | (0.376) | (0.277) |
| bought & sold | 0.237 | 1.409*** | -0.343 | -0.475** | -0.339 | -0.536** | -0.115 | 0.094 | 0.068 |
| | (0.298) | (0.266) | (0.232) | (0.216) | (0.249) | (0.236) | (0.161) | (0.171) | (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 17** Principal Component Analysis: Sold

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

Principal component analysis of all factors from table 15. 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.

housing prices, reduces the probability of buying by 15% points. This effect is similar for owners and renters (columns 2 and 3), even though it means expected wealth increases for owner and additional rent payments for renter.

Columns four to six capture quantitative statements. Here, a 1% point higher estimate reduces the probability of buying financial assets by 2.6% points. Interestingly, the effect is stronger for renters than owners.

**Table 18**  Regression Table: Has bought and Expectations of Property Prices (Probit)

|  | (1) All | (2) Owner | (3) Renter | (4) All | (5) Owner | (6) Renter |
|---|---|---|---|---|---|---|
| housing quali | -0.144*** (0.045) | | | | | |
| 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 | 2018 | 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 households want to invest more into housing and save less in other liquid assets, as the return on housing investment is high. Alternatively, higher expected houseprices could also lead to an increase in houseprice risk if the household perceives it as a bubble. Therefore, to reduce aggregate 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 down-payment financial

**Table 19** 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 | -0.130** (0.059) | | | | | |
| 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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

assets are going to be liquidated, the household could start to reduce risk of stockmarket volatility and liquidate early.

**NOTE: 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 20 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 the average of qualitative statements *inflation rate*, *interest of credit*, and *fuel prices*. All of them measure increases in prices to some degree. The results estimate 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 to limit the importance of outliers.

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. **NOTE: SEE ROBUSTNESS SECTION FOR DISTRIBUTION ESTIMATIONS. STILL WORKING ON SOME WEIRD CASES WHICH MIGHT ALTER THE RESULTS.**

**Table 20** 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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

**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.

**Table 21** 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*** | -0.090*** | -0.082*** | | | | |
| | | (0.022) | (0.022) | (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*** | -0.099*** |
| | | | | | | | (0.020) | (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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

To test these two explanations, I use a proxy for a pessimistic economic outlook[15] as well as expected increase in interest rates[16]. Table 22 shows that both explain higher inflation expectations. Nevertheless, they cannot rationalize why inflation expectations reduce the probability to buy (column 5) as the coefficient remains significant and unchanged in magnitude. Therefore, other explanations might be important which the literature has missed so far.

**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.

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[15]The question ask 'to what extent do you think' the economy 'is a serious problem at present?' where 1 means no problem at all and 10 an extremely serious problem.

[16]Here I use the qualitative statement if the respondent thinks interest rates will decrease or increase.

**Table 22** Regression Table: Inflation expectations:
Stagflation vs Central bank intervention

| | (1) inflation | (2) inflation | (3) inflation | (4) Bought | (5) Bought |
|---|---|---|---|---|---|
| pess economy | 0.280*** | | 0.279*** | | -0.003 |
| | (0.070) | | (0.071) | | (0.022) |
| inc interest rates | | 0.468** | 0.469** | | -0.109* |
| | | (0.223) | (0.217) | | (0.061) |
| inflation PE wins | | | | -0.097*** | -0.098*** |
| | | | | (0.018) | (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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

# 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 26 shows
that the relationship breaks down...

Table 27 splits the principal component up and investigates each reason explicitly...

**REMAINS SIGNIFICANT IF I USE A MORE PARSIMONIOUS MODEL
WITH LESS DEMOGRAPHICS. HAVING A MILLION CONTROLS AND
ONLY 500 OBSERVATIONS IS JUST NOT A GOOD THING TO DO...**

**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 28 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 29 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

**IDEAS TO EXTENT THIS PAPER. FEEL FREE TO ADD SOMETHING :)**

- Endogenize probability to adjust portfolio: $Pr(Adj) = \beta_1 X_1 + ...$ Use PCA components to match

- Structural model on how covid changed financial asset investment decisions (Would need to ask the same questions post-covid (whenever that might be))

# 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 to identify he importance of each reason.

**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.

- Importance of financial literacy training

- Modelling

**Limitation**   Some limitations need to be taken into consideration. First, the respondent of the interview might not be the household had 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 intermitted 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 re-balancing 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.

- End probability to adjust portfolio

- Structural model on how covid changed asset investments

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# Appendices

## A Bundesbank Online Panel Questionnaire

This appendix lists the inserted questions in the Bundesbank Online Panel Wave 8. Note that the original questions were asked in German.

| 816A | PRO A1 | Stock market 1 | has_portfolio_[a-d] |
|---|---|---|---|

Info box with the following text:

A) A fund is a "basket" of many, sometimes very different, securities. A fund share denotes a share in this basket and its income. In some cases, the fund finances only individual projects, such as real estate, ship building or films. Examples of common types of funds are share-based funds, bond-based funds, money market funds, funds of funds, hedge funds, exchange-traded funds (ETFs), shipping funds and media funds.

B) Fixed income securities are assets which entitle the bearer to a pre-determined rate of interest. Depending on who issued these securities, they could be government bonds (such as Federal bonds, Federal savings notes, Federal Treasury financing paper, Federal Treasury notes, municipal bonds, Pfandbriefe issued by central, state or local government), corporate bonds or other debt securities (e.g. bank bonds).

C) A listed share is a security that is traded on the stock exchange which shows the shareholder (owner of the security) as being a co-owner of a public limited company. This type of security therefore usually entitles the bearer to a share of the company's income. The share constitutes a certificate which securitises a share in the capital of a public limited company.

QUESTION: Prior to the coronavirus pandemic, did you hold the following financial assets directly in your safe custody account?

1 = Yes
2 = No

a) Fund shares
b) Fixed income securities (such as government bonds, corporate bonds and bank bonds)
c) Listed shares
d) Other financial products (such as foreign exchange, gold, cryptocurrency)

| 816B | PRO A1 | Stock market 1 | value_portfolio_[a-d] |
|------|--------|----------------|------------------------|

Input filter: if has_portfolio_a == 1 OR has_portfolio_b == 1 OR has_portfolio_c == 1 OR has_portfolio_d == 1

Info box with the following text:

A) A fund is a "basket" of many, sometimes very different, securities. A fund share denotes a share in this basket and its income. In some cases, the fund finances only individual projects, such as real estate, ship building or films. Examples of common types of funds are share-based funds, bond-based funds, money market funds, funds of funds, hedge funds, exchange-traded funds (ETFs), shipping funds and media funds.

B) Fixed income securities are assets which entitle the bearer to a pre-determined rate of interest. Depending on who issued these securities, they could be government bonds (such as Federal bonds, Federal savings notes, Federal Treasury financing paper, Federal Treasury notes, municipal bonds, Pfandbriefe issued by central, state or local government), corporate bonds or other debt securities (e.g. bank bonds).

C) A listed share is a security that is traded on the stock exchange which shows the shareholder (owner of the security) as being a co-owner of a public limited company. This type of security therefore usually entitles the bearer to a share of the company's income. The share constitutes a certificate which securitises a share in the capital of a public limited company.

QUESTION: What is your rough estimate of the market value of your financial assets prior to the coronavirus pandemic?

a  Fund shares [only show item if portfolio_a =1]
b  Fixed income securities (such as government bonds, corporate bonds and bank bonds) [only show item if portfolio_b =1]
c  Listed shares [only show item if portfolio_c =1]
d  Other financial products (such as foreign exchange, gold, cryptocurrency) [only show item if portfolio_d =1]

Show brackets:

1 = €1 to less than €500
2 = €500 to less than €1,000
3 = €1,000 to less than €3,000
4 = €3,000 to less than €5,000
5 = €5,000 to less than €10,000
6 = €10,000 to less than €20,000
7 = €20,000 to less than €30,000
8 = €30,000 to less than €50,000
9 = €50,000 or more

| 817A | PRO A1 | Stock market 2 – change | portfolio_bought_[a-d] portfolio_sold_[a-d] portfolio_unchanged_[a-d] |
|------|--------|-------------------------|---------------------------------------------------------------------|

QUESTION: Have you bought or sold the following financial assets since the start of the coronavirus pandemic?

| | 1 – Bought | 2 – Sold | 3 – Neither bought nor sold |
|---|---|---|---|
| a) Fund shares | | | |
| b) Fixed income securities | | | |
| c) Listed shares | | | |
| d) Other financial products (such as foreign exchange, gold, cryptocurrency) | | | |

| 817B | PRO A1 | Stock market 2 – value | portfolio_value_bought_[a-d] portfolio_value_sold_[a-d] |
|---|---|---|---|

Input filter: if portfolio_unchanged_a == 2 OR portfolio_unchanged_b == 2 OR portfolio_unchanged_c == 2 OR portfolio_unchanged_d == 2

QUESTION: Please indicate the amount for which you have bought or sold financial assets <u>since the start of the coronavirus pandemic</u>.

| | 1 – Bought | 2 – Sold |
|---|---|---|
| a) Fund shares [only show item if portfolio_bought_a =1 OR portfolio_sold_a = 1] | _euro | _euro |
| b) Fixed income securities [only show item if portfolio_bought_b =1 OR portfolio_sold_b = 1] | _euro | _euro |
| c) Listed shares [only show item if portfolio_bought_c =1 OR portfolio_sold_c = 1] | _euro | _euro |
| d) Other financial products (such as foreign exchange, gold, cryptocurrency) [only show item if portfolio_bought_d =1 OR portfolio_sold_d = 1] | _euro | _euro |

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| 818A | PRO A1 | Stock market 3a | portfolio_reason_bought[a-h] |
|---|---|---|---|

Input filter: if portfolio_bought_a == 1 OR portfolio_bought_b == 1 OR portfolio_bought_c == 1 OR portfolio_bought_d == 1

Order of the categories a to h is generated randomly for each respondent.

QUESTION: Why did you decide to buy the asset(s) after the coronavirus pandemic began?

1 = Strongly agree
2 = Mostly agree
3 = Mostly disagree
4 = Strongly disagree
Please select an answer for each row.

a   The prices are/were low at the time.
b   I (finally) found time for it.
c   I received additional information (e.g. from your bank, social media, television).
d   Since my consumption expenditure has fallen, I have money to invest.
e   Since my income has risen, I have money to invest.
f   My bank has (temporarily) lowered its safe custody account costs.
g   People in my circle of (close) family and friends have also bought assets.
h   I have a fixed savings plan.

| 818B | PRO A1 | Stock market 3b | portfolio_reason_sold[a-i] |
|---|---|---|---|

Input filter: if portfolio_sold_a == 1 OR portfolio_sold_b == 1 OR portfolio_sold_c == 1 OR portfolio_sold_d == 1

Order of the categories a to i is generated randomly for each respondent.

QUESTION: Why did you decide to sell the asset(s) after the coronavirus pandemic began?

1 = Strongly agree
2 = Mostly agree
3 = Mostly disagree
4 = Strongly disagree


Please select an answer for each row.

a   Prices will fall again or fall lower.
b   I have no time for it (anymore).
c   The recent collapse in financial market prices put me off.
d   Financial assets are too risky for me at the moment.
e   I needed the money to pay my bills.
f   I needed the money to support friends and relatives.
g   I needed the money for other consumption expenditure.
h   People in my circle of (close) family and friends have also sold assets.
i   I preferred to invest in other financial assets.

| 818C | PRO A1 | Stock market 3c | portfolio_reason_nostocks[a-k] |
|------|--------|-----------------|-------------------------------|

Input filter: if has_portfolio_a==2 AND has_portfolio_b==2 AND has_portfolio_c==2 AND has_portfolio_d==2 AND portfolio_unchanged_a == 1 AND portfolio_unchanged_b == 1 AND portfolio_unchanged_c == 1 AND portfolio_unchanged_d == 1

QUESTION: Why did you decide not to buy any asset(s) during the coronavirus pandemic?

1 = Strongly agree

2 = Mostly agree

3 = Mostly disagree

4 = Strongly disagree

Please select an answer for each row.

a   Prices will fall again or fall lower.

b   I have no time for it (anymore).

c   I do not know enough about the financial market or how to buy assets.

d   The recent collapse in financial market prices puts me off.

e   Financial assets are too risky for me at the moment.

f   I have no money to save.

g   The costs of safe custody accounts and transactions are too high for me.

h   No one in my circle of (close) family and friends holds assets.

i   I do not trust the stock market.

j   I have moral concerns.

k   I have no interest in it.

| 818D | PRO A1 | Stock market 3d | portfolio_reason_unchange[a-f] |
|---|---|---|---|

Input filter: if (has_portfolio_a==1 OR has_portfolio_b==1 OR has_portfolio_c==1 OR has_portfolio_d==1) AND (portfolio_unchanged_a == 1 AND portfolio_unchanged_b == 1 AND portfolio_unchanged_c == 1 AND portfolio_unchanged_d == 1)

QUESTION: Why did you decide not to buy any more assets during the coronavirus pandemic?

1 = Strongly agree
2 = Mostly agree
3 = Mostly disagree
4 = Strongly disagree
Please select an answer for each row.

a   Prices will fall again or fall lower.
b   I have no time for it (anymore).
c   Financial assets are too risky for me at the moment.
d   I have no money to save.
e   The transaction costs are too high for me.
f   People in my circle of (close) family and friends have not bought assets either.

# B Additional Regression Tables

Here will be additional Regression Tables

**Table 23**  Regression Table: Reason No Participation and Demographics

| | (1) no information | (2) no interest | (3) distrust | (4) too risky | (5) no time | (6) peer-effect | (7) no savings | (8) prices fall | (9) shock | (10) cost | (11) moral |
|---|---|---|---|---|---|---|---|---|---|---|---|
| college | 0.021 | 0.163 | -0.051 | 0.032 | 0.163* | -0.113 | -0.107 | -0.076 | -0.074 | -0.012 | 0.061 |
| | (0.082) | (0.100) | (0.078) | (0.081) | (0.096) | (0.110) | (0.133) | (0.085) | (0.093) | (0.098) | (0.099) |
| full-time | 0.119 | 0.044 | -0.013 | 0.077 | 0.294** | 0.228 | -0.260 | -0.045 | -0.079 | 0.030 | -0.373** |
| | (0.117) | (0.159) | (0.121) | (0.129) | (0.131) | (0.164) | (0.193) | (0.134) | (0.136) | (0.125) | (0.154) |
| part-time | 0.095 | 0.244 | -0.036 | 0.038 | 0.092 | 0.137 | -0.329 | -0.083 | -0.115 | 0.051 | -0.058 |
| | (0.134) | (0.162) | (0.136) | (0.131) | (0.179) | (0.186) | (0.224) | (0.146) | (0.144) | (0.139) | (0.168) |
| retired | 0.072 | 0.222 | -0.100 | -0.078 | 0.029 | 0.136 | -0.126 | 0.248 | -0.085 | 0.122 | -0.385** |
| | (0.179) | (0.198) | (0.142) | (0.184) | (0.179) | (0.208) | (0.229) | (0.156) | (0.177) | (0.177) | (0.191) |
| self-employed | -0.300 | 0.001 | -0.248 | 0.005 | 0.391** | 0.079 | -0.300 | 0.488** | 0.116 | 0.102 | -0.301 |
| | (0.229) | (0.281) | (0.171) | (0.180) | (0.196) | (0.211) | (0.432) | (0.229) | (0.215) | (0.239) | (0.239) |
| female | 0.071 | 0.161* | -0.015 | -0.078 | 0.139* | -0.135 | -0.006 | -0.047 | 0.018 | -0.029 | -0.108 |
| | (0.079) | (0.088) | (0.078) | (0.078) | (0.081) | (0.101) | (0.118) | (0.082) | (0.084) | (0.082) | (0.093) |
| kurzarbeit | 0.241* | 0.249 | 0.092 | -0.143 | -0.226 | -0.129 | -0.392 | 0.152 | 0.298 | -0.284 | 0.183 |
| | (0.137) | (0.197) | (0.149) | (0.165) | (0.177) | (0.167) | (0.291) | (0.133) | (0.217) | (0.188) | (0.217) |
| children | -0.119 | 0.092 | 0.124 | -0.167* | 0.157 | 0.001 | 0.242* | -0.139 | -0.067 | -0.155 | -0.024 |
| | (0.087) | (0.111) | (0.092) | (0.098) | (0.107) | (0.123) | (0.139) | (0.103) | (0.098) | (0.102) | (0.115) |
| 1500-3000 | -0.079 | 0.226* | -0.067 | 0.207* | 0.060 | 0.026 | -0.199 | 0.129 | -0.030 | -0.050 | -0.202 |
| | (0.118) | (0.133) | (0.115) | (0.117) | (0.129) | (0.148) | (0.186) | (0.111) | (0.124) | (0.124) | (0.156) |
| 3000-5000 | -0.047 | 0.246 | -0.019 | 0.269** | 0.050 | 0.049 | -0.589*** | 0.138 | -0.028 | -0.000 | -0.045 |
| | (0.126) | (0.149) | (0.127) | (0.118) | (0.140) | (0.149) | (0.221) | (0.118) | (0.117) | (0.135) | (0.177) |
| 5000-8000 | 0.069 | 0.427** | -0.009 | 0.092 | 0.082 | -0.170 | -0.695*** | 0.269 | 0.108 | 0.028 | -0.161 |
| | (0.153) | (0.187) | (0.150) | (0.138) | (0.177) | (0.193) | (0.255) | (0.168) | (0.137) | (0.150) | (0.179) |
| 8000+ | -0.278 | 0.522** | 0.151 | 0.452*** | -0.032 | -0.410 | -0.458 | 0.077 | 0.139 | 0.204 | -0.413* |
| | (0.177) | (0.204) | (0.171) | (0.151) | (0.279) | (0.326) | (0.278) | (0.186) | (0.209) | (0.218) | (0.211) |
| owner | -0.038 | 0.035 | -0.003 | 0.028 | 0.010 | -0.009 | -0.065 | 0.089 | 0.051 | -0.074 | -0.035 |
| | (0.075) | (0.094) | (0.075) | (0.082) | (0.089) | (0.099) | (0.125) | (0.085) | (0.082) | (0.085) | (0.105) |
| age | -0.014*** | -0.001 | 0.010*** | 0.009** | -0.014*** | 0.003 | -0.005 | -0.003 | 0.010** | 0.003 | 0.001 |
| | (0.003) | (0.004) | (0.003) | (0.004) | (0.004) | (0.004) | (0.005) | (0.004) | (0.004) | (0.003) | (0.004) |
| fin illiterate | 0.261** | 0.035 | -0.133 | -0.067 | 0.005 | -0.052 | -0.292** | -0.041 | 0.129 | 0.029 | 0.121 |
| | (0.103) | (0.119) | (0.112) | (0.127) | (0.129) | (0.172) | (0.129) | (0.119) | (0.155) | (0.144) | (0.139) |
| Observations | 838 | 837 | 833 | 824 | 829 | 831 | 837 | 817 | 819 | 812 | 829 |
| Adjusted $R^2$ | 0.087 | 0.031 | 0.022 | 0.049 | 0.109 | 0.015 | 0.054 | 0.031 | 0.031 | 0.012 | 0.023 |

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 24** Regression Table: Principal Component of Reason No Participation and Demographics

| | (1)<br>Risk<br>Aversion | (2)<br>Lack of<br>Resources | (3)<br>Lack of<br>Savings |
|---|---|---|---|
| college | -0.034 | 0.060 | -0.053 |
| | (0.049) | (0.048) | (0.070) |
| | | | |
| female | -0.034 | 0.089* | -0.049 |
| | (0.044) | (0.046) | (0.063) |
| | | | |
| children | -0.046 | 0.086 | 0.090 |
| | (0.058) | (0.056) | (0.078) |
| | | | |
| owner | 0.057 | -0.033 | -0.103 |
| | (0.046) | (0.047) | (0.063) |
| | | | |
| fin illiterate | -0.025 | 0.007 | -0.080 |
| | (0.078) | (0.060) | (0.088) |
| | | | |
| full-time | -0.027 | 0.052 | -0.313*** |
| | (0.077) | (0.076) | (0.101) |
| | | | |
| part-time | -0.052 | 0.034 | -0.201 |
| | (0.078) | (0.086) | (0.126) |
| | | | |
| retired | -0.025 | 0.071 | -0.223 |
| | (0.092) | (0.104) | (0.138) |
| | | | |
| self-employed | 0.076 | -0.052 | -0.296 |
| | (0.110) | (0.138) | (0.201) |
| | | | |
| kurzarbeit | 0.081 | -0.021 | -0.049 |
| | (0.109) | (0.110) | (0.154) |
| | | | |
| age | 0.006*** | -0.009*** | -0.002 |
| | (0.002) | (0.002) | (0.003) |
| | | | |
| < 1500 | -0.073 | 0.029 | 0.261*** |
| | (0.058) | (0.064) | (0.096) |
| Observations | 811 | 823 | 827 |
| Adjusted $R^2$ | 0.073 | 0.103 | 0.059 |

OLS model with principal component as dependent variable on demographics.
Standard errors in parentheses. $^*$ $p < 0.10$, $^{**}$ $p < 0.05$, $^{***}$ $p < 0.01$

**Table 25** Regression Table: Reason No Adjustment and Demographics

| | (1)<br>too risky | (2)<br>no time | (3)<br>prices fall | (4)<br>no savings | (5)<br>peer effect | (6)<br>costs |
|---|---|---|---|---|---|---|
| college | -0.061 | 0.334** | -0.151 | 0.037 | -0.182 | 0.025 |
| | (0.116) | (0.148) | (0.114) | (0.149) | (0.123) | (0.101) |
| full-time | 0.235 | 0.277 | -0.242 | -0.322 | -0.007 | 0.039 |
| | (0.185) | (0.237) | (0.174) | (0.291) | (0.252) | (0.144) |
| part-time | 0.128 | 0.033 | -0.535* | 0.194 | 0.123 | 0.040 |
| | (0.222) | (0.257) | (0.273) | (0.389) | (0.281) | (0.181) |
| retired | 0.107 | -0.142 | -0.415* | -0.365 | 0.673** | 0.125 |
| | (0.240) | (0.274) | (0.217) | (0.322) | (0.264) | (0.184) |
| self-employed | -0.242 | 0.076 | -0.652*** | 0.438 | 0.139 | 0.230 |
| | (0.250) | (0.338) | (0.226) | (0.344) | (0.266) | (0.349) |
| female | -0.001 | 0.084 | -0.116 | -0.148 | 0.038 | 0.142 |
| | (0.104) | (0.138) | (0.137) | (0.145) | (0.139) | (0.097) |
| kurzarbeit | -0.106 | -0.148 | -0.542*** | 0.051 | 0.468 | 0.262 |
| | (0.255) | (0.265) | (0.165) | (0.242) | (0.323) | (0.334) |
| children | 0.119 | 0.179 | -0.244* | 0.196 | -0.175 | -0.073 |
| | (0.150) | (0.184) | (0.129) | (0.206) | (0.173) | (0.129) |
| 1500-3000 | -0.240 | 0.161 | 0.259 | -0.714*** | 0.175 | 0.379* |
| | (0.189) | (0.274) | (0.202) | (0.270) | (0.245) | (0.199) |
| 3000-5000 | 0.026 | 0.021 | 0.183 | -0.862*** | 0.353 | 0.304 |
| | (0.186) | (0.272) | (0.237) | (0.285) | (0.244) | (0.198) |
| 5000-8000 | -0.355 | 0.220 | 0.274 | -0.728** | 0.508* | 0.098 |
| | (0.225) | (0.318) | (0.261) | (0.319) | (0.260) | (0.207) |
| 8000+ | 0.358 | 0.598* | 0.031 | -1.364*** | 0.169 | 0.213 |
| | (0.264) | (0.323) | (0.269) | (0.385) | (0.319) | (0.285) |
| owner | -0.029 | -0.088 | 0.324* | -0.211 | -0.166 | 0.167* |
| | (0.117) | (0.136) | (0.170) | (0.158) | (0.136) | (0.100) |
| age | 0.006 | -0.009* | 0.004 | 0.015** | -0.019*** | 0.004 |
| | (0.005) | (0.006) | (0.005) | (0.007) | (0.007) | (0.004) |
| fin illiterate | 0.292* | 0.303* | 0.209 | -0.944*** | 0.406* | -0.255** |
| | (0.164) | (0.167) | (0.205) | (0.324) | (0.241) | (0.117) |
| Observations | 440 | 441 | 436 | 439 | 432 | 437 |
| Adjusted $R^2$ | 0.038 | 0.124 | 0.097 | 0.112 | 0.073 | 0.046 |

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 26** Robustness: Principal Component of Reason No Participation and Demographics

| | (1) Risk Aversion | (2) Risk Aversion | (3) Risk Aversion | (4) Risk Aversion | (5) Risk Aversion | (6) Risk Aversion |
|---|---|---|---|---|---|---|
| college | -0.034 | -0.031 | -0.032 | -0.031 | -0.031 | -0.033 |
| | (0.049) | (0.057) | (0.057) | (0.057) | (0.057) | (0.057) |
| female | -0.034 | -0.048 | -0.046 | -0.046 | -0.047 | -0.046 |
| | (0.044) | (0.057) | (0.056) | (0.056) | (0.056) | (0.056) |
| children | -0.046 | -0.037 | -0.026 | -0.028 | -0.032 | -0.025 |
| | (0.058) | (0.067) | (0.062) | (0.063) | (0.065) | (0.062) |
| owner | 0.057 | 0.051 | 0.054 | 0.053 | 0.052 | 0.054 |
| | (0.046) | (0.056) | (0.056) | (0.056) | (0.056) | (0.056) |
| fin illiterate | -0.025 | -0.004 | -0.007 | -0.006 | -0.005 | -0.008 |
| | (0.078) | (0.098) | (0.097) | (0.097) | (0.097) | (0.097) |
| part-time | -0.052 | -0.043 | -0.040 | -0.041 | -0.042 | -0.041 |
| | (0.078) | (0.082) | (0.083) | (0.083) | (0.083) | (0.083) |
| retired | -0.025 | 0.006 | 0.004 | 0.006 | 0.006 | 0.003 |
| | (0.092) | (0.107) | (0.106) | (0.106) | (0.107) | (0.106) |
| self-employed | 0.076 | 0.095 | 0.099 | 0.098 | 0.097 | 0.098 |
| | (0.110) | (0.119) | (0.119) | (0.119) | (0.119) | (0.119) |
| kurzarbeit | 0.081 | 0.086 | 0.085 | 0.085 | 0.086 | 0.084 |
| | (0.109) | (0.111) | (0.110) | (0.110) | (0.111) | (0.110) |
| < 1500 | -0.073 | -0.046 | -0.048 | -0.047 | -0.046 | -0.048 |
| | (0.058) | (0.072) | (0.072) | (0.072) | (0.072) | (0.072) |
| age | 0.006*** | 0.006 | 0.009 | 0.008 | 0.007 | 0.010 |
| | (0.002) | (0.004) | (0.006) | (0.005) | (0.005) | (0.006) |
| Experience (k=1) | | 0.122 | | | | |
| | | (9.227) | | | | |
| Experience (k=1.4322) | | | -8.109 | | | |
| | | | (14.504) | | | |
| Experience (k=1.325) | | | | -5.279 | | |
| | | | | (12.841) | | |
| Experience (k=1.166) | | | | | -2.126 | |
| | | | | | (10.861) | |
| Experience (k=1.5) | | | | | | -10.177 |
| | | | | | | (15.699) |
| Observations | 811 | 526 | 526 | 526 | 526 | 526 |
| Adjusted $R^2$ | 0.073 | 0.027 | 0.028 | 0.028 | 0.027 | 0.028 |

OLS model with principal component as dependent variable on demographics.
Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

**Table 27** Robustness: Reason No Participation and Demographics

| | (1) no information | (2) no interest | (3) distrust | (4) too risky | (5) no time | (6) peer-effect | (7) no savings | (8) prices fall | (9) shock | (10) cost | (11) moral |
|---|---|---|---|---|---|---|---|---|---|---|---|
| college | 0.002 | 0.135 | -0.072 | 0.035 | 0.227** | -0.068 | -0.134 | -0.099 | -0.042 | 0.014 | 0.013 |
| | (0.093) | (0.118) | (0.090) | (0.093) | (0.110) | (0.127) | (0.154) | (0.099) | (0.108) | (0.114) | (0.113) |
| part-time | 0.049 | 0.270 | -0.053 | 0.071 | 0.084 | 0.187 | -0.364 | -0.082 | -0.096 | 0.000 | -0.026 |
| | (0.129) | (0.178) | (0.143) | (0.140) | (0.182) | (0.195) | (0.232) | (0.153) | (0.155) | (0.144) | (0.173) |
| retired | -0.148 | 0.095 | 0.137 | -0.198 | 0.058 | 0.173 | -0.162 | 0.271 | -0.111 | 0.548** | -0.601** |
| | (0.261) | (0.240) | (0.163) | (0.274) | (0.237) | (0.263) | (0.237) | (0.183) | (0.228) | (0.242) | (0.276) |
| self-employed | -0.377 | -0.010 | -0.250 | 0.072 | 0.307 | 0.104 | -0.280 | 0.527** | 0.110 | 0.078 | -0.245 |
| | (0.246) | (0.310) | (0.187) | (0.191) | (0.197) | (0.225) | (0.475) | (0.246) | (0.241) | (0.261) | (0.245) |
| female | 0.094 | 0.156 | 0.003 | -0.052 | 0.129 | -0.231* | 0.043 | -0.074 | -0.045 | 0.043 | -0.106 |
| | (0.083) | (0.115) | (0.094) | (0.100) | (0.096) | (0.123) | (0.145) | (0.105) | (0.104) | (0.098) | (0.111) |
| kurzarbeit | 0.216 | 0.246 | 0.099 | -0.129 | -0.238 | -0.179 | -0.380 | 0.154 | 0.301 | -0.278 | 0.227 |
| | (0.137) | (0.196) | (0.150) | (0.163) | (0.187) | (0.160) | (0.300) | (0.139) | (0.220) | (0.189) | (0.222) |
| children | -0.118 | 0.023 | 0.145 | -0.096 | 0.207* | -0.031 | 0.124 | -0.214* | -0.049 | -0.090 | 0.047 |
| | (0.094) | (0.134) | (0.098) | (0.115) | (0.120) | (0.138) | (0.149) | (0.128) | (0.113) | (0.107) | (0.124) |
| 1500-3000 | -0.025 | 0.238 | -0.161 | 0.163 | 0.199 | 0.121 | -0.182 | 0.186 | -0.050 | -0.061 | -0.405** |
| | (0.134) | (0.180) | (0.126) | (0.144) | (0.157) | (0.186) | (0.228) | (0.140) | (0.151) | (0.150) | (0.177) |
| 3000-5000 | 0.015 | 0.293 | -0.129 | 0.242* | 0.097 | 0.052 | -0.506* | 0.167 | -0.059 | -0.008 | -0.128 |
| | (0.134) | (0.196) | (0.146) | (0.143) | (0.167) | (0.179) | (0.270) | (0.142) | (0.142) | (0.159) | (0.200) |
| 5000-8000 | 0.118 | 0.434* | -0.062 | 0.066 | 0.143 | -0.240 | -0.642** | 0.284 | 0.117 | 0.051 | -0.210 |
| | (0.171) | (0.226) | (0.163) | (0.162) | (0.202) | (0.223) | (0.300) | (0.194) | (0.161) | (0.173) | (0.201) |
| 8000+ | -0.257 | 0.541** | 0.129 | 0.405** | 0.016 | -0.404 | -0.394 | 0.089 | 0.112 | 0.210 | -0.491** |
| | (0.191) | (0.237) | (0.183) | (0.173) | (0.309) | (0.356) | (0.314) | (0.203) | (0.235) | (0.239) | (0.229) |
| owner | -0.067 | 0.051 | -0.027 | -0.014 | 0.082 | 0.155 | -0.056 | 0.104 | 0.073 | -0.112 | -0.204 |
| | (0.084) | (0.120) | (0.088) | (0.100) | (0.105) | (0.117) | (0.153) | (0.103) | (0.099) | (0.097) | (0.126) |
| age | -0.010* | -0.007 | 0.011** | 0.015* | -0.008 | 0.001 | -0.015* | -0.013* | 0.010 | 0.012** | 0.002 |
| | (0.005) | (0.008) | (0.005) | (0.008) | (0.007) | (0.008) | (0.009) | (0.008) | (0.008) | (0.006) | (0.008) |
| fin illiterate | 0.245* | -0.035 | -0.119 | -0.022 | 0.069 | 0.033 | -0.268* | -0.081 | 0.181 | -0.056 | 0.053 |
| | (0.126) | (0.157) | (0.128) | (0.149) | (0.158) | (0.204) | (0.157) | (0.149) | (0.187) | (0.176) | (0.176) |
| Experience (k=1) | -3.911 | 15.991 | 0.121 | -18.288 | -20.188 | 2.083 | 29.137 | 23.093 | -2.982 | -17.172 | -9.082 |
| | (14.194) | (20.424) | (13.595) | (17.916) | (17.460) | (20.220) | (23.828) | (15.890) | (17.627) | (15.730) | (19.446) |
| Observations | 543 | 543 | 542 | 536 | 538 | 539 | 543 | 529 | 532 | 528 | 538 |
| Adjusted $R^2$ | 0.057 | 0.028 | 0.029 | 0.025 | 0.065 | 0.021 | 0.042 | 0.027 | 0.010 | 0.032 | 0.043 |

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 28** Robustness: Principal Component of Reason No Participation and Demographics

| | (1)<br>Risk<br>Aversion | (2)<br>Lack of<br>Resources | (3)<br>Lack of<br>Savings |
|---|---|---|---|
| college | -0.017 | 0.054* | -0.012 |
| | (0.035) | (0.030) | (0.031) |
| female | -0.010 | 0.060* | -0.012 |
| | (0.032) | (0.033) | (0.028) |
| children | -0.042 | -0.017 | 0.028 |
| | (0.041) | (0.040) | (0.036) |
| owner | 0.015 | -0.008 | -0.045* |
| | (0.032) | (0.029) | (0.027) |
| fin illiterate | 0.055 | 0.062 | 0.032 |
| | (0.049) | (0.043) | (0.044) |
| part-time | 0.042 | 0.016 | -0.046 |
| | (0.066) | (0.072) | (0.060) |
| retired | 0.019 | 0.040 | -0.075 |
| | (0.071) | (0.073) | (0.062) |
| self-employed | 0.131 | 0.051 | -0.087 |
| | (0.090) | (0.081) | (0.065) |
| kurzarbeit | 0.032 | 0.036 | 0.044 |
| | (0.087) | (0.057) | (0.054) |
| age | 0.005*** | -0.003 | 0.001 |
| | (0.002) | (0.002) | (0.001) |
| < 1500 | 0.003 | 0.031 | 0.139*** |
| | (0.046) | (0.041) | (0.042) |
| Observations | 879 | 892 | 895 |
| Adjusted $R^2$ | 0.065 | 0.026 | 0.033 |

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

**Table 29** Regression Table: Has bought and Expectations of Inflation (Probit)

|  | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| inflation prob exp | -0.047*** | -0.084*** |  |  |  |
|  | (0.016) | (0.019) |  |  |  |
| inflation prob sd |  | -0.534*** |  |  |  |
|  |  | (0.180) |  |  |  |
| Mean |  |  | -0.043** | -0.035 | -0.049* |
|  |  |  | (0.020) | (0.022) | (0.026) |
| SD |  |  |  | -0.043 |  |
|  |  |  |  | (0.034) |  |
| 90-10 Percentile |  |  |  |  | -0.122 |
|  |  |  |  |  | (0.099) |
| Observations | 1716 | 1716 | 1138 | 1138 | 772 |
| Controls | 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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$