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## Uncertainty and Information Acquisition: Evidence from Firms and Households

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# Uncertainty and Information Acquisition: Evidence from Firms and Households

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# Uncertainty and Information Acquisition: Evidence from Firms and Households

## Abstract

We leverage the small open economy Switzerland as a testing ground for basic premises of macroeconomic models of endogenous information acquisition, using tailored surveys of firms and households. First, we show that firms perceive a greater exposure to exchange rate movements than households, which is reflected in higher levels of information acquisition and less dispersed beliefs about past and future exchange rate realizations. Similarly, within the two samples, acquisition of exchange rate information strongly increases in various proxies for stake size. Second, households who perceive higher costs of acquiring or processing information acquire less information. Finally, an exogenous increase in the perceived uncertainty of the exchange rate increases firms' demand for a report about exchange rate developments, but not households'. Our findings inform the modeling of information frictions in macroeconomics.

JEL-Codes: D120, D140, D830, D840, E320, G110.

Keywords: information acquisition, uncertainty, stake size, firms, households.

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# 1 Introduction

Information frictions are central to theories of macroeconomic expectation formation. In several influential models, information frictions are assumed to be exogenous (Carroll, 2003; Mankiw and Reis, 2002; Mankiw et al., 2003; Woodford, 2003). This stands in contrast to models of endogenous information acquisition, in which economic agents have a limited capacity to acquire or process information and choose how much and which types of information to acquire (Mackowiak and Wiederholt, 2009; Reis, 2006; Sims, 2003). As a result, an economic agent’s demand for a specific piece of information increases in the importance of the variable of interest for the agent’s payoff function, decreases in the cognitive costs of information acquisition and processing, and responds to changes in economic conditions. For instance, a central prediction of these models is that an increase in uncertainty of a variable of interest leads economic agents to acquire more information about this variable (Mackowiak et al., 2021). The way information frictions are modeled has important implications for the transmission of shocks and policies (Angeletos and Lian, 2018; Ball et al., 2005; Lorenzoni, 2010; Paciello and Wiederholt, 2014; Wiederholt, 2015).

In this paper, we test several basic predictions of models of endogenous information acquisition by studying how information acquisition about the future development of the exchange rate is related to (i) exposure to exchange rate risk, (ii) perceived information acquisition and processing costs, and (iii) the perceived uncertainty surrounding the exchange rate. We conduct surveys among firm managers and households from the small open economy Switzerland.<sup>1</sup> Exchange rate movements play an important role for Swiss firms, as they directly affect product demand of exporting firms and input costs of importing firms. Moreover, they indirectly affect the wage and employment prospects of households working for those firms, and shape households’ cost of living through their pass-through to retail prices. Depending on their exposure, holding more precise beliefs

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<sup>1</sup>For convenience and in line with the convention in macroeconomics, we often refer to participants in the firm survey as “firms” instead of “firm managers”, and refer to their beliefs as “firms’ beliefs”.

about exchange rate movements should allow firms and households to make better economic choices, such as decisions about production, pricing, investment and hiring for firms, or decisions about saving, job search and portfolio allocation for households. Thus, the context of exchange rate developments in Switzerland offers a setting in which information acquisition is relevant for high-stakes economic decisions, especially for firms.

We first establish two sets of descriptive facts consistent with the basic prediction that agents more exposed to exchange rate movements acquire more information. First, firms report a greater importance of the exchange rate for their own situation than households, which is reflected in acquisition of more exchange rate information over the three months before our survey. Firms also hold more accurate and less dispersed beliefs about past exchange rate movements, and are more confident in these beliefs. Similarly, their expectations about the future exchange rate are less dispersed and more closely aligned with expert forecasts compared to households'. Second, within our samples of firms and households, information acquisition about the exchange rate is positively associated with various proxies for exposure to exchange rate risk. For instance, firms with a higher share of revenue earned through exports to the euro area and firms importing input goods from the euro area acquire more information about the exchange rate of the Swiss franc to the euro. Similarly, households who do more shopping abroad or who work for an exporting firm acquire more information about the exchange rate.

Next, we provide evidence consistent with the prediction that higher costs of acquiring and processing of information are associated with lower levels of information acquisition. Importantly, in models of endogenous information acquisition, perceived rather than actual costs of information acquisition and processing shape agents' information demand. Employing novel survey questions directly eliciting these perceived costs, we detect strong negative correlations with acquisition of exchange rate information within our household sample.

The most central part of our surveys are simple experiments that we use to examine the causal effect of perceived exchange rate uncertainty on information demand. We first provide all respondents with information about the CHF-euro exchange rate at the time of

the survey and with the same forecast of the *level* of the exchange rate 12 months after the survey. Then, respondents are randomly assigned to receive differential truthful expert forecasts about the probability mass that the exchange rate will fall into a narrow interval around the forecast of its level. Respondents in the high uncertainty arm receive an expert forecast indicating that the percent chance that one year after the survey the exchange rate will be close to the forecast of its level is 30%, while respondents in the low uncertainty arm receive a forecast indicating that this chance is 90%. Then, we elicit all respondents' posterior beliefs about exchange rate uncertainty. Moreover, we measure their demand for an exclusive special report about the future development of the exchange rate provided by the most renowned economic forecasting institute in Switzerland, which would be compiled and sent to respondents three months after the survey.

Our approach provides a non-deceptive way to generate exogenous variation in the second moment of people's beliefs, holding fixed the first moment. By comparing the demand for information between respondents in the high and the low uncertainty arm we can obtain causal evidence on the role of perceived uncertainty in driving information demand. Our experimental design overcomes issues related to omitted variable bias, reverse causality or measurement error, which could bias correlational estimates in a direction that is unclear ex-ante. Based on our experimental estimates we document that firms' demand for the special report on the future development of the exchange rate causally increases in perceived exchange rate uncertainty, consistent with models of endogenous information acquisition. For households, demand for this special report is inelastic to an exogenous shift in exchange rate uncertainty.

We contribute to a literature on the importance of information frictions in macroeconomic expectation formation (Coibion and Gorodnichenko, 2012, 2015). Information frictions offer an explanation for the widely documented disagreement in the macroeconomic expectations of households (Carroll, 2003; Giglio et al., 2021; Mankiw et al., 2003), firms (Coibion et al., 2018; Link et al., 2021b) and experts (Andrade and Le Bihan, 2013; Doern et al., 2012). Macroeconomic models of endogenous information acquisition, such as models of rational inattention, explain information frictions as arising endogenously

from a trade-off between the costs and benefits of acquiring information (Mackowiak and Wiederholt, 2009; Reis, 2006; Sims, 2003). Consistent with these models, our evidence highlights important roles for stake size and information acquisition and processing costs in shaping information demand. However, the prediction that information acquisition responds to changes in (perceived) economic conditions, such as changes in uncertainty of the variable of interest, only finds support in our firm sample but not in our household sample. One possible way to model information acquisition consistent with our findings would be to allow firms to endogenously decide what information to acquire in every period, while households in period zero endogenously decide about future information acquisition but do not re-adjust in response to changes in economic conditions.

Only few papers have provided direct causal evidence on the predictions of theories of macroeconomic information acquisition in applied settings. Roth et al. (2021b) show that US households who learn of a higher exposure to unemployment risk during recessions increase their demand for an expert forecast about the likelihood of a recession, in line with information acquisition depending on stake size. Fuster et al. (2020) show that, among a sample of US households, information acquisition regarding future home price developments increases in exogenously higher monetary incentives for prediction accuracy. Beyond testing for rational motives of information acquisition, Faia et al. (2021) and Chopra et al. (2021) provide evidence consistent with confirmation bias in information selection, and D’Acunतो et al. (2021a) show that committee diversity matters for acquisition of Fed-related information by under-represented groups.<sup>2</sup> Our paper advances this literature in two ways: first, we provide novel evidence on the effects of uncertainty on information acquisition. Second, we provide new causal evidence on drivers of information acquisition among firms.<sup>3</sup>

Other papers have used observational data to study the drivers of information fric-

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<sup>2</sup>For a review of the literature on information acquisition in applied settings, see Capozza et al. (2021).

<sup>3</sup>At a general level, we contribute to a growing empirical literature studying macroeconomic expectation formation and the role of these expectations in the decisions of households and firms (Andre et al., 2021a,b; Bachmann et al., 2015; Bailey et al., 2018; D’Acunतो et al., 2021b; Kuchler and Zafar, 2019; Link et al., 2021a; Roth et al., 2021a).



tions. Coibion et al. (2018) document that firms' knowledge about recent inflation is systematically correlated with proxies for their incentives to process or track such information. Ciani et al. (2019) provide evidence that information acquisition costs affect information demand in the context of pension reform expectations. Our findings are consistent with work by Coibion and Gorodnichenko (2012), who show that information frictions are most pronounced for less volatile macroeconomic variables, that beliefs about most variables adjust more slowly to shocks during the period of the Great Moderation, and that the rigidity of expectations drops during recessions, when volatility is higher. Our paper provides evidence of a behavioral mechanism that could be underlying these time series patterns.

Our paper also relates to a small but growing literature on the measurement and consequences of macroeconomic uncertainty (Baker et al., 2016; Bloom, 2009, 2014; Bloom et al., 2018). Only few papers have studied the drivers and consequences of households and firms' uncertainty about the (macroeconomic) environment. Bachmann et al. (2013) use survey expectations data to construct empirical proxies for time-varying business-level uncertainty. Bachmann et al. (2021) study how firms' uncertainty about sales growth is related to changes in sales growth. Bachmann et al. (2020) document an important role for Knightian uncertainty among firms. In a recent study, Coibion et al. (2021a) use an information provision experiment to study how macroeconomic uncertainty affects spending decisions of households. Dibiasi et al. (2021) use hypothetical survey questions to study firms' investment, employment and production responses to uncertainty shocks. Our paper is different from these papers in its focus on testing the prediction of models of endogenous information acquisition on how perceived uncertainty affects information acquisition.

Methodologically, our paper relates to a growing literature using information provision experiments in the contexts of expectations about inflation (Armantier et al., 2016; Cavallo et al., 2017; Coibion et al., 2020a, 2021b, 2020b; D'Acunto et al., 2020), house prices (Armona et al., 2019; Bottan and Perez-Truglia, 2020; Qian, 2020), GDP growth

(Roth and Wohlfart, 2020) or stock returns (Hanspal et al., 2021; Laudenbach et al., 2021).<sup>4</sup> More closely related, Galashin et al. (2020) study the causal effect of information about exchange rates on credit card spending.

## 2 Samples and survey overview

### 2.1 Samples

We first describe the different samples we collected. Online Appendix Table A.1 provides an overview of the different data collections.

**Firm sample** We designed a tailored survey module, which was administered as part of the March/April 2020 wave of the KOF Swiss Economic Institute Investment Survey, a quarterly survey of firms in Switzerland on topics such as business confidence and investment, which aims to be representative of the Swiss economy. The respondents are usually higher-level managers. This dataset has been used in prior research in economics (Drechsel et al., 2015).

Our questionnaire was attached as a voluntary special module to the regular survey. At the end of the regular survey module, respondents were invited to participate in a special module on managerial decision-making. Thus, firm managers did not know that our module was concerned with the exchange rate, and were not aware of being part of an experiment.

Out of the 2,821 firm managers participating in the March/April 2020 survey wave, 1,183 also responded to at least some of our questions. In our main analysis we focus on responses collected until March 20th, before a major outbreak of the coronavirus in Switzerland. We demonstrate robustness of our findings to changing the cutoff date and to using the full sample below. Out of the 679 responses collected until March 20th, we

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<sup>4</sup>See Haaland et al. (2021) for a review of the literature using information provision experiments in economics.

drop nine respondents who give non-sensible estimates of past realizations of macroeconomic variables (e.g. an exchange rate of 50,000 CHF per euro), which may indicate inattention to the survey. We also drop 80 participants who did not respond to any outcome question of interest.

Online Appendix Table A.2 displays summary statistics for the remaining sample of 576 firms that we use in our main analysis, including benchmarks from the full sample of 2,821 firms who participated in the March/April 2020 wave of the KOF Investment Survey. The firm size distribution in our final sample is heavily skewed, with the average firm having 210 employees and the median firm having 41 employees. 37 percent of firms are in manufacturing, while 22 percent are in consumer services and 34 percent in business services. The firms in our final sample are somewhat larger compared to the full sample in terms of both number of employees and overall investment expenditure. They are also somewhat more likely to be in manufacturing or business services, and somewhat less likely to be in consumer services. The composition in terms of part of Switzerland is similar to the full sample. The table also demonstrates that the sample is balanced across the two experimental arms described below.

**Household samples** We conducted our surveys in collaboration with the online panel provider Dynata, which is widely used in the social sciences (de Quidt et al., 2018). The surveys were conducted in March 2020 (Wave 1) and in September 2021 (Wave 2). Thus, Wave 1 of the household survey was conducted at the same time as the firm survey. All respondents to Wave 1 completed the survey until March 20th, such that responses should not be majorly affected by the outbreak of the pandemic. Due to restrictions with the survey provider we only invited individuals from the German-speaking part of Switzerland.

A total of 522 individuals completed Wave 1 at least until the first outcome question, while 1,028 completed Wave 2 at least until the first outcome question. At the median, respondents spent 19.9 and 17.2 minutes responding to Wave 1 and Wave 2 of the household survey, respectively. We drop observations in the top and bottom percentiles of response

time, as very short or very long response time may indicate inattention to the survey.<sup>5</sup> Online Appendix Table A.3 provides summary statistics of the 510 respondents from Wave 1 and the 1,006 respondents from Wave 2 in our final samples, including benchmarks from the Swiss Household Panel (SHP), a representative household survey. Wave 2 of our survey is roughly representative of the German-speaking Swiss population in terms of gender, age, employment status, education and household income. Wave 1 features a somewhat lower average age and a lower fraction of retirees compared to the population, but is otherwise similar. Table A.3 also includes balance checks for the two experimental arms in the survey, which are described in detail below. There are slight differences in terms of the shares of stockowners and of employees in export-oriented firms across experimental arms in Wave 1, but the samples are otherwise balanced. To address any concern, we include a set of controls in our estimations.

## 2.2 Survey overview

In what follows, we provide a brief overview of the content of our surveys. We describe the different survey questions used in the analysis in more detail at the relevant places throughout the paper. The full sets of instructions can be found in online Appendix C. The firm survey and the two waves of the household survey are overall very similar, but differ somewhat in the included background questions, the questions about potential determinants of information acquisition, and smaller aspects of the experimental design. Throughout the paper, we indicate which survey wave is used for the presented piece of evidence.

We start by eliciting a set of basic views and beliefs related to the CHF-euro exchange rate. In particular, respondents report their beliefs about past and future realizations of the exchange rate, as well as their confidence in these beliefs. Subsequently, we ask respondents how important they consider the CHF-euro exchange rate, the unemployment rate and the inflation rate to be for the economic situation of their firm or of their house-

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<sup>5</sup>We have no information on response time in the firm survey.

hold.

The surveys continue with an experimental module, in which survey respondents are exposed to an information treatment shifting their perceived uncertainty about the exchange rate and in which they are offered access to a special report about the exchange rate to be published three months after the survey. The experimental design is described in detail in Section 4 below.

In the final section of the survey, we elicit how often participants acquired information about the exchange rate, the unemployment rate and the inflation rate in the last three months before taking our survey. In addition, we measure a set of background characteristics, such as the share of revenue a firm earns in the euro, or households' perception of the revenue share of exports to the euro area at their employer.

### **3 Descriptive evidence: Stake size, perceived costs, and information acquisition**

Models of endogenous information acquisition predict that agents demand more information about a variable if the variable is more important in their payoff function, and that higher perceived costs of acquiring or processing information result in lower information acquisition (Mackowiak et al., 2021). In this section, we first compare the information acquisition of households with that of firms, for which exchange rate movements should be more important. Similarly, we examine how information acquisition varies with different proxies for stake size within our samples of firms and households. Finally, we examine how households' perceived information acquisition and processing costs are correlated with the amount of information they acquire. The evidence presented in this section does not allow for causal statements, but highlights to what extent the correlational patterns in the data are consistent with models of endogenous information acquisition.

### 3.1 Information acquisition of firms and households

**Perceived importance** We start by comparing information acquisition between households and firms, using Wave 1 of the household survey, which was conducted at the same time as the firm survey. Both households and firms are asked to rate the importance of the exchange rate, the inflation rate, and the unemployment rate for their own economic situation on five-point categorical scales. Figure 1 Panels A-C show the cumulative distributions of responses for each variable separately for households and for firms. Respondents to the firm survey are more likely than households to consider the exchange rate to be important for their own situation. For instance, 59 percent of firm managers rather agree or fully agree that the exchange rate is important for their situation, while this fraction is 44 percent among households. Firms attach substantially higher importance to the exchange rate than to inflation and unemployment, while for households these differences across variables are less pronounced. This underscores that firms in the export-oriented economy Switzerland perceive particularly high stakes in being informed about exchange rate movements. Households perceive somewhat lower stakes, potentially because they are partially insured against the repercussions of exchange rate movements through their employer.

**Information acquisition** To measure information acquisition, households and firms are asked the following question: “How frequently did you gather information about [...] in the last 3 months before taking this survey”? The response scale ranges from “not at all” to “daily”.

Figure 1 Panels D-F display the cumulative distributions of responses for the different macroeconomic variables separately for households and firms. Firms acquire substantially more information about the exchange rate than households. For instance, almost half of the respondents to the firm survey acquire information about the exchange rate at a weekly frequency or more often, while among households this fraction is less than 20 percent. This is consistent with the greater perceived importance of the exchange rate for

own economic outcomes among firms (see Figure 1 Panel A). Naturally, firms and households also differ along other dimensions, such as information acquisition and processing costs, which could contribute to higher information acquisition among firms.

The figure also reveals that firms acquire more information about inflation and unemployment than do households. Moreover, both firms and households report higher information acquisition about the exchange rate than about inflation or unemployment. While this is consistent with potentially higher stakes of being informed about the exchange rate than about other variables, it could also be driven by the higher frequency at which new data on the exchange rate becomes available.

**Recall and expectations of exchange rate realizations** Differences in information acquisition should be reflected in differences in beliefs about past and future exchange rate realizations. For instance, models of information frictions, such as sticky information models (Mankiw and Reis, 2002; Reis, 2006) or rational inattention models (Mackowiak et al., 2021), posit that a higher frequency of updating information sets or obtaining less noisy signals about the economy should reduce the dispersion of expectations and bring expectations closer to objective benchmarks.

Online Appendix Figure A.1 plots the distributions of households' and firms' recollection of the average exchange rates in the years 2013, 2016 and 2019 – seven years, four years, and one year before participating in the survey – including the actual realizations. The figure also displays the distributions of firms' and households' expectations about future realizations of the exchange rate in March 2021 and March 2022 – one and two years after the survey.<sup>6</sup> We compare these distributions to the median expert forecasts taken from a survey of professional forecasters conducted by the KOF Economic Institute shortly before our household and firm surveys. Online Appendix Table A.4 provides different quantitative measures of biases and dispersion of beliefs about past and future exchange rate realizations among households and among firms.

There is substantially more disagreement among households than among firms for

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<sup>6</sup>We winsorize beliefs about the exchange rate at 0.8 and 1.6 CHF per euro to account for outliers.

beliefs at every horizon, according to standard deviation, interquartile range and the difference between the 90th and the 10th percentile across respondents. For instance, the interquartile range of beliefs about the average exchange in 2016 is 0.14 CHF among households and 0.09 CHF among firms. Moreover, firms display significantly lower mean absolute deviations from the benchmarks compared to households at all horizons. For instance, the mean absolute deviation of beliefs from the actual exchange rate realization in 2016 is 0.12 CHF among households, and only 0.06 CHF among firms.

Finally, online Appendix Figure A.2 highlights that firms are also more confident than households in their recall of past exchange rate realizations, while the difference is less pronounced for confidence in expectations about the future. The lower dispersion and greater similarity of beliefs to benchmarks as well as the higher confidence in beliefs among firms are consistent with a higher degree of information acquisition among firms, potentially due to higher stakes.

### **3.2 Stake size and information acquisition within samples of firms and households**

We next examine how information acquisition varies with different proxies for stake size within our samples of firms and households. For households, we focus on data from Wave 2, as it contains particularly rich measures of respondents' stakes related to exchange rate movements.<sup>7</sup> We again use our measure of information acquisition over the three months before taking the survey, and assign values one to six to the different response options (ranging from "not at all" to "daily") and standardize it using the mean and standard deviation in the respective sample. Figure 2 shows binned scatter plots of the association of information acquisition with different proxies for stake size, partialing out a set of controls, among others including measures of information processing and ac-

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<sup>7</sup>A subset of these measures are also available for Wave 1. For this subset, the patterns are very similar across the two waves. The results based on data from Wave 1 are omitted for brevity's sake.



quisition costs in the household sample.<sup>8</sup> All of the partial correlations displayed in the figure are statistically significant at least at the 1-percent level.

Panel A of Figure 2 shows a strong and highly significant positive correlation between firm managers' information acquisition about the exchange rate over the three months before taking the survey and their self-reported overall importance of exchange rate movements for economic outcomes of their firm. Panel B demonstrates similar patterns using the fraction of firm revenue generated through exports to the euro area as a proxy for exposure to exchange rate risk. Specifically, a 10 percentage point higher share of exports to the euro area is associated with a 0.11 standard deviation higher information acquisition.

Panels C to H show results for the household sample. Panel C highlights a strong and highly statistically significant positive relationship between information acquisition and households' perceived overall importance of exchange rate movements for their own economic outcomes. Panel D confirms this relationship using the respondent's estimate of her employer's share of revenue earned through exports to the euro area as proxy for stake size. In particular, a 10 percentage point higher share of exports to the euro area of the respondent's firm is associated with a 0.09 standard deviation higher information acquisition before the survey. Panel E highlights that employees of firms that import goods from the euro area, whose costs depend on the exchange rate, acquire significantly more exchange rate-related information. The higher information acquisition among employees of exporting and importing firms is consistent with a role for exchange rate movements in shaping people's perceived labor income risk, which we confirm in Section 4.6 below.

In addition, we exploit the fact that due to the higher price level in Switzerland, many Swiss individuals regularly go shopping in the neighboring countries, which belong to the euro area (Auer et al., 2021b). Movements in the exchange rate are of direct importance to the cost of living faced by these individuals. Consistent with this, acquisition of exchange rate information is significantly negatively associated with the distance to the closest border in terms of minutes by car (Panel F), and significantly positively associ-

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<sup>8</sup>Throughout the paper, we code missings in the control variables as zeros and include dummies indicating missings in the different controls.

ated with the number of times a household went shopping in the euro area in the three months before the survey (Panel G). Finally, individuals that have traveled more often to the euro area over the 12 months before taking the survey report significantly higher levels of information acquisition (Panel H).

Taken together, our first main result is the following:

**Result 1.** *Firms perceive a greater exposure to the exchange rate than households, which is reflected in higher information acquisition, lower belief dispersion and smaller distance of beliefs to objective benchmarks. Moreover, within our samples of firms and households, information acquisition increases in several proxies for exposure to exchange rate risk. These patterns are consistent with higher stake size leading agents to acquire more information – a core prediction of macroeconomic models of endogenous information acquisition.*

Online Appendix Figure A.3 confirms the patterns on firms' and households' self-reported exposure and information acquisition in the contexts of the unemployment and the inflation rate.

### 3.3 Information acquisition and processing costs of households

Another core prediction of models of endogenous information acquisition is that the perceived costs of acquiring and processing information negatively affect the amount of information agents acquire (Mackowiak et al., 2021). While previous literature has focused on proxies for actual processing costs such as IQ (D'Acunto et al., 2021b), we included direct measures of *perceived* information processing and acquisition costs in Wave 2 of the household survey.<sup>9</sup> To elicit perceived information acquisition costs, we ask respondents to imagine that they wanted to inform themselves about the development of the economy (e.g. exchange rate fluctuations) in Switzerland. We then ask them how difficult it would be for them to find relevant information about the development of the economy. To elicit perceived processing costs, we ask our respondents how difficult they typically

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<sup>9</sup>It was not possible to include such measures in our firm survey.

find it to understand and interpret information about the economy (e.g. exchange rate fluctuations).

Table 1 shows that information acquisition and processing costs are strongly negatively associated with the amount of information respondents acquired over the three months before the survey. Specifically, a one standard deviation increase in perceived acquisition costs is associated with a 0.17 standard deviations reduction in information acquisition (column 1), while a one standard deviation higher cost of processing information is associated with a 0.29 standard deviations lower information acquisition (column 4). The magnitudes remain almost unchanged if we control for holding at least a high school degree and the respondent's score in a short numeracy test included in our survey (columns 2 and 5) – proxies for actual costs of acquiring and processing information faced by the respondents. Indeed, perceived information acquisition and processing costs are only weakly correlated with holding a high school degree and the respondent's numeracy score.<sup>10</sup> The partial correlation of information acquisition with perceived costs is stronger than the partial correlation with proxies for actual costs, and is robust to including additional control variables including a measure of stake size (columns 3 and 6). Finally, when jointly including acquisition and processing costs, only processing costs remain significant (column 7). While this suggests that processing costs are potentially more important in shaping information demand, this result should be interpreted cautiously given the high correlation between perceived acquisition and perceived processing costs (bivariate correlation coefficient of 0.605).

Taken together, our second main result is the following:

**Result 2.** *Households who perceive higher costs of acquiring or processing information acquire significantly less exchange rate-related information, consistent with models of endogenous information acquisition.*

The evidence reported in this section is purely descriptive, and exchange rate exposure

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<sup>10</sup>The bivariate correlation coefficient of perceived processing (acquisition) costs with holding a high school degree is -0.067 (-0.074), and the correlation coefficient with the respondent's numeracy score is -0.005 (0.033).

and perceived information acquisition and processing costs could be correlated with other factors influencing information demand. In the next section we provide causal evidence on another prediction of models of endogenous information acquisition.

## **4 Experimental evidence: Uncertainty and information acquisition**

Theories of endogenous information acquisition predict that an increase in the perceived uncertainty of the variable of interest leads to an increase in the amount of information agents acquire about that variable (Mackowiak et al., 2021; Reis, 2006; Sims, 2003). Correlational estimates of the relationship between perceived uncertainty and information demand could be biased in a direction that is unclear ex-ante. First, omitted variables such as cognitive abilities could drive both perceived uncertainty and demand for information. Second, reverse causality is plausibly important, given that holding more information may reduce people’s perceived uncertainty. Finally, (classical) measurement error in perceived uncertainty could lead to attenuation bias of coefficient estimates. In this section, we overcome these issues using an experiment that allows us to study the causal effect of perceived uncertainty on information demand.

### **4.1 Experimental Design**

We focus the design description on the firm survey, which was conducted in March 2020. The design of Wave 2 of the household survey is very similar except for slight differences in the belief elicitations and the information treatment, reflecting the different date (September 2021) and the different level of the exchange rate at the time of the survey (1.09 CHF per euro in September 2021 vs 1.06 CHF per euro in March 2020). The experimental design used in Wave 1 of the household survey, which was conducted simultaneously with the firm survey in March 2020, uses a somewhat different outcome measure, as is explained in more detail below. Online Appendix C provides the full set of experimental

instructions.

**Prior beliefs** We start by informing all respondents that the KOF macroeconomic model predicts that the exchange rate will be 1.06 CHF per euro on average in March 2021, one year after the survey, equivalent to a no-change forecast.<sup>11</sup> The purpose of this information is to hold constant the first moment of respondents' beliefs across treatment arms. We then ask them to estimate the percent chance that the CHF-EUR exchange rate in March 2021 will on average be somewhere between 1.04 CHF per euro and 1.08 CHF per euro, i.e. within a range of plus/minus 0.02 CHF around the KOF forecast of its level. This provides us with a proxy for the respondent's prior perception of exchange rate uncertainty.

**Information treatment** To experimentally manipulate respondents' perceived exchange rate uncertainty, we randomly assign them into two groups of equal size. Respondents then receive one of two truthful forecasts, which are taken from surveys of professional forecasters run by the KOF institute shortly before our surveys of households and firms. Specifically, our respondents receive a message of the following type:

According to an expert that regularly participates in the KOF expert surveys on economic forecasts, the probability that the CHF-EUR exchange rate in March 2021 will on average be somewhere between 1.04 CHF per euro and 1.08 CHF per euro is **90% [30%]**.

This means that according to this expert, with a probability of **10% [70%]** the CHF-EUR exchange rate will be on average somewhere outside this range (i.e. above 1.08 CHF per EUR or below 1.04 CHF per EUR).

where the probability that the exchange rate will be between 1.04 and 1.08 CHF per euro

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<sup>11</sup>In Wave 2 of the household survey, which was conducted in September 2021, respondents are given a no-change forecast of an average exchange rate of 1.09 CHF per euro in September 2022. In line with this, all the CHF values mentioned in the rest of the design description are higher by 0.03 CHF in Wave 2 of the household survey, and all calendar dates mentioned in the instructions are moved into the future by one and a half years.

is 90% in the low uncertainty treatment and 30% in the high uncertainty treatment.<sup>12</sup>

Our experimental design employs an active control group, i.e. all participants are provided with (differential) information to generate differences in respondents' beliefs, which we can in turn use to study the causal effect of perceived uncertainty on information demand. This has several advantages compared to an alternative design that provides a random subset of respondents with information and another subset (a passive control group) with no information (Haaland et al., 2021). First, receiving information about the future development of the exchange rate increases the stock of information about the exchange rate respondents have available. Second, receiving information makes the exchange rate salient to respondents. Both of these issues by themselves could affect respondents' demand for exchange rate information, and are therefore particularly relevant when information acquisition is the main outcome of interest. In our active control group design, these effects should be constant across treatment arms. Third, identification in the alternative design hinges on the respondent's prior belief, which determines the expected direction and strength of the information treatment. Prior beliefs, however, are likely correlated with other characteristics, such as cognitive abilities, which may themselves affect individuals' demand for information and its elasticity to perceived exchange rate uncertainty. In addition, prior beliefs are likely measured with error, which may attenuate estimated treatment effects depending on the prior. In our design, where all respondents are provided with (differential) information, the identifying variation is orthogonal to prior beliefs.

**Measuring belief updating** The goal of our experimental manipulation is to shift the second moment of respondents' beliefs about the future exchange rate, leaving the first moment unchanged. We thus need to measure the full density distribution of each respondents' posterior beliefs about the exchange rate. Following state-of-the-art measurement techniques proposed by Manski (2004, 2017), we elicit the respondents' perceived

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<sup>12</sup>The probabilities provided to respondents in the different arms are identical for Wave 2 of the household survey conducted in September 2021, where similar forecasts were available in the corresponding expert survey.

probabilities that the average exchange rate in March 2021 will fall into one of five bins, which are mutually exclusive and collectively exhaustive. We construct the respondent-level mean and standard deviation of the subjective distribution using the midpoints of these bins.<sup>13</sup>

**Measuring the demand for information** Then, we measure our respondents' demand for exclusive information about the exchange rate. We show our respondents the following instructions.

The KOF offers the participants in this survey exclusive access to one of three new detailed special reports. These special reports will be compiled and sent out in June 2020, and will account for all relevant developments until this point.

You can now decide whether you would like to receive one of these special reports, and if so, which one of these three special reports you would like to receive. These special reports will not be made publicly available.

We further explain to our respondents that the special reports contain an exclusive expert interview, exclusive model predictions and details on expert forecasts. We also tell them that there are in total three special reports, one for the exchange rate, one for the inflation rate, and one for the unemployment rate. Moreover, we emphasize that they can only receive one of the three special analyses. Respondents to the firm survey are informed that they will receive their selected report from the KOF institute three months after the survey, while respondents to the household survey are told that they can sign up for a reminder email from the survey provider and they receive a link to a website where the report will be published.<sup>14</sup> Then our respondents choose which of the three reports they

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<sup>13</sup>We use the following five bins: less than 0.94 CHF; between 0.94 and 1.04 CHF; between 1.04 and 1.08 CHF; between 1.08 and 1.18 CHF; more than 1.18 CHF. We assign 0.89 and 1.23 CHF per euro to the lowest and the highest bin, respectively.

<sup>14</sup>At the end of Wave 2 of the household survey, 51 percent of respondents who previously chose to receive a report (corresponding to 29 percent of the full sample) indicate that, on top of the link to the website, they want to receive a reminder message once the report is published. This underscores the high interest among our respondents in receiving the information.

would like to receive, or whether they prefer not to receive any report.

With our measure of information acquisition we capture changes in behavior along two margins. First, respondents can decide between receiving a report and not receiving a report. Second, participants can choose between forecasts on three different variables – the unemployment rate, the inflation rate and the exchange rate. These features capture two theoretically relevant margins of information acquisition in models of endogenous information acquisition: First, agents optimally choose how much attention to pay overall, e.g. how much time to spend on collecting information (Mackowiak and Wiederholt, 2009; Maćkowiak and Wiederholt, 2015). Second, agents choose how to allocate attention across different signals (Mackowiak and Wiederholt, 2009).

Our measure of information demand has several notable features: First, the KOF economic institute is well-known and highly reputable in Switzerland, which means that respondents will likely perceive the report as containing credible and trustworthy information. Second, we explicitly tell respondents that the reports will not be made publicly available, which implies that there is no concern that respondents think they can get access to the reports through alternative ways than our survey. Third, since the reports will be released a few months after the time of the survey and will account for all relevant developments until this point, respondents will not perceive the reports as containing only information that they may have already acquired at the time of the survey.

Online Appendix Table A.5 shows that respondents' demand for the different reports is strongly positively correlated with self-reported information acquisition about the exchange rate, inflation and unemployment over the three months prior to the survey.

**Summary** Taken together, our design provides a non-deceptive way to generate exogenous variation in the second moment of people's beliefs, holding fixed the first moment. By comparing the demand for information between respondents in the high and the low uncertainty arm we can obtain causal evidence on the role of perceived uncertainty in driving information demand. Given that the treatment was randomly assigned, our experimental estimates are immune to concerns related to omitted variable bias, reverse



causality or measurement error, which could bias correlational estimates in a direction that is unclear ex-ante.

## 4.2 Results: Firms

We first present the experimental results in our firm sample.

**Exchange rate expectations** We start by discussing our first-stage evidence on the effects of the information treatment on perceived exchange rate uncertainty. Figure 3 shows the average posterior probabilities the firm managers assign to different future exchange rate realizations in the low (Panel A) and high uncertainty arms (Panel B). In both arms, respondents assign the highest probability to the bin in the middle, which contains the no-change forecast of 1.06 CHF per euro. We had provided this as the forecast of the KOF macroeconomic model to all respondents before the belief elicitation. Respondents view the probabilities of appreciations and depreciations of the Swiss franc as close to symmetric in both treatment arms. The key difference between the two treatment arms is that respondents in the high uncertainty treatment attach higher probabilities to appreciation and depreciation scenarios compared to respondents in the low uncertainty arm.

To quantify the (differential) effect of being assigned to the high uncertainty instead of the low uncertainty arm on different properties of respondents' posterior beliefs about the exchange rate, we estimate specifications of the following type:

$$\text{Posterior}_i = \alpha_0 + \alpha_1 \text{High Uncertainty} + \mathbf{\Pi}^T \mathbf{X}_i + \varepsilon_i \quad (1)$$

where  $\mathbf{X}_i$  is a parsimonious set of controls, including the firm's share of revenue earned through exports to the euro area, the perceived importance of the exchange rate, the respondents' prior expectations about the exchange rate in March 2021 and in March 2022, and the respondent's confidence in these predictions.  $\varepsilon_i$  is the error term. Throughout our analysis we employ robust standard errors.

Panel A of Table 2 reveals that the high uncertainty treatment generates a significant increase in exchange rate uncertainty as measured by the standard deviation of respondents' subjective distribution by 0.006 CHF per euro ( $p < 0.01$ ), compared to an average standard deviation of 0.052 CHF per euro in the low uncertainty arm. At the same time, there is no effect on the expected level as measured by the mean of the distribution. This suggests that our experimental manipulation works as intended: it generates a significant shift in perceptions of the second moment, while holding constant the first moment of respondents' beliefs. This in turn allows us to test the key prediction of models of endogenous information acquisition that agents acquire more information about variables with a higher perceived uncertainty.

**Information demand** We estimate the reduced-form effects of receiving the high uncertainty treatment on information demand using the following simple specification:

$$\text{Info Demand}_i = \alpha_0 + \beta_1 \text{High Uncertainty}_i + \mathbf{\Pi}^T \mathbf{X}_i + \varepsilon_i \quad (2)$$

where  $\text{Info Demand}_i$  is a dummy variable for choosing a given report or for choosing no report. Consistent with models of endogenous information acquisition, Panels C and D of Figure 3 and Panel B of Table 2 show an 8 percentage points higher demand for the exchange rate report in the high uncertainty condition compared to a mean of 44 percent in the low uncertainty arm ( $p < 0.05$ ). This effect is driven by a reduction in the share of individuals not wanting to receive any report at all by 6.7 percentage points in the high uncertainty treatment arm compared to a mean of 33 percent among respondents in the low uncertainty condition ( $p < 0.1$ ). There are no significant effects of the uncertainty treatment on respondents' tendency to select the inflation or the unemployment report.

**Robustness** Online Appendix Table A.7 shows robustness checks of our experimental results from the firm sample. Our findings remain similar if we use no controls (Panel B),

or a more parsimonious (Panel C) or a more extensive (Panel D) set of controls than in the main specifications. Moreover, our results are similar if we only use responses collected until March 10th (before the WHO declared the coronavirus to be a pandemic, Panel E) or until March 15th (before the Swiss parliament decided on measures to contain the spread of the virus in Switzerland, Panel F). Moreover, our results are robust to using the full available sample, i.e. including the responses collected until April 30th (Panel G). Effects using this sample remain economically and statistically significant, although both first stage and reduced form somewhat decrease in size.

### 4.3 Results: Households

Our main experimental evidence on households' information demand is based on Wave 2 of the household survey, in which the design was almost identical to the firm survey. We estimate the same specifications as for firms, the only difference being the set of included controls: the respondents' employer's share of revenue earned through exports to the euro area (coding non-employed respondent as zero), the z-scored perceived importance of the exchange rate, the respondents' prior expectations about the exchange rate in March 2021 and in March 2022, the respondents' confidence in these predictions, a dummy variable for being employed, as well as a dummy variable for stockownership.

**Exchange rate expectations** As shown in Panels A and B of Figure 4 and Panel A of Table 3, respondents in the high uncertainty treatment attach higher probability to scenarios with stronger deviations from the status quo compared to respondents in the low uncertainty treatment. The high uncertainty treatment generates a significant increase of 0.005 CHF per euro in the perceived standard deviation ( $p < 0.01$ ), compared to an average perceived standard deviation of 0.055 CHF per euro in the low uncertainty arm. Thus, the first-stage effect on perceived uncertainty is similar in size as in the firm sample. Moreover, as in the firm sample, there is no effect of the treatment on the mean of respondents' subjective distributions over future exchange rate realizations. This in turn

suggests that our treatments successfully shift the perceived uncertainty surrounding the exchange rate without changing its expected level.

**Information Demand** As shown in Figure 4 and Panel B of Table 3, households' likelihood of choosing the different special reports does not differ significantly between the high and low uncertainty treatments. Thus, households' demand for exchange rate information seems to be inelastic to perceived uncertainty. Table A.8 demonstrates robustness of the experimental results in the household sample to various checks. The results are almost identical using no controls (Panel B), a parsimonious (Panel C) or a more extensive (Panel D) set of controls.

Taken together, our second main result is the following:

**Result 3.** *Firms' demand for exchange rate information increases in an exogenous increase in perceived exchange rate uncertainty, in line with models of endogenous information acquisition. Households' demand for exchange rate information is inelastic to perceived exchange rate uncertainty.*

#### **4.4 Robustness to using an alternative measure of households' information demand**

One concern with our experimental results for the household sample is that the exchange rate plausibly affects a fraction of Swiss households mostly through its effects on the unemployment rate and inflation (Auer et al., 2021a; Cravino and Levchenko, 2017). A higher perceived exchange rate uncertainty might therefore lead to a rationally higher demand for information about inflation or unemployment among groups of households, leading to a muted average effect on demand for the exchange rate report.

We address this concern based on data from Wave 1 of the household survey. The experimental design in Wave 1 is almost identical to the design for Wave 2 and the design for firms. The key difference is a somewhat different measurement of information

demand. Specifically, we elicit households' willingness to pay to receive the special report on the exchange rate using a multiple price list. Households make a series of choices between a varying amount of money and receiving the special report. They are informed that ten percent of participants will be selected at random and will have one randomly selected choice implemented. Selected households who obtain the report receive a link to a website where they are told that the special report will be published three months later, and can also register for a reminder email.

46 percent of respondents exhibit a positive willingness to pay for the exchange rate report, and among those, the average willingness to pay is 2.64 CHF. Online Appendix Table A.5 shows that willingness to pay for the exchange rate report is significantly positively associated with self-reported acquisition of exchange rate information over the three months prior to the survey.

We estimate specifications of the same type as for our main evidence. As shown in Panels A and B of online Appendix Figure A.4 and Panel A of online Appendix Table A.6, respondents in the high uncertainty treatment attach higher probability to scenarios with stronger deviations from the status quo compared to respondents in the low uncertainty treatment. The high uncertainty treatment generates a significant increase of 0.014 CHF per euro in the perceived standard deviation ( $p < 0.01$ ), compared to an average perceived standard deviation of 0.052 CHF per euro in the low uncertainty arm. However, as shown in Panel B of Table A.6 and Panels C and D of Figure A.4, households' willingness to pay for the special report on the exchange rate does not differ significantly between the high and low uncertainty treatments. Thus, also a measure of households' demand for exchange rate information that should be unaffected by changes in the demand for inflation or unemployment information is inelastic to perceived uncertainty. Taken together, this evidence confirms the muted effect of perceived uncertainty on households' information demand documented above.

## 4.5 Potential confounds

In this subsection, we discuss three potential concerns about our experimental evidence.

**Experimenter demand effects** One concern with the experimental evidence could be that respondents in the high uncertainty and low uncertainty treatment arms hold different beliefs about the hypothesis we wanted to test, and accordingly adjust their behavior. While recent evidence suggests that demand effects are not a major concern in online experiments (de Quidt et al., 2018), we elicited beliefs about the hypothesis the researchers aimed to test in an open-ended question at the end of Wave 2 of the household survey. The responses to this question reveal that less than 1 percent of participants correctly guess our interest in understanding how perceptions of uncertainty affect the demand for information. Most participants guess that the study tests for knowledge about the economy and the exchange rate. A large fraction of respondents indicate not knowing what hypothesis the researchers aim to test.

**Updating about reliability of expert forecasts** One potential confound of our experiment could be that respondents update their beliefs about the reliability and precision of forecasts by the KOF institute or of experts more generally in response to the treatment. Specifically, respondents in the high uncertainty treatment may view expert forecasts in general as less reliable. This would result in a lower demand for reports about macroeconomic developments. However, in the firm sample, the demand for the exchange rate report increases, while the demand for the inflation and unemployment reports remains unchanged in response to the high uncertainty treatment. This mechanism therefore works in the opposite direction of our main findings, which thus - if anything - constitute a lower bound of the true effect.

**Predictability of exchange rate movements** Another potential concern with our evidence is that respondents to our survey may hold the view that financial markets are efficient and therefore, at any point in time, the best forecast of the future level of the

exchange rate is the current exchange rate. Accordingly, they may perceive the special report as containing no additional value beyond providing an update of the level of the exchange rate three months after the survey, which may result in a low demand for the exchange rate report. However, respondents may not only care about the level of the exchange rate but about the full distribution of potential future exchange rate realizations, and they could perceive the report as providing valuable information about it. More importantly, respondents likely perceive some degree of predictability of the exchange rate going beyond the current level. Indeed, empirical evidence indicates that exchange rates only sluggishly adjust to shocks (Müller et al., 2021). Consistent with this, there is evidence of beliefs in predictability of exchange rate movements even among experts (Bacchetta et al., 2009).

As our results demonstrate, our respondents exhibit high levels of baseline demand for the exchange rate report, suggesting that they do expect the report to contain valuable information.

#### **4.6 Treatment effects on other outcomes**

Our setup also allows us to study how perceived exchange rate uncertainty affects other beliefs and behavior, for which we elicited various measures in the household survey. In online Appendix Table A.9 we present treatment effects on different relevant measures of beliefs and (planned) behavior pooling data from Wave 1 and Wave 2. Learning of a higher exchange rate uncertainty makes households significantly more uncertain about their future earnings ( $p < 0.01$ ; column 2), while the mean of their subjective distribution over future earnings is unchanged (column 1). Yet, the high uncertainty treatment does not significantly affect self-reported intentions about future spending or saving (columns 3-5). While the coefficient estimates go in the directions predicted by theory, they are noisily measured. One promising avenue for future research would be to study how exchange rate uncertainty affects actual spending and saving decisions as measured in scanner or bank account data.

## 5 Conclusion

We use the small open economy Switzerland as a testing ground for macroeconomic models of endogenous information acquisition. First, we show that firms perceive a greater exposure to the exchange rate than households, which is reflected in higher levels of information acquisition and less dispersed beliefs about the exchange rate. Moreover, within our samples of firms and households, information acquisition is strongly positively associated with different proxies for stake size. Second, households who perceive higher costs of acquiring or processing information acquire less information about the exchange rate. Finally, firms' demand for a report about exchange rate developments increases in an exogenously induced increase in the perceived uncertainty of the exchange rate. Households' demand for the exchange rate report, however, is inelastic to an exogenous increase in perceived exchange rate uncertainty. Thus, we find broad support for the predictions of models of endogenous information acquisition, with the exception of the muted effect of perceived uncertainty on households' information demand.

What features would a model consistent with our findings have? On the firm side, agents could decide each period how much information to acquire by trading off costs and benefits of information acquisition. As a result, their information demand responds to changes in economic conditions, such as changes in uncertainty, in line with models of endogenous information acquisition, such as rational inattention models (Mackowiak and Wiederholt, 2009; Mackowiak et al., 2021; Reis, 2006; Sims, 2003). On the household side, agents may decide in period zero about the frequency at which they update their information sets in future periods and not re-optimize their decision later. As a result, more exposed households and households who perceive lower information acquisition and processing costs acquire more information, but their information demand does not respond to changes in economic conditions.

One potential limitation of our evidence is that we mostly focus on information about the exchange rate and the small open economy Switzerland. While we believe that households' and firms' decision-making should not differ fundamentally between our context



and other settings, an interesting avenue for future research would be to study the role of perceived uncertainty on information acquisition in the context of other variables and other countries. Moreover, in light of our findings, a fruitful direction for future research could be to collect panel data with direct measures of information acquisition to better understand to what extent households' and firms' demand for information changes with economic circumstances. At a more general level, our findings call for more research on the determinants of attention and information acquisition in the context of macroeconomic beliefs to inform modeling choices.

From a methodological perspective, our approach of experimentally shifting the second moment of individuals' beliefs while keeping constant the first moment offers a widely applicable method to obtain clean causal evidence on the role of perceived uncertainty in driving belief formation and economic decision-making. For instance, our method could be used to test theories of precautionary saving or to study the role of the perceived riskiness of equity investments in driving portfolio choices of households.

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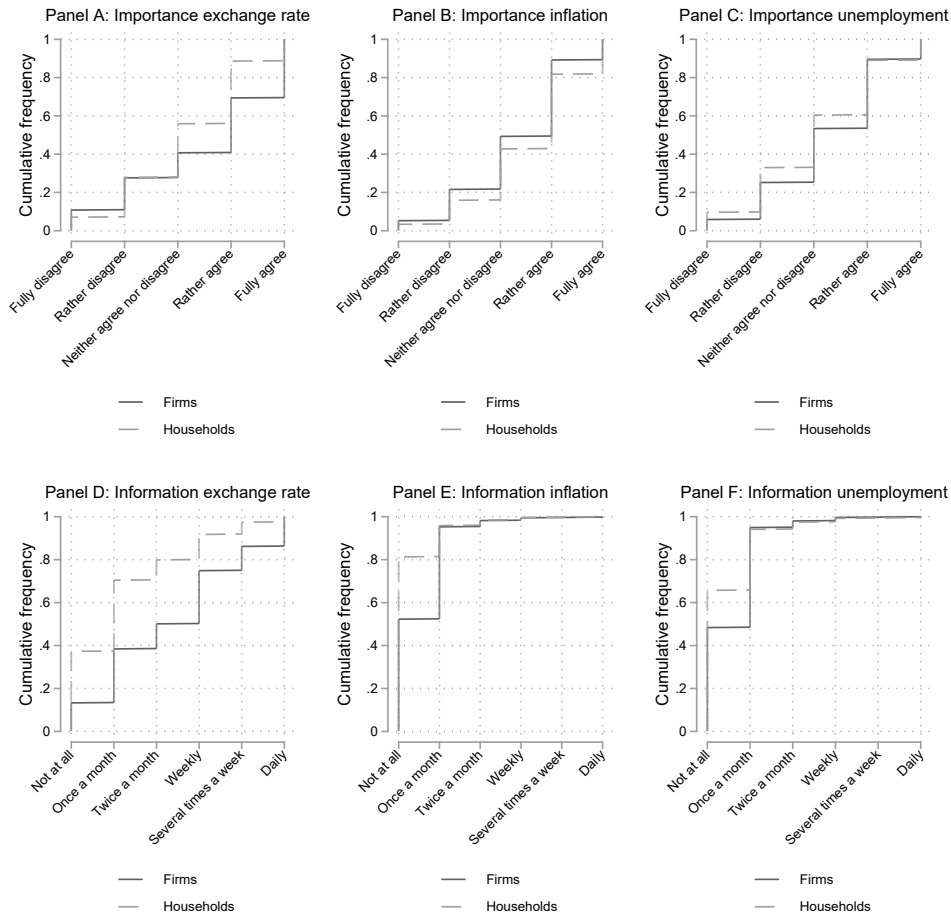
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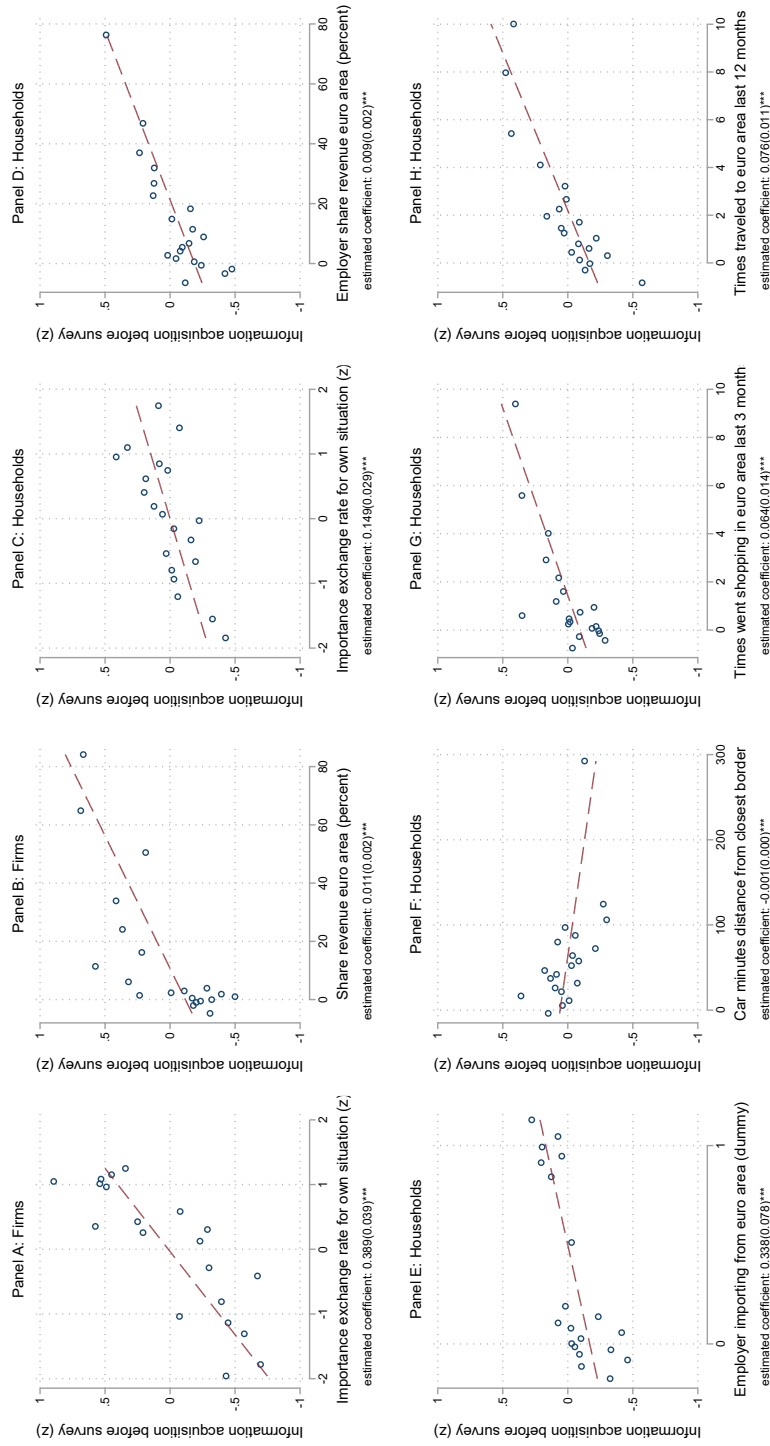
# Main figures

Figure 1: Perceived importance and information acquisition for different macroeconomic variables



*Notes:* This figure displays cumulative distributions of respondents' subjective importance of different macroeconomic variables for their own economic outcomes and their acquisition of information on those variables. The figure focuses on the exchange rate (Panels A and D), the inflation rate (Panels B and E) and the unemployment rate (Panels C and F), and displays the distributions among firms (solid lines) and among respondents from Wave 1 of the household survey (dashed lines). The measures shown in Panels A-C are based on questions eliciting respondents' agreement on a scale ranging from "fully disagree" to "fully agree" to identical statements: "The [...] is important for the economic situation of my firm/household." The measures shown in Panels D-F are based on questions eliciting respondents' answers on a scale ranging from "not at all" to "daily" to identical questions: "How frequently did you gather information about [...] in the last 3 months before taking this survey?"

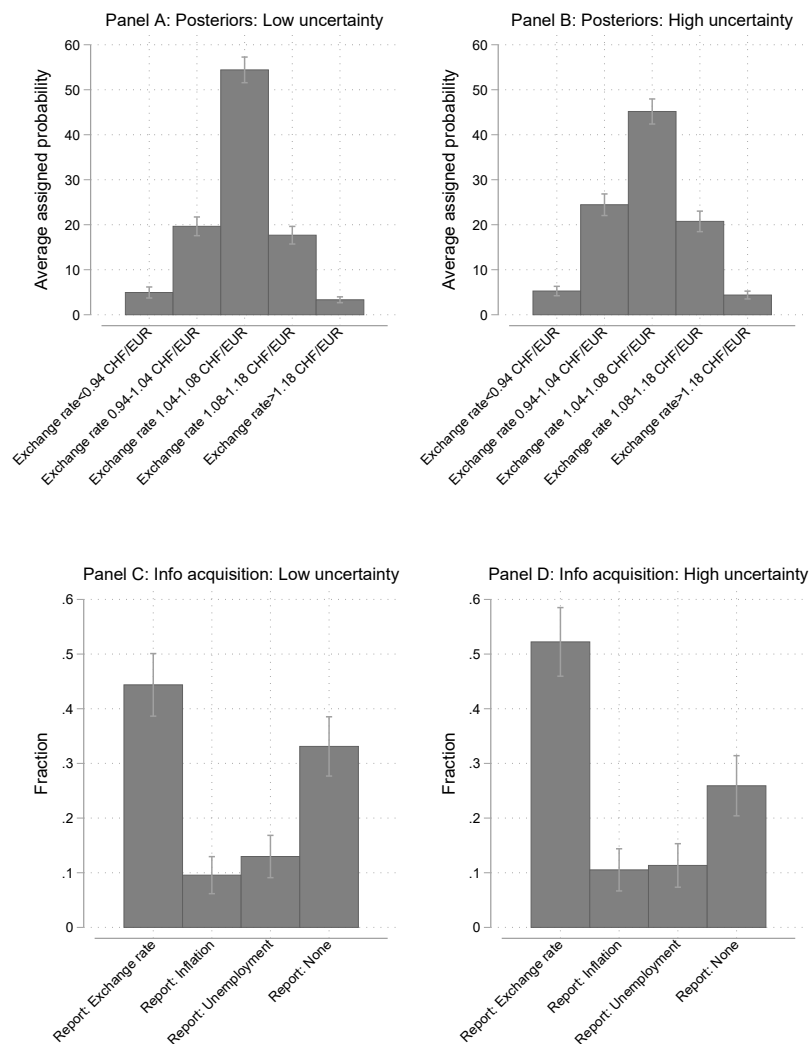
Figure 2: Stake size and acquisition of exchange rate information



Notes: This figure provides binned scatter plots on the relationship between stake size and acquisition of exchange rate information among firms (Panels A and B) and among respondents from Wave 2 of the household survey (Panels C-G). The variables on the y-axes are z-scored transformations of responses to the following question: “How frequently did you gather information about the exchange rate in the last 3 months before taking this survey?”, with responses on a scale ranging from “not at all” to “daily”. The variables on the x-axes are the following: the z-scored transformation of people’s responses to the question “The exchange rate is important for the economic situation of my [firm/household]”, with responses on a scale from “fully disagree” to “fully agree” (Panels A and C); the share of firm revenue generated through exports to the euro area (Panel B); the share of revenue the respondent’s employer earns in the euro area, setting non-employed respondents to missing (Panel D); a dummy indicating whether a respondent’s employer imports goods or services from the euro area, setting non-employed respondents to missing (Panel E); the minutes it takes by car to reach the closest border to the euro area from the respondent’s household’s residence (Panel F); the number of times the respondent went shopping in the euro area over the previous three months (Panel G); the number of times the respondent traveled to the euro area over the previous twelve months (Panel H). All estimations partial out a set of controls, including the log number of employees for firms and including a dummy for females, age, a dummy for holding at least a high school degree, z-scored measures of numeracy, perceived information acquisition costs and perceived information processing costs, log income, a dummy for employed respondents, and dummies for homeownership and stockownership. Robust standard errors are in parentheses. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

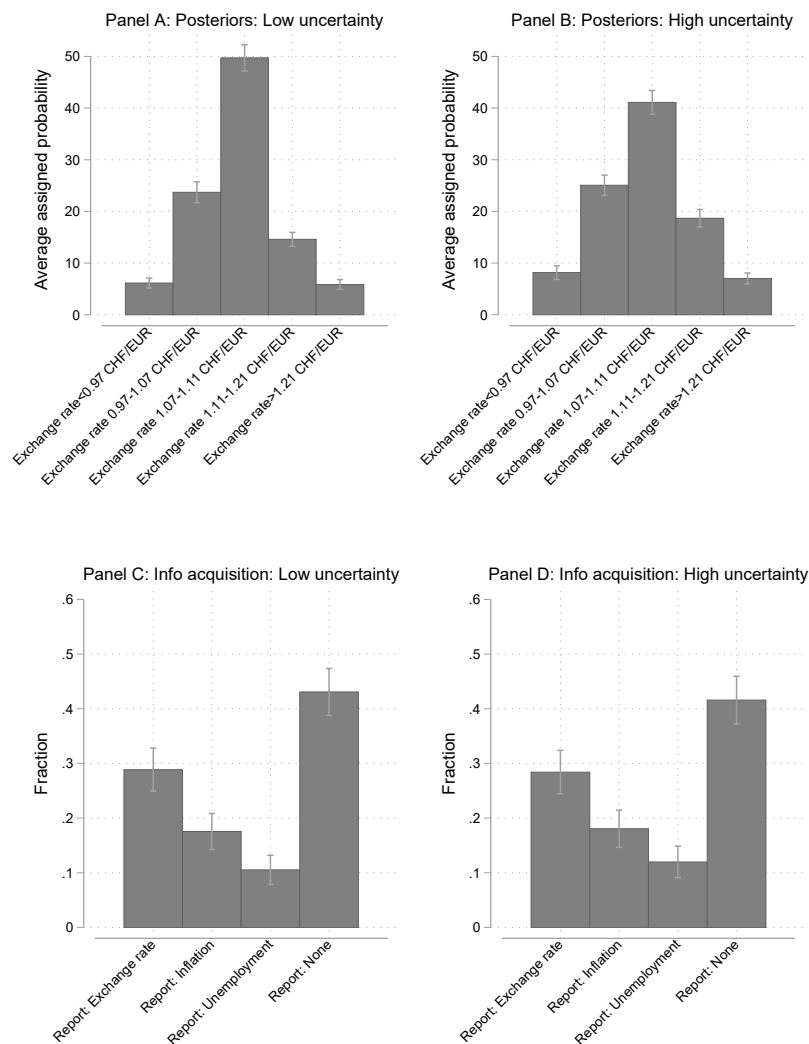


Figure 3: Experimental evidence: Firms



*Notes:* This figure provides experimental evidence on the effect of perceived uncertainty on information acquisition in our sample of firms. Panels A and B shows average posterior perceived probabilities assigned to different realizations of the exchange rate in March 2021, one year after the survey, among respondents in the low uncertainty arm and among those in the high uncertainty arm, respectively. Panels C and D display the fractions of respondents choosing the different reports or no report in the low and in the high uncertainty arm. The figure also displays standard error bands around the means.

Figure 4: Experimental evidence: Households



*Notes:* This figure provides experimental evidence on the effect of perceived uncertainty on information acquisition in our sample of respondents from Wave 2 of the household survey. Panels A and B shows average posterior perceived probabilities assigned to different realizations of the exchange rate in September 2022, one year after the survey, among respondents in the low uncertainty arm and among those in the high uncertainty arm, respectively. Panels C and D display the fractions of respondents choosing the different reports or no report in the low and in the high uncertainty arm. The figure also displays standard error bands around the means.

## Main tables

Table 1: Perceived information acquisition and processing costs and acquisition of exchange rate information: Households

	Exchange rate info before survey (z)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Perceived information acquisition costs (z)	-0.172*** (0.033)	-0.167*** (0.033)	-0.073** (0.031)				0.041 (0.035)
Perceived information processing costs (z)				-0.287*** (0.032)	-0.287*** (0.031)	-0.182*** (0.031)	-0.206*** (0.036)
At least high school		0.136** (0.066)	0.092 (0.062)		0.114* (0.063)	0.083 (0.061)	0.082 (0.061)
Numeracy score (z)		0.064** (0.032)	0.022 (0.029)		0.075** (0.031)	0.032 (0.029)	0.033 (0.029)
Controls	No	No	Yes	No	No	Yes	Yes
R <sup>2</sup>	0.03	0.04	0.18	0.08	0.09	0.20	0.20
Observations	1,006	1,006	1,006	1,006	1,006	1,006	1,006

*Notes:* This table provides correlational evidence on the relationship between perceived information acquisition and processing costs and information acquisition among respondents from Wave 2 of the household survey. The outcome is a z-scored measure of acquisition of information about the exchange rate over the three months prior to the survey. Perceived information acquisition costs are based on the following survey question: "Imagine that you wanted to inform yourself about the development of the economy (e.g. exchange rate fluctuations) in Switzerland. How difficult would it be for you to find relevant information about the development of the economy?", with responses on a scale from "very easy" to "very difficult". Perceived information processing costs are based on the question: "How difficult do you typically find it to understand and interpret information about the economy (e.g. exchange rate fluctuations)?", with responses on a scale from "Very easy" to "Very difficult". These variables are z-scored using their means and standard deviations in the sample. Columns 2-3 and 5-7 control for a dummy for holding at least a high school degree and a z-scored measure of numeracy. Columns 3, 6 and 7 additionally control for a dummy for females, age, log income, a dummy for employed respondents, dummies for homeownership and stock-ownership, and a z-scored measure of the perceived importance of the exchange rate for respondents' own outcomes. Robust standard errors are in parentheses. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

Table 2: Experimental evidence: Firms

	Exchange rate: Mean	Exchange rate: SD	Exchange rate: Prob. <0.94 CHF	Exchange rate: Prob. 0.94-1.04 CHF	Exchange rate: Prob. 1.04-1.08 CHF	Exchange rate: Prob. 1.08-1.18 CHF	Exchange rate: Prob. >1.18 CHF
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Panel A: First stage</b>							
High exchange rate uncertainty	0.001 (0.002)	0.006*** (0.002)	0.362 (0.742)	4.454*** (1.463)	-9.390*** (2.045)	3.403** (1.360)	1.171** (0.519)
Mean dep. var. (low uncertainty arm)	1.056	0.052	4.939	19.648	54.415	17.673	3.325
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.35	0.07	0.12	0.17	0.04	0.23	0.15
Observations	546	546	546	546	546	546	546
	Report: Exchange rate	Report: Inflation	Report: Unemp- loyment	Report: Any other (2)-(3)	Report: None		
	(1)	(2)	(3)	(4)	(5)		
<b>Panel B: Reduced form</b>							
High exchange rate uncertainty	0.083** (0.039)	0.007 (0.026)	-0.024 (0.028)	-0.016 (0.035)	-0.067* (0.038)		
Mean dep. var. (low uncertainty arm)	0.444	0.096	0.130	0.225	0.331		
Controls	Yes	Yes	Yes	Yes	Yes		
R <sup>2</sup>	0.22	0.04	0.06	0.09	0.09		
Observations	540	540	540	540	540		

*Notes:* This table provides experimental evidence on the effect of perceived uncertainty on information acquisition in our sample of firms. Panel A shows estimates of the first stage specification (equation 1) measuring the effect of being randomly assigned to the high uncertainty arm on mean and standard deviation of the respondents' posterior subjective distribution over exchange rate realizations in March 2021, one year after the survey (columns 1-2), as well as posterior probabilities assigned to different bins into which the exchange rate may fall (columns 3-7). Panel B shows estimates of the reduced form specification (equation 2) measuring the effect of being randomly assigned to the high uncertainty arm on dummy variables indicating which report the respondent selects (columns 1-3), whether any non-exchange rate report is selected (column 4), or whether no report is selected (column 5). All specifications control for the firm's share of revenue earned through exports to the euro area, the z-scored perceived importance of the exchange rate for the firm's situation, winsorized prior expectations about the average exchange rate in March 2021 and in March 2022, and the respondents' z-scored confidence in their prior expectations about the future exchange rate. Robust standard errors are in parentheses. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

Table 3: Experimental evidence: Households

	Exchange rate: Mean	Exchange rate: SD	Exchange rate: Prob. <0.97 CHF	Exchange rate: Prob. 0.97-1.07 CHF	Exchange rate: Prob. 1.07-1.11 CHF	Exchange rate: Prob. 1.11-1.21 CHF	Exchange rate: Prob. >1.21 CHF
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Panel A: First stage</b>							
High exchange rate uncertainty	0.001 (0.002)	0.005*** (0.002)	1.993** (0.804)	1.321 (1.413)	-8.995*** (1.735)	4.228*** (1.068)	1.453** (0.690)
Mean dep. var. (low uncertainty arm)	1.083	0.055	6.137	23.702	49.721	14.593	5.847
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.15	0.05	0.06	0.04	0.05	0.08	0.12
Observations	1,006	1,006	1,006	1,006	1,006	1,006	1,006
	Report: Exchange rate	Report: Inflation	Report: Unemployment	Report: Any other (2)-(3)	Report: None		
	(1)	(2)	(3)	(4)	(5)		
<b>Panel B: Reduced form</b>							
High exchange rate uncertainty	0.006 (0.028)	0.004 (0.024)	0.013 (0.020)	0.018 (0.028)	-0.024 (0.030)		
Mean dep. var. (low uncertainty arm)	0.288	0.175	0.105	0.281	0.431		
Controls	Yes	Yes	Yes	Yes	Yes		
R <sup>2</sup>	0.07	0.04	0.02	0.03	0.10		
Observations	1,006	1,006	1,006	1,006	1,006		

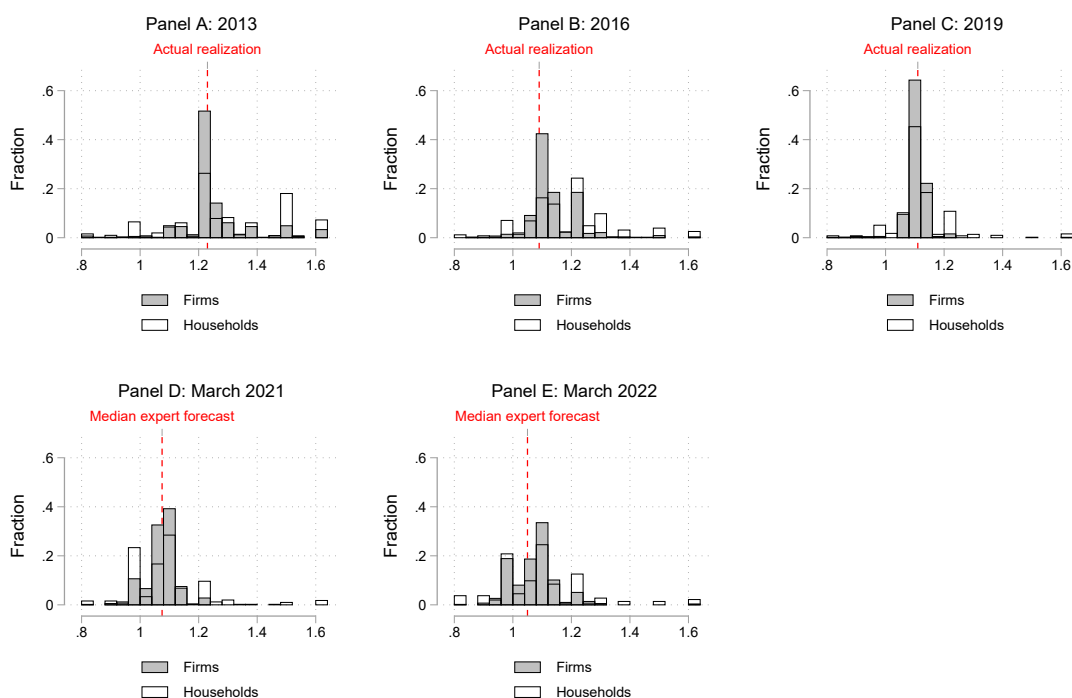
*Notes:* This table provides experimental evidence on the effect of perceived uncertainty on information acquisition in our sample of respondents of Wave 2 of the household survey. Panel A shows estimates of the first stage specification (equation 1) measuring the effect of being randomly assigned to the high uncertainty arm on mean and standard deviation of the respondents' posterior subjective distribution over exchange rate realizations in September 2022, one year after the survey (columns 1-2), as well as posterior probabilities assigned to different bins into which the exchange rate may fall (columns 3-7). Panel B shows estimates of the reduced form specification (equation 2) measuring the effect of being randomly assigned to the high uncertainty arm on dummy variables indicating which report the respondent selects (columns 1-3), whether any non-exchange rate report is selected (column 4), or whether no report is selected (column 5). All specifications control for the respondent's employer's share of revenue earned through exports to the euro area (coding non-employed as zero), the z-scored perceived importance of the exchange rate for the household's situation, winsorized prior expectations about the average exchange rate in September 2022 and in September 2023, the respondents' z-scored confidence in their prior expectations about the future exchange rate, a dummy for employed respondents, and a dummy for stockownership. Robust standard errors are in parentheses. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

# Online Appendix: Uncertainty and Information Acquisition: Evidence from Firms and Households

Heiner Mikosch Christopher Roth Samad Sarferaz Johannes Wohlfart

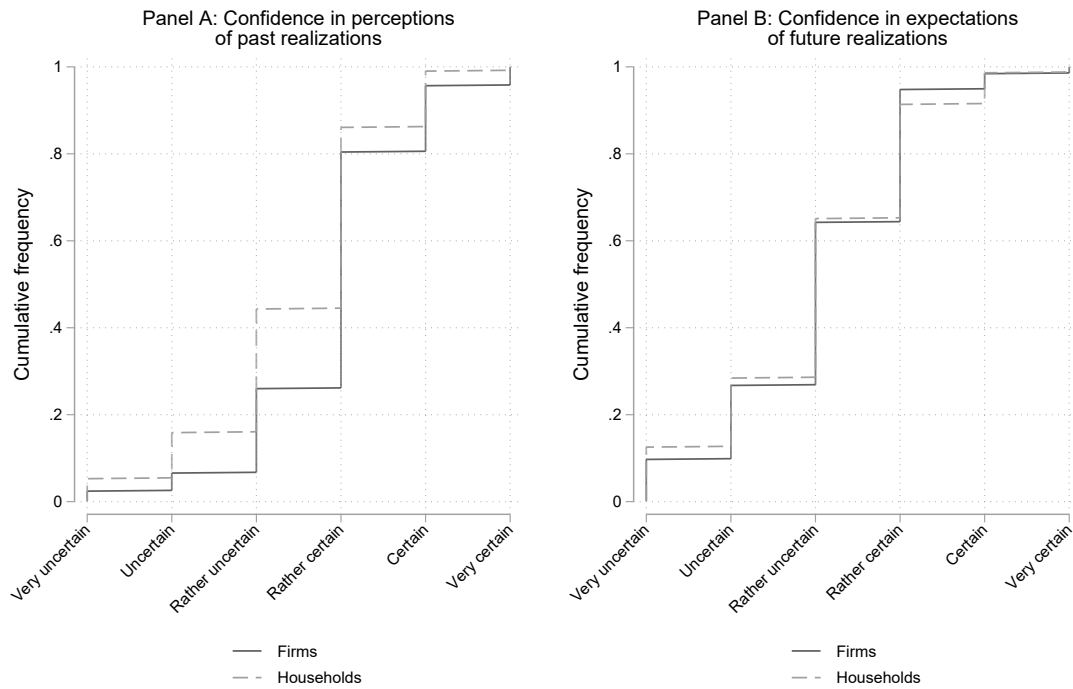
## A Additional figures

Figure A.1: Recall and expectations of exchange rate realizations



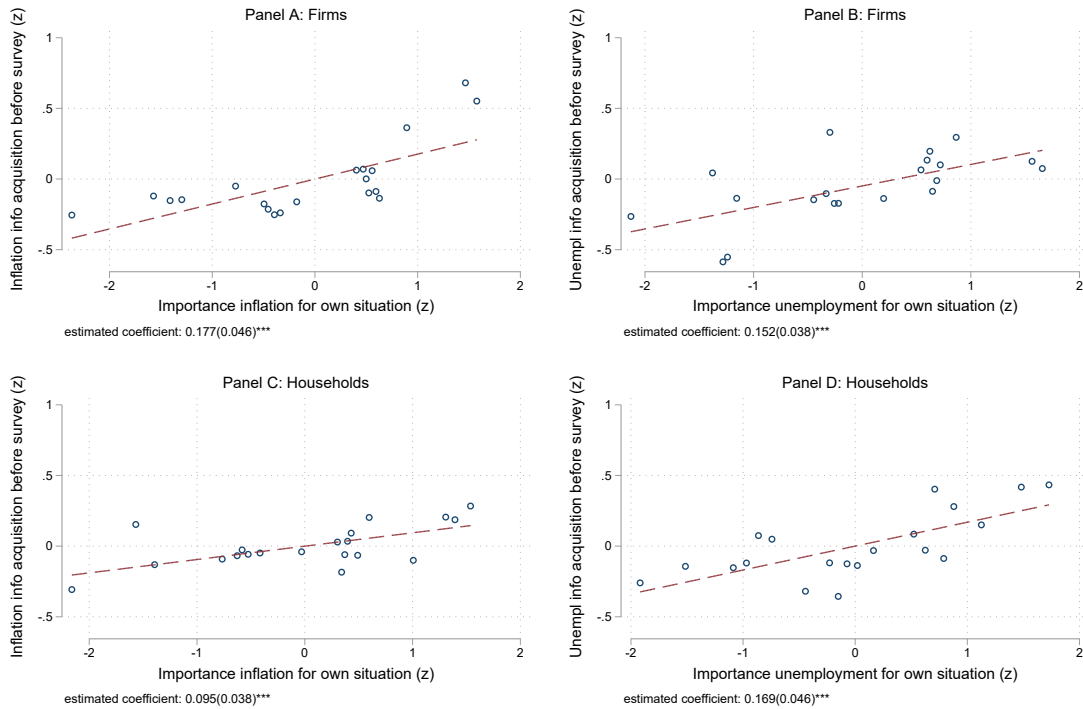
*Notes:* This figure plots distributions of recalled past and expected future realizations of the CHF-euro exchange rate among firms (gray bars) and among respondents from Wave 1 of the household survey (transparent bars). Households and firms are asked to recall the average exchange rate for the years 2013 (Panel A), 2016 (Panel B) and 2019 (Panel C), and to predict the average exchange rate for March 2021 (Panel D) and March 2022 (Panel E). The lines in red are benchmarks, specifically actual realizations for the past and the median forecasts in a survey of experts conducted by the KOF institute for the future. Beliefs about the exchange rate are winsorized at 0.8 and 1.6 CHF per euro to account for outliers.

Figure A.2: Confidence in beliefs about past and future exchange rate realizations



Notes: This figure displays cumulative distributions of confidence in recall of past (Panel A) and expectations of future (Panel B) realizations of the exchange rate among firms (solid lines) and among respondents from Wave 1 of the household survey (dashed lines). Households and firms are asked the identical question on a scale ranging from “very uncertain” to “very certain”: “How certain are you about these estimates?”

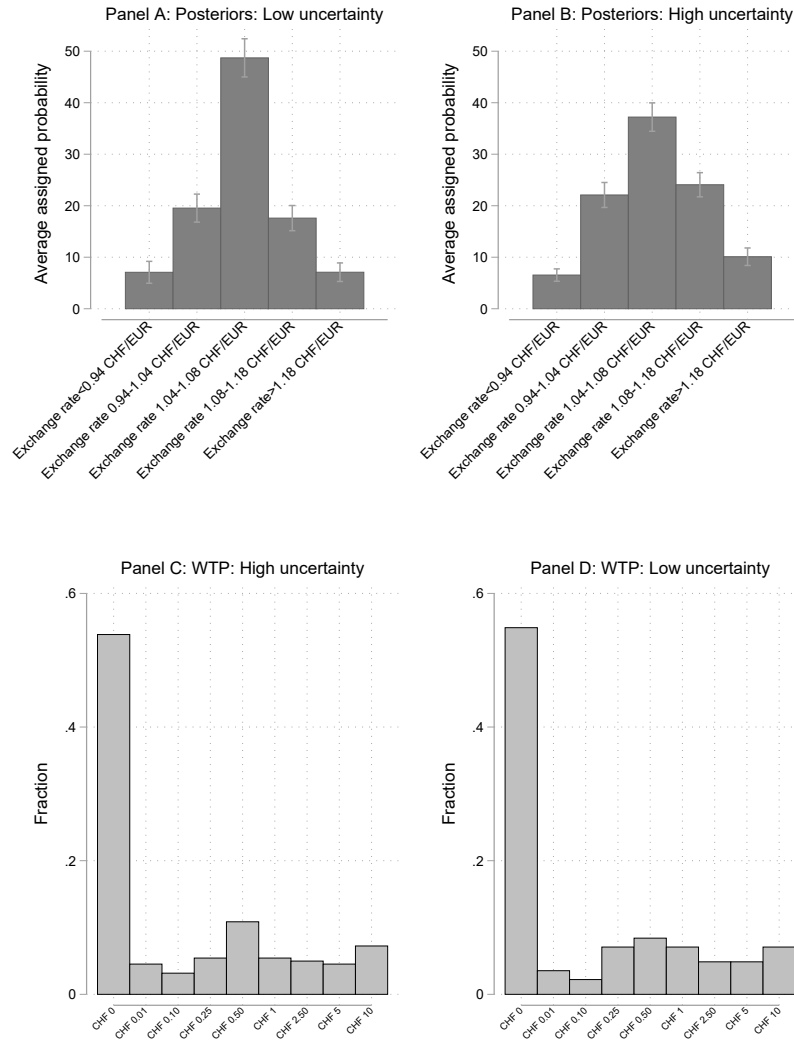
Figure A.3: Stake size and acquisition of inflation and unemployment information



*Notes:* This figure provides binned scatter plots on the relationship between stake size and information acquisition among firms (Panels A and B) and among respondents from Wave 1 of the household survey (Panels C and D). The variables on the y-axes are z-scored transformations of responses to the following question: “How frequently did you gather information about [...] in the last 3 months before taking this survey?”, with responses on a scale ranging from “not at all” to “daily”. In Panels A and C the information acquisition is about the inflation rate, while in Panels B and D it is about the unemployment rate. The variables on the x-axes are z-scored transformations of people’s responses to the question “The [...] is important for the economic situation of my [firm/household]”, with responses on a scale from “fully disagree” to “fully agree”, for the inflation rate (Panels A and C) and the unemployment rate (Panels B and D), respectively. All estimations partial out a set of controls, including the log number of employees for firms and including a dummy for females, age, a dummy for holding at least a high school degree, a z-scored measure of numeracy, log income, a dummy for employed respondents, and dummies for homeownership and stockownership. Robust standard errors are in parentheses. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.



Figure A.4: Robustness of experimental evidence to using willingness to pay: Households



*Notes:* This figure provides experimental evidence on the effect of perceived uncertainty on information acquisition, measured as the willingness to pay for an exchange rate report, in our sample of respondents from Wave 1 of the household survey. Panels A and B shows average posterior perceived probabilities assigned to different realizations of the exchange rate in March 2021, one year after the survey, among respondents in the low uncertainty arm and among those in the high uncertainty arm, respectively, including standard error bands around the means. Panels C and D display histograms of the willingness to pay for the exchange rate report in the low and in the high uncertainty arm.

## B Additional tables

Table A.1: Overview of data collections

<b>Data collection</b>	<b>Sample</b>	<b>Time</b>
Firm Data Collection (N=1,183)	Online surveys with Swiss firms from the KOF firm panel	March and April 2020
Household Wave 1 (N=522)	Online surveys with households from the German-speaking part of Switzerland with Dynata	March 2020
Household Wave 2 (N=1,028)	Online surveys with households from the German-speaking part of Switzerland with Dynata	September 2021

This table provides an overview of the different data collections conducted.

Table A.2: Summary statistics and balance: Firms

	Full sample	Final working sample				Low	High	p-value
	in wave					Uncertainty	Uncertainty	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
	Mean	Mean	Median	SD	N	Mean	Mean	(6) = (7)
German-speaking part	0.76	0.80	1.00	0.40	590	0.78	0.82	0.321
French-speaking part	0.18	0.14	0.00	0.35	590	0.16	0.12	0.153
Italian-speaking part	0.06	0.06	0.00	0.23	590	0.05	0.06	0.809
Sector: Manufacturing	0.31	0.37	0.00	0.48	590	0.38	0.36	0.589
Sector: Construction	0.08	0.07	0.00	0.25	590	0.06	0.07	0.534
Sector: Consumer services	0.29	0.22	0.00	0.42	590	0.22	0.23	0.818
Sector: Business services	0.32	0.34	0.00	0.47	590	0.34	0.34	0.984
Log(Investment Expenditure)	9.34	10.66	12.28	5.33	526	10.67	10.64	0.958
Number of employees	180.44	210.12	41.00	1431.84	557	239.66	175.13	0.597
Share revenue euro area (percent)		14.82	1.00	24.31	531	15.55	13.98	0.458
Uses hedging products		0.36	0.00	0.48	548	0.34	0.37	0.470
Importance exchange rate for own situation (z)		-0.01	0.35	1.00	565	-0.02	0.00	0.825
Exchange rate info before survey (z)		0.01	-0.22	1.00	549	-0.03	0.05	0.381
Expected exchange rate March 2021		1.07	1.07	0.05	574	1.07	1.07	0.946
Confidence in expected exchange rate (z)		-0.03	-0.08	1.00	576	-0.06	0.02	0.359
Prior prob. exchange rate March 2021: 1.04-1.08 CHF		68.92	80.00	21.84	560	69.01	68.83	0.924

*Notes:* This table provides basic summary statistics (columns 2-5) for the final sample of firms completing our special survey module that we use in our baseline analysis, as well as benchmarks for the full set of respondents completing the March/April 2020 wave of the KOF survey (column 1). The table also displays means separately for the low and the high uncertainty arm (columns 6-7), as well as p-values for tests for the equality of these means (column 8). “Investment Expenditure” refers to total investment expenditure in Swiss franc in the year 2019, to which we add value one before taking the log to include zeros.

Table A.3: Summary statistics and balance: Households

	Swiss Household Panel	Full survey sample				Low Uncertainty	High Uncertainty	p-value
	(1) Mean	(2) Mean	(3) Median	(4) SD	(5) N	(6) Mean	(7) Mean	(8) (6) = (7)
<b>Panel A: Households wave 1 (March 2021)</b>								
Female	0.51	0.51	1.00	0.50	510	0.54	0.49	0.327
Age	49.28	39.48	40.00	14.14	510	39.19	39.76	0.652
At least high school	0.44	0.43	0.00	0.50	505	0.42	0.44	0.599
Employed	0.72	0.79	1.00	0.41	510	0.80	0.78	0.538
Unemployed	0.01	0.02	0.00	0.14	510	0.02	0.02	0.731
Retired	0.23	0.04	0.00	0.19	510	0.04	0.03	0.452
Log(Household Income)	11.51	11.22	11.41	0.62	442	11.16	11.28	0.044
Homeowner		0.41	0.00	0.49	504	0.40	0.41	0.817
Stockowner		0.36	0.00	0.48	501	0.32	0.41	0.042
Employer share revenue euro area (percent)		12.50	0.00	18.74	373	10.76	14.22	0.075
Importance exchange rate for own situation (z)		0.00	-0.19	1.00	510	0.03	-0.03	0.518
Exchange rate info before survey (z)		0.00	-0.17	1.00	507	-0.00	0.00	0.990
Expected exchange rate March 2021		1.09	1.08	0.12	510	1.09	1.09	0.642
Confidence in expected exchange rate (z)		0.00	-0.03	1.00	510	-0.02	0.02	0.709
Prior prob. exchange rate March 2021: 1.04-1.08 CHF		67.43	75.00	23.68	510	67.00	67.85	0.686
<b>Panel B: Households wave 2 (September 2022)</b>								
Female	0.51	0.47	0.00	0.50	1,006	0.48	0.47	0.873
Age	49.28	46.63	40.00	17.69	1,006	46.50	46.76	0.817
At least high school	0.44	0.40	0.00	0.49	1,001	0.41	0.39	0.495
Employed	0.72	0.69	1.00	0.46	1,006	0.69	0.69	0.900
Unemployed	0.01	0.03	0.00	0.16	1,006	0.03	0.02	0.489
Retired	0.23	0.18	0.00	0.39	1,006	0.19	0.18	0.787
Log(Household Income)	11.51	11.17	11.16	0.67	880	11.17	11.18	0.841
Homeowner		0.42	0.00	0.49	1,004	0.42	0.42	0.981
Stockowner		0.43	0.00	0.50	1,004	0.42	0.44	0.539
Employer share revenue euro area (percent)		15.16	5.00	20.73	692	15.21	15.11	0.952
Importance exchange rate for own situation (z)		0.00	-0.02	1.00	1,006	0.04	-0.05	0.156
Exchange rate info before survey (z)		0.00	-0.76	1.00	1,006	0.03	-0.04	0.278
Expected exchange rate September 2022		1.12	1.10	0.14	1,006	1.13	1.12	0.173
Confidence in expected exchange rate (z)		0.00	-0.03	1.00	1,006	0.03	-0.03	0.405
Prior prob. exchange rate September 2022: 1.07-1.11 CHF		69.28	75.00	23.34	1,006	69.95	68.59	0.353

Notes: This table provides basic summary statistics (columns 2-5) for Wave 1 (Panel A) and Wave 2 (Panel B) of the household survey, as well as benchmarks for the population (column 1), which are taken from German-speaking households in the Swiss Household Panel (SHP) for households. The table also displays means separately for the low and the high uncertainty arm (columns 6-7), as well as p-values for tests for the equality of these means (column 8). Income is expressed in terms of logs of Swiss franc, and refers to total annual net household income in the year preceding the survey.

Table A.4: Distributions of beliefs

	Firms				Households				p-value (16)					
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)		(10)	(11)	(12)	(13)	(14)
Bench- mark	Mean	Median	SD	p75-p25	p90-p10	Mean abs. bias	N	Mean	Median	SD	p75-p25	p90-p10	Mean abs. bias	N
Exchange rate 2013	1.23	1.25	1.22	0.12	0.05	0.25	573	1.28	1.25	0.19	0.30	0.46	0.15	510
Exchange rate 2016	1.09	1.13	1.10	0.08	0.09	0.13	573	1.18	1.18	0.14	0.14	0.36	0.12	510
Exchange rate 2019	1.11	1.10	1.10	0.04	0.02	0.06	577	1.12	1.10	0.10	0.06	0.15	0.06	510
<i>Expectations:</i>														
Exchange rate March 2021	1.08	1.07	1.07	0.05	0.05	0.11	574	1.09	1.08	0.12	0.10	0.20	0.08	510
Exchange rate March 2022	1.05	1.07	1.08	0.07	0.08	0.15	573	1.09	1.10	0.14	0.15	0.22	0.10	510

*Notes:* This table provides descriptive statistics on respondents' beliefs about past and future realizations of the exchange rate for the firm sample (columns 2-8) and for the sample of respondents from Wave 1 of the household survey (columns 9-15). The benchmarks in column 1 are i) actual realizations for the past and ii) median expert forecasts among a survey of professional forecasters conducted by the KOF institute for the future. The mean absolute biases in columns 7 and 14 are the mean absolute differences between beliefs and the corresponding benchmarks.

Table A.5: Validation of behavioral measures of information acquisition

	Firms				Households wave 1				Households wave 2
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Report: Exchange rate	Report: Inflation	Report: Unemp- loyment	Report: None	WTP: Number forecast	WTP: Number forecast (no incons.)	WTP: Level in CHF	WTP>0	Report: Exchange rate
Exchange rate info before survey (z)	0.183*** (0.021)	-0.019 (0.013)	-0.058*** (0.013)	-0.105*** (0.021)	0.368*** (0.126)	0.375*** (0.137)	0.269* (0.142)	0.067*** (0.024)	0.081*** (0.015)
Inflation info before survey (z)	0.012 (0.027)	0.043*** (0.016)	-0.029 (0.020)	-0.026 (0.031)					
Unemployment info before survey (z)	-0.095*** (0.025)	0.010 (0.014)	0.078*** (0.021)	0.007 (0.028)					
Mean dep. var.	0.485	0.098	0.117	0.299	2.396	2.177	1.203	0.456	0.286
SD dep. var.	0.500	0.298	0.322	0.458	2.730	2.784	2.702	0.499	0.452
R <sup>2</sup>	0.13	0.02	0.06	0.06	0.02	0.02	0.01	0.02	0.03
Observations	528	528	528	528	507	447	447	447	1,006

*Notes:* This table correlates the behavioral measures of information acquisition in the survey with self-reported information acquisition over the three months before the survey. Columns 1-4 focus on the firm sample, columns 5-8 focus on Wave 1 of the household survey, while column 9 focuses on Wave 2 of the household survey. The outcomes are dummy variables indicating which report the respondent selects (columns 1-3 and 9), or whether no report is selected (column 4), the number of times the respondent selects the exchange rate report instead of varying amounts of money in the multiple price list (column 5), the number of times the report is selected dropping those with more than one switching point between receiving the monetary reward and receiving the report (column 6), the level of the willingness to pay for the report in CHF (column 7), and a dummy indicating whether the willingness to pay is positive (column 8). The independent variables are z-scored measures of information acquisition over the three months prior to the survey regarding the exchange rate, inflation, and unemployment. Robust standard errors are in parentheses. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

Table A.6: Robustness of experimental evidence to using willingness to pay: Households

	Exchange rate: Mean	Exchange rate: SD	Exchange rate: Prob. <0.94 CHF	Exchange rate: Prob. 0.94-1.04 CHF	Exchange rate: Prob. 1.04-1.08 CHF	Exchange rate: Prob. 1.08-1.18 CHF	Exchange rate: Prob. >1.18 CHF
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Panel A: First stage</b>							
High exchange rate uncertainty	0.009** (0.004)	0.014*** (0.002)	-0.532 (1.246)	2.834 (1.783)	-12.161*** (2.326)	7.078*** (1.704)	2.780** (1.252)
Mean dep. var. (low uncertainty arm)	1.059	0.052	7.071	19.536	48.706	17.595	7.091
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.14	0.13	0.02	0.09	0.07	0.08	0.13
Observations	510	510	510	510	510	510	510
	WTP: Number forecast	WTP: Number forecast (no incons.)	WTP: Level in CHF	WTP>0			
	(1)	(2)	(3)	(4)			
<b>Panel B: Reduced form</b>							
High exchange rate uncertainty	-0.098 (0.243)	-0.072 (0.264)	-0.003 (0.252)	-0.027 (0.047)			
Mean dep. var. (low uncertainty arm)	2.381	2.172	1.200	0.462			
Controls	Yes	Yes	Yes	Yes			
R <sup>2</sup>	0.03	0.03	0.02	0.03			
Observations	510	447	447	447			

*Notes:* This table provides experimental evidence on the effect of perceived uncertainty on information acquisition, measured as the willingness to pay for an exchange rate report, in our sample of respondents from Wave 1 of the household survey. Panel A shows estimates of the first stage specification (equation 1) measuring the effect of being randomly assigned to the high uncertainty arm on mean and standard deviation of the respondents' posterior subjective distribution over exchange rate realizations in March 2021, one year after the survey (columns 1-2), as well as posterior probabilities assigned to different bins into which the exchange rate may fall (columns 3-7). Panel B shows estimates of the reduced form specification (equation 2) measuring the effect of being randomly assigned to the high uncertainty arm on the number of times the respondent selects the exchange rate report instead of varying amounts of money in the multiple price list (column 1), the number of times the report is selected dropping those with more than one switching point between receiving the monetary reward and receiving the report (column 2), the level of the willingness to pay for the report in CHF (column 3), and a dummy indicating whether the willingness to pay is positive (column 4). All specifications control for the respondent's employer's share of revenue earned through exports to the euro area (coding non-employed as zero), the z-scored perceived importance of the exchange rate for the household's situation, winsorized prior expectations about the average exchange rate in March 2021 and in March 2022, the respondents' z-scored confidence in their prior expectations about the future exchange rate, a dummy for employed respondents, and a dummy for stockownership. Robust standard errors are in parentheses. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

Table A.7: Additional robustness of experimental evidence: Firms

	First stage			Reduced form				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Exchange rate: Mean	Exchange rate: SD	Exchange rate: Prob. 1.04-1.08 CHF	Report: Exchange rate	Report: Inflation	Report: Unemployment	Report: Any other (2)-(3)	Report: None
<b>Panel A: Baseline (until March 20th)</b>								
High exchange rate uncertainty	0.001 (0.002)	0.006*** (0.002)	-9.390*** (2.045)	0.083** (0.039)	0.007 (0.026)	-0.024 (0.028)	-0.016 (0.035)	-0.067* (0.038)
Observations	546	546	546	540	540	540	540	540
<b>Panel B: No controls</b>								
High exchange rate uncertainty	0.000 (0.003)	0.006*** (0.002)	-9.244*** (2.024)	0.079* (0.043)	0.010 (0.026)	-0.016 (0.028)	-0.007 (0.036)	-0.072* (0.039)
Observations	546	546	546	540	540	540	540	540
<b>Panel C: Parsimonious controls</b>								
High exchange rate uncertainty	-0.000 (0.003)	0.006*** (0.002)	-9.203*** (2.034)	0.081** (0.039)	0.010 (0.026)	-0.024 (0.028)	-0.014 (0.035)	-0.067* (0.038)
Observations	546	546	546	540	540	540	540	540
<b>Panel D: Extensive controls</b>								
High exchange rate uncertainty	0.001 (0.002)	0.006*** (0.002)	-9.117*** (2.050)	0.083** (0.039)	0.014 (0.026)	-0.029 (0.027)	-0.015 (0.035)	-0.067* (0.038)
Observations	546	546	546	540	540	540	540	540
<b>Panel E: Until March 10th</b>								
High exchange rate uncertainty	0.000 (0.002)	0.006*** (0.002)	-9.093*** (2.196)	0.071* (0.043)	0.013 (0.029)	-0.012 (0.029)	0.001 (0.038)	-0.072* (0.042)
Observations	481	481	481	475	475	475	475	475
<b>Panel F: Until March 15th</b>								
High exchange rate uncertainty	0.000 (0.002)	0.007*** (0.002)	-9.261*** (2.141)	0.079* (0.041)	0.010 (0.027)	-0.007 (0.028)	0.003 (0.036)	-0.082** (0.040)
Observations	504	504	504	500	500	500	500	500
<b>Panel G: Until April 30th</b>								
High exchange rate uncertainty	0.003 (0.002)	0.006*** (0.001)	-9.599*** (1.579)	0.061** (0.030)	-0.033 (0.022)	-0.007 (0.021)	-0.040 (0.027)	-0.021 (0.030)
Observations	917	917	917	912	912	912	912	912

*Notes:* This table provides robustness checks of the experimental evidence on the effect of perceived uncertainty on information acquisition in our sample of firms. Columns 1-3 show estimates of the first stage specification (equation 1) measuring the effect of being randomly assigned to the high uncertainty arm on mean and standard deviation of the respondents' posterior subjective distribution over exchange rate realizations in March 2021, one year after the survey (columns 1-2), as well as the posterior probability assigned to a realization in the interval 1.04-1.08 CHF per euro (column 3). Columns 4-8 show estimates of the reduced form specification (equation 2) measuring the effect of being randomly assigned to the high uncertainty arm on dummy variables indicating which report the respondent selects (columns 4-6), whether any non-exchange rate report is selected (column 7), or whether no report is selected (column 8). Panels A, E, F and G use the baseline set of controls, including the firm's share of revenue earned through exports to the euro area, the z-scored perceived importance of the exchange rate for the firm's situation, winsorized prior expectations about the average exchange rate in March 2021 and in March 2022, and the respondents' z-scored confidence in their prior expectations about the future exchange rate. Panel B uses no controls. Panel C drops prior expectations about the exchange rate and confidence therein from the baseline set of controls. Panel D adds the perceived importance of inflation and unemployment to the baseline set of controls. Panels A-D use the baseline sample of respondents who completed the survey until March 20th. Panels E-G use the samples of respondents who completed the survey until March 10th, until March 15th, or until April 30th, respectively. Robust standard errors are in parentheses. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.



Table A.8: Additional robustness of experimental evidence: Households

	First stage			Reduced form				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Exchange rate: Mean	Exchange rate: SD	Exchange rate: Prob. 1.04-1.08 CHF	Report: Exchange rate	Report: Inflation	Report: Unemployment	Report: Any other (2)-(3)	Report: None
<b>Panel A: Baseline</b>								
High exchange rate uncertainty	0.001 (0.002)	0.005*** (0.002)	-8.995*** (1.735)	0.006 (0.028)	0.004 (0.024)	0.013 (0.020)	0.018 (0.028)	-0.024 (0.030)
Observations	1006	1006	1006	1006	1006	1006	1006	1006
<b>Panel B: No controls</b>								
High exchange rate uncertainty	0.000 (0.003)	0.004** (0.002)	-8.627*** (1.744)	-0.005 (0.029)	0.005 (0.024)	0.014 (0.020)	0.020 (0.029)	-0.015 (0.031)
Observations	1006	1006	1006	1006	1006	1006	1006	1006
<b>Panel C: Parsimonious controls</b>								
High exchange rate uncertainty	0.000 (0.003)	0.005** (0.002)	-8.717*** (1.739)	0.003 (0.028)	0.004 (0.024)	0.014 (0.020)	0.019 (0.028)	-0.022 (0.030)
Observations	1006	1006	1006	1006	1006	1006	1006	1006
<b>Panel D: Extensive controls</b>								
High exchange rate uncertainty	0.001 (0.002)	0.005*** (0.002)	-8.805*** (1.732)	0.005 (0.028)	0.008 (0.023)	0.011 (0.020)	0.020 (0.028)	-0.024 (0.030)
Observations	1006	1006	1006	1006	1006	1006	1006	1006

*Notes:* This table provides robustness checks of the experimental evidence on the effect of perceived uncertainty on information acquisition in our sample of respondents from Wave 2 of the household survey. Columns 1-3 show estimates of the first stage specification (equation 1) measuring the effect of being randomly assigned to the high uncertainty arm on mean and standard deviation of the respondents' posterior subjective distribution over exchange rate realizations in September 2022, one year after the survey (columns 1-2), as well as the posterior probability assigned to a realization in the interval 1.07-1.11 CHF per euro (column 3). Columns 4-8 show estimates of the reduced form specification (equation 2) measuring the effect of being randomly assigned to the high uncertainty arm on dummy variables indicating which report the respondent selects (columns 4-6), whether any non-exchange rate report is selected (column 7), or whether no report is selected (column 8). Panel A uses the baseline set of controls, including the respondent's employer's share of revenue earned through exports to the euro area (coding non-employed as zero), the z-scored perceived importance of the exchange rate for the household's situation, winsorized prior expectations about the average exchange rate in September 2022 and in September 2023, the respondents' z-scored confidence in their prior expectations about the future exchange rate, a dummy for employed respondents, and a dummy for stockownership. Panel B uses no controls. Panel C drops prior expectations about the exchange rate and confidence therein from the baseline set of controls. Panel D adds the perceived importance of inflation and unemployment to the baseline set of controls. Robust standard errors are in parentheses. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

Table A.9: Experimental evidence on other outcomes: Households

	Earnings growth (percent): Mean	Earnings growth (percent): SD	Probability more saving next 4 weeks (percent)	Non-durables spending growth next 4 weeks (percent)	Probability durables purch. next 4 weeks (percent)
	(1)	(2)	(3)	(4)	(5)
High exchange rate uncertainty	-0.290 (0.478)	0.797*** (0.268)	0.851 (1.657)	-1.229 (1.079)	-0.966 (1.403)
Mean dep. var. (low uncertainty arm)	2.867	5.431	29.089	13.883	18.453
Controls	Yes	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.01	0.06	0.02	0.05	0.03
Observations	1,513	1,513	1,513	1,513	1,513

*Notes:* This table provides experimental evidence on the effect of perceived exchange rate uncertainty on different measures of beliefs and planned behavior in our sample of households, pooling data from Wave 1 and Wave 2. The estimations are based on the reduced-form specification 2, measuring the effect of being randomly assigned to the high uncertainty arm (instead of the low uncertainty arm). The outcomes are the mean and the standard deviation of respondents' posterior perceived distribution over their earnings growth over the next 12 months (columns 1 and 2), the respondent's posterior perceived probability of saving more over the four weeks after the survey than over the four weeks prior to the survey (column 3), the respondent's planned non-durables spending growth over the four weeks after the survey compared to the four weeks prior to the survey (column 4), and the posterior perceived probability of making any major durable purchase over the four weeks after the survey (column 5). All specifications control for the respondent's employer's share of revenue earned through exports to the euro area (coding non-employed as zero), the z-scored perceived importance of the exchange rate for the household's situation, winsorized prior expectations about the average exchange rate in March 2021 and in March 2022, the respondents' z-scored confidence in their prior expectations about the future exchange rate, a dummy for employed respondents, a dummy for stockownership, and a dummy for Wave 2 respondents. Robust standard errors are in parentheses. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

## C Survey instructions

### C.1 Survey instructions translated to English (Firms)

#### Beliefs about the evolution of inflation

In what follows we will ask you some questions about inflation in Switzerland. Inflation refers to the percent increase in the general price level measured by the so-called Consumer Price Index. A decrease in the general price level is called deflation (negative inflation).

What do you think was the inflation rate over the following years?

... 2013: \_\_%

... 2016: \_\_%

... 2019: \_\_%

How certain are you about these estimates?

very certain - certain - uncertain - very uncertain

What do you expect the inflation rate in Switzerland to be over the following time periods?

March 2021 compared to March 2020 in %

March 2022 compared to March 2021 in %

How certain are you about these estimates?

very certain - certain - uncertain - very uncertain

#### Beliefs about the evolution of unemployment

In what follows we will ask you some questions about the unemployment rate in Switzerland.

What do you think was the unemployment rate in the following years?

... 2013: \_\_%

... 2016: \_\_%

... 2019: \_\_%

How certain are you about these estimates?

very certain - certain - uncertain - very uncertain

What do you expect the unemployment rate in Switzerland to be at the following points in time?

Unemployment rate in March 2021: \_\_ %

Unemployment rate in March 2022: \_\_ %

How certain are you about these estimates?

very certain - certain - uncertain - very uncertain

### **Beliefs about the evolution of the exchange rate**

We will now ask you some questions about the exchange rate between the Swiss franc and the euro. What do you think: How many Swiss franc did one have to pay to get one euro in the following years?

2013: \_\_\_ Swiss franc for one euro.

In 2016: \_\_\_ Swiss franc for one euro.

In 2019: \_\_\_ Swiss franc for one euro.

How certain are you about these estimates?

very certain - certain - uncertain - very uncertain

What do you expect the CHF-EUR exchange rate to be at the following points in time?

How many CHF will one have to pay for one euro in March 2021 on average?

How many CHF will one have to pay for one euro in March 2022 on average?

### **Perceived relevance of different macroeconomic variables**

To what extent do you agree with the following statements? (Strongly disagree, disagree, neither agree nor disagree, agree, strongly agree)

The inflation rate is important for the economic situation of my company.

The unemployment rate is important for the economic situation of my company.

The exchange rate of the Swiss franc and the euro is important for the economic situation of my company.

### **Prior beliefs about exchange rate uncertainty**

Please now think about the different things that may happen with the exchange rate of the Swiss franc to the euro in the future.

According to the current forecast of the KOF macro model about the CHF-EUR exchange rate, one will have to pay 1.06 CHF for one euro in March 2021. The KOF macro model is the central model the KOF uses to make economic forecasts for Switzerland.

We now would like to know how certain or uncertain you consider the development of the CHF-EUR exchange rate to be.

What is your estimate of the probability (in %) that the CHF-EUR exchange rate in March 2021 will on average be somewhere between 1.04 CHF per euro and 1.08 CHF per euro?

Please indicate a percent chance between 0 and 100.

### **Information treatment: High uncertainty**

According to an expert that regularly participates in the KOF expert surveys on economic forecasts, the probability that the CHF-EUR exchange rate in March 2021 will on average be somewhere between 1.04 CHF per euro and 1.08 CHF per euro is **30%**.

This means that according to this expert, with a probability of **70%** the CHF-EUR exchange rate will be on average somewhere outside this range (i.e. above 1.08 CHF per EUR or below 1.04 CHF per EUR).

### **Information treatment: Low uncertainty**

According to an expert that regularly participates in the KOF expert surveys on economic forecasts, the probability that the CHF-EUR exchange rate in March 2021 will on average be somewhere between 1.04 CHF per euro and 1.08 CHF per euro is **90%**.

This means that according to this expert, with a probability of **10%** the CHF-EUR exchange rate will be on average somewhere outside this range (i.e. above 1.08 CHF per EUR or below 1.04 CHF per EUR).

## **Post-treatment uncertainty**

We now would like to ask you about your expectations regarding the development of the **CHF-EUR exchange rate in March 2021**.

Please indicate the percent chance that you assign to the different scenarios. The probabilities have to sum to 100 percent.

- less than 0.94 CHF (in %)
- between 0.94 and 1.04 CHF (in %)
- between 1.04 and 1.08 CHF (in %)
- between 1.08 and 1.18 CHF (in %)
- more than 1.18 CHF (in %)

## **Information demand**

The KOF offers the participants in this survey exclusive access to one of three new detailed special reports. These special reports will be compiled and sent out in June 2020, and will account for all relevant developments until this point. You can now decide whether you would like to receive one of these special reports, and if so, which one of these three special reports you would like to receive. These special reports will not be made publicly available.

### **Special report on the exchange rate**

This special report contains an exclusive expert interview, exclusive model predictions and details on expert forecasts on the exchange rate of the Swiss franc to the euro.

### **Special report on inflation**

This special report contains an exclusive expert interview, exclusive model predictions and details on expert forecasts on the Swiss inflation rate.

### **Special report on the unemployment rate**

This special report contains an exclusive expert interview, exclusive model predictions and details on expert forecasts on the Swiss unemployment rate.

For reasons of exclusivity we can unfortunately only offer you one of the three special analyses. Which special analysis would you like to receive?

- Special report on the exchange rate
- Special report on the inflation rate
- Special report on the unemployment rate
- I do not want to receive a special report

### **Other descriptives**

How much influence do you personally have on important economic decisions within your firm? (very strong influence, strong influence, neither strong nor weak influence, weak influence, very weak influence)

How many percent of your firm's revenues are achieved domestically and abroad?

Share of total revenue achieved inside Switzerland in %

Share of total revenue achieved in the euro area in %

Share of total revenue achieved outside Switzerland and outside the euro area in %

Over the last 3 months, how frequently did you follow news about...

the exchange rate of the Swiss franc and the euro?

the inflation rate in Switzerland?

the unemployment rate in Switzerland?

(never, once per month, twice per month, once per week, twice per week, daily)

Does your company use financial products or internal hedging strategies to hedge against exchange rate fluctuations?

We use them frequently

We use them occasionally

We do not use them at all.

## C.2 Survey instructions in English (Households Wave 1)

### Attention check

The next question is about the following problem. In surveys like this one, sometimes there are participants who don't read the questions carefully and just click quickly through the survey. This means that there are many random answers that affect the results of our research.

To show that you have read the questions carefully, please select "Very interested" and "Not at all interested" as answers in the next question.

Given the above problem, how interested are you in politics? (Very interest, Interested, Somewhat interested, Little interested, Not at all interested)

### Introduction

In this survey we will ask you several times things about your household, such as total household income. By household we mean all family members who live with you at your main residence, excluding roommates and subtenants.

In some of the following questions we will ask you about the percentage probability that a certain event will occur in the future. Your answers can range from 0 to 100, where 0 means an event is certain not to happen and 100 means an event is certain to happen.

For example, numbers like:

2 or 5 percent mean that something "has a very low probability" of happening.

18 percent mean that something "has a low probability" of happening.

47 or 52 percent mean that something "has an even probability" of happening.

83 percent mean that something "has a high probability" of happening.

95 or 98 percent mean that something will "almost certainly" occur.

### Demographics

Do you live in the German-speaking part of Switzerland?

In which year were you born?

What was the gross total income of your household in 2020 (before taxes, contributions to pension / disability and unemployment insurance)?



Which gender do you feel you most belong to?

What age group do you belong to?

In which canton do you live?

What is your current employment status?

### **Beliefs about the evolution of inflation**

In what follows we will ask you some questions about inflation in Switzerland. Inflation refers to the percent increase in the general price level measured by the so-called Consumer Price Index. A decrease in the general price level is called deflation (negative inflation).

What do you think was the inflation rate over the following years?

... 2013: \_\_%

... 2016: \_\_%

... 2019: \_\_%

How certain are you about these estimates?

very certain - certain - uncertain - very uncertain

What do you expect the inflation rate in Switzerland to be over the following time periods?

March 2021 compared to March 2020 in %

March 2022 compared to March 2021 in %

How certain are you about these estimates?

very certain - certain - uncertain - very uncertain

### **Beliefs about the evolution of unemployment**

In what follows we will ask you some questions about the unemployment rate in Switzerland.

What do you think was the unemployment rate over the following years?

... 2013: \_\_%

... 2016: \_\_%

... 2019: \_\_%

How certain are you about these estimates?  
very certain - certain - uncertain - very uncertain

What do you expect the unemployment rate in Switzerland to be at the following points in time?

Unemployment rate in March 2021: \_\_ %

Unemployment rate in March 2022: \_\_ %

How certain are you about these estimates?  
very certain - certain - uncertain - very uncertain

### **Beliefs about the evolution of the exchange rate**

We will now ask you some questions about the exchange rate between the Swiss franc and the euro. What do you think: How many Swiss franc did one have to pay to get one euro in the following years?

2013: \_\_\_ Swiss franc for one euro.

In 2016: \_\_\_ Swiss franc for one euro.

In 2019: \_\_\_ Swiss franc for one euro.

How certain are you about these estimates?  
very certain - certain - uncertain - very uncertain

What do you expect the CHF-EUR exchange rate to be at the following points in time?

How many CHF will one have to pay for one euro in March 2021 on average?

How many CHF will one have to pay for one euro in March 2022 on average?

### **Perceived relevance of different macroeconomic variables**

To what extent do you agree with the following statements? (Strongly disagree, disagree, neither agree nor disagree, agree, strongly agree)

The inflation rate is important for the economic situation of my household.

The unemployment rate is important for the economic situation of my household.

The exchange rate of the Swiss franc and the euro is important for the economic situation of my household.

### **Prior beliefs about exchange rate uncertainty**

Please now think about the different things that may happen with the exchange rate of the Swiss franc to the euro in the future.

According to the current forecast of the KOF macro model about the CHF-EUR exchange rate, one will have to pay 1.06 CHF for one euro in March 2021. The KOF macro model is the central model the KOF uses to make economic forecasts for Switzerland.

We now would like to know how certain or uncertain you consider the development of the CHF-EUR exchange rate to be.

What is your estimate of the probability (in %) that the CHF-EUR exchange rate in March 2021 will on average be somewhere between 1.04 CHF per euro and 1.08 CHF per euro?

Please indicate a percent chance between 0 and 100.

### **Information treatment: High uncertainty**

According to an expert that regularly participates in the KOF expert surveys on economic forecasts, the probability that the CHF-EUR exchange rate in March 2021 will on average be somewhere between 1.04 CHF per euro and 1.08 CHF per euro is **30%**.

This means that according to this expert, with a probability of **70%** the CHF-EUR exchange rate will be on average somewhere outside this range (i.e. above 1.08 CHF per EUR or below 1.04 CHF per EUR).

### **Information treatment: Low uncertainty**

According to an expert that regularly participates in the KOF expert surveys on economic forecasts, the probability that the CHF-EUR exchange rate in March 2021 will on average be somewhere between 1.04 CHF per euro and 1.08 CHF per euro is **90%**.

This means that according to this expert, with a probability of **10%** the CHF-EUR exchange rate will be on average somewhere outside this range (i.e. above 1.08 CHF per EUR or below 1.04 CHF per EUR).

### **Post-treatment uncertainty**

We now would like to ask you about your expectations regarding the development of the **CHF-EUR exchange rate in March 2021**.

Please indicate the percent chance that you assign to the different scenarios. The probabilities have to sum to 100 percent.

- less than 0.94 CHF (in %)
- between 0.94 and 1.04 CHF (in %)
- between 1.04 and 1.08 CHF (in %)
- between 1.08 and 1.18 CHF (in %)
- more than 1.18 CHF (in %)

## Information demand

The KOF offers the participants in this survey exclusive access to a new detailed special reports about the exchange rate. This special report will be compiled and sent out in June 2020, and will account for all relevant developments until this point. This special report contains an exclusive expert interview, exclusive model predictions and details on expert forecasts on the exchange rate of the Swiss franc to the euro.

You can now decide whether you would like to receive this special reports or a monetary amount in panel points. This special report will not be made publicly available.

If you opt for the special analysis, you will be able to access it from June 26th via a link that we will make available to you exclusively. You do not have to leave us your email address for this, but if you wish, we will also notify you of the appearance by email. Please select one of the following two options in each of the following decisions.

- Option A: KOF Special report on the exchange rate
- Option B: Monetary amount in panel points

For every tenth participant we will randomly select one of the decisions with the same probability and implement it as described in the instructions. If you receive the special analysis or an amount of money, we will inform you about this later in the survey. Which option do you prefer?

<b>Option A</b>		<b>Option B</b>
Special report	<input type="radio"/>	<input type="radio"/> 0.01 Swiss franc for me
Special report	<input type="radio"/>	<input type="radio"/> 0.25 Swiss franc for me
Special report	<input type="radio"/>	<input type="radio"/> 0.50 Swiss franc for me
Special report	<input type="radio"/>	<input type="radio"/> 1 Swiss franc for me
Special report	<input type="radio"/>	<input type="radio"/> 2.50 Swiss franc for me
Special report	<input type="radio"/>	<input type="radio"/> 5 Swiss franc for me
Special report	<input type="radio"/>	<input type="radio"/> 10 Swiss franc for me

## Personal expectations and behavior

**Income expectations** In this question, we present six possible scenarios for the change in the total net income of your household, i.e. the money that is available to the whole household after deducting taxes and contributions to pension / disability and unemployment insurance, over the next 12 months.

Please state the percentage probabilities that you assign to the individual scenarios. The sum of the probabilities must add up to 100%.

My household income will increase by more than 20% \_\_\_%

My household income will increase by between 10% and 20%\_\_\_%

My household income will increase by between 0% and 10%\_\_\_%

My household income will decrease by between 0% and 10%\_\_\_%

My household income will decrease by between 10% and 20%\_\_\_%

My household income will decrease by more than 20%\_\_\_%

**Savings: likelihood** What is the probability (in %) that your household will save more in the next 4 weeks than in the last 4 weeks? Savings are income that your household will not spend in the next 4 weeks, but rather put aside in the bank or savings account, or invest in the stock market or in other financial assets.

**Durable spending: likelihood** What is the probability (in %) that your household will make at least one major purchase of a durable good in the next four weeks? Durable consumer goods include, for example, cars, electrical appliances, kitchen and household appliances, renovations, jewelry, etc.

**Non-durable spending: growth** How many percent higher or lower do you think your household's total expenditure on consumer goods and services will be over the next four weeks compared to the last four weeks? If you assume lower total expenditure, please enter a negative percentage. Note: Consumables and services include groceries, food-stuffs, health and personal care products, dining out, gasoline, clothing, hairdressing visits, mobility, hotel stays, leisure and entertainment, and other non-durable services and

consumables.

### **Other descriptives**

Do you protect yourself against exchange rate fluctuations, e.g. with financial products?

I use them frequently

I use them occasionally

I do not use them at all.

Over the last 3 months, how frequently did you follow news about...

the exchange rate of the Swiss franc and the euro?

the inflation rate in Switzerland?

the unemployment rate in Switzerland?

(never, once per month, twice per month, once per week, twice per week, daily)

### **Information about the employer**

How many percent of your employer's revenues are achieved domestically and abroad?

Share of total revenue achieved inside Switzerland in %

Share of total revenue achieved in the euro area in %

Share of total revenue achieved outside Switzerland and outside the euro area in %

### **Additional background information**

How many people are there in your household?

What is your highest level of education?

In which industry do you work?

Which of the following categories best describes your occupation?

## Numeracy

Next we would like to ask you three questions to see how people use numbers in everyday life.

Let's say you have 200 Euro in a savings account. The account earns ten per cent interest per year. Interest accrues at each anniversary of the account. If you never withdraw money or interest payments, how much will you have in the account at the end of two years?

—

Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After one year, how much would you be able to buy with the money in this account?

More than today - The same as today - Less than today

Please tell me whether this statement is true or false: Buying a single company's stock usually provides a safer return than a share of a stock mutual fund with the same value.

True - False

## Preferences

Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks when it comes to financial investment? 1 - Unwilling to take risk; 10 - Fully prepared to take risk.

Are you generally a patient person or an impatient person? 1 - Very patient; 10 - Very impatient.

## Additional background information II

To what degree do you agree with the following statement? fully agree, rather agree, neither agree nor disagree, rather disagree, fully disagree

- I usually follow news about the economy.

Who is the main earner in your household?



You - Your spouse - You and your spouse earn the same amount - Another person

Who in your household is most knowledgeable regarding the finances of your household? By this we mean the household member who has the best overview of income, financial accounts, pension schemes, and real estate holdings.

I am most knowledgeable about the household's finances. - My spouse is most knowledgeable about the household's finances. - My spouse and I are equally knowledgeable about the household's finances - Another person.

Does your household use your main residence ...

... as main owner - ... as partial owner - ... as renter - ... for free

Does your household own stocks or stock mutual funds?

Yes - No

**Email Elicitation** Congratulations. Your decision X was selected at random. Thus you will receive access to the KOF special analysis of the exchange rate.

The KOF special analysis on the exchange rate will be available exclusively from June 26th via the following link: XXX

If you would like to be informed by e-mail about the publication of the special analysis in June, please leave us your e-mail address here:

## C.3 Survey instructions in English (Households Wave 2)

### Attention check

The next question relates to the following problem. With questionnaires like ours, there are sometimes participants who don't read through the questions carefully and simply click their way through the survey quickly. This means that there are many random answers that affect the results of research studies. To show that you read our questions carefully, please type 333 in response to the next question.

### Introduction

In this survey we will ask you several times things about your household, such as your total household income. By household we mean all family members who live with you at your main residence, excluding roommates and subtenants.

In some of the following questions we will ask you about the percentage probability that a certain event will occur in the future. Your answers can range from 0 to 100, where 0 means an event is certain not to happen and 100 means an event is certain to happen.

For example, numbers like:

2 or 5 percent mean that something "has a very low probability" of happening.

18 percent mean that something "has a low probability" of happening.

47 or 52 percent mean that something "has an even probability" of happening.

83 percent mean that something "has a high probability" of happening.

95 or 98 percent mean that something will "almost certainly" occur.

### Demographics

Do you live in the German-speaking part of Switzerland?

In which year were you born?

What was the gross total income of your household in 2020 (before taxes, contributions to pension / disability and unemployment insurance)?

Which gender do you feel you most belong to?

What age group do you belong to?

In which canton do you live?

What is your current employment status?

## **Beliefs about the evolution of the exchange rate**

We will now ask you some questions about the exchange rate between the Swiss franc and the euro. What do you think: How many Swiss franc did one have to pay to get one euro in the following years?

In 2014: \_\_\_ Swiss franc for one euro.

In 2017: \_\_\_ Swiss franc for one euro.

In 2020: \_\_\_ Swiss franc for one euro.

How certain are you about these estimates?

very certain - certain - uncertain - very uncertain

What do you expect the CHF-EUR exchange rate to be at the following points in time?

How many CHF will one have to pay for one euro in September 2022 on average?

How many CHF will one have to pay for one euro in September 2023 on average?

## **Perceived relevance of different macroeconomic variables**

To what extent do you agree with the following statements? (strongly disagree, disagree, neither agree nor disagree, agree, strongly agree)

The inflation rate is important for the economic situation of my household.

The unemployment rate is important for the economic situation of my household.

The exchange rate of the Swiss franc and the euro is important for the economic situation of my household.

## **Prior beliefs about exchange rate uncertainty**

Please now think about the different things that may happen with the exchange rate of the Swiss franc to the euro in the future.

According to the current forecast of a KOF macro model about the CHF-EUR exchange rate, one will have to pay 1.09 CHF for one euro in September 2022.

We now would like to know how certain or uncertain you consider the development of the CHF-EUR exchange rate to be.

What is your estimate of the probability (in %) that the CHF-EUR exchange rate in September 2022 will on average be somewhere between 1.07 CHF per euro and 1.11 CHF per euro?

Please indicate a percent chance between 0 and 100.

### **Information treatment: High uncertainty**

According to an expert that regularly participates in the KOF expert surveys on economic forecasts, the probability that the CHF-EUR exchange rate in September 2022 will on average be somewhere between 1.07 CHF per euro and 1.11 CHF per euro is **30%**.

This means that according to this expert, with a probability of **70%** the CHF-EUR exchange rate will be on average somewhere outside this range (i.e. above 1.11 CHF per EUR or below 1.07 CHF per EUR).

### **Information treatment: Low uncertainty**

According to an expert that regularly participates in the KOF expert surveys on economic forecasts, the probability that the CHF-EUR exchange rate in September 2022 will on average be somewhere between 1.07 CHF per euro and 1.11 CHF per euro is **90%**.

This means that according to this expert, with a probability of **10%** the CHF-EUR exchange rate will be on average somewhere outside this range (i.e. above 1.11 CHF per EUR or below 1.07 CHF per EUR).

### **Post-treatment uncertainty**

We now would like to ask you about your expectations regarding the development of the **CHF-EUR exchange rate in September 2022**.

Please indicate the percent chance that you assign to the different scenarios. The probabilities have to sum to 100 percent.

- less than 0.97 CHF (in %)
- between 0.97 and 1.07 CHF (in %)
- between 1.07 and 1.11 CHF (in %)

- between 1.11 and 1.21 CHF (in %)
- more than 1.21 CHF (in %)

### **Information demand**

The KOF offers the participants in this survey exclusive access to one of three new detailed special reports. These special reports will be compiled and sent out in December 2021, and will account for all relevant developments until this point. You can now decide whether you would like to receive one of these special reports, and if so, which one of these three special reports you would like to receive. These special reports will not be made publicly available.

### **Special report on the exchange rate**

This special report contains an exclusive expert interview, exclusive model predictions and details on expert forecasts on the exchange rate of the Swiss franc to the euro.

### **Special report on inflation**

This special report contains an exclusive expert interview, exclusive model predictions and details on expert forecasts on the Swiss inflation rate.

### **Special report on the unemployment rate**

This special report contains an exclusive expert interview, exclusive model predictions and details on expert forecasts on the Swiss unemployment rate.

If you would like to receive one of the three special reports you will at the end of the survey receive a link to the website on which your desired special report will be published. You also have the option to receive a reminder message with a link to the website from the panel provider when the special analysis is published.

For reasons of exclusivity we can unfortunately only offer you one of the three special analyses. Which special analysis would you like to receive?

- Special report on the exchange rate
- Special report on the inflation rate

- Special report on the unemployment rate
- I do not want to receive a special report.

### Personal expectations and behavior

**Income expectations** In this question, we present six possible scenarios for the change in the total net income of your household, i.e. the money that is available to the whole household after deducting taxes and contributions to pension / disability and unemployment insurance, over the next 12 months.

Please state the percentage probabilities that you assign to the individual scenarios. The sum of the probabilities must add up to 100%.

My household income will increase by more than 20% \_\_\_%

My household income will increase by between 10% and 20%\_\_\_%

My household income will increase by between 0% and 10%\_\_\_%

My household income will decrease by between 0% and 10%\_\_\_%

My household income will decrease by between 10% and 20%\_\_\_%

My household income will decrease by more than 20%\_\_\_%

**Savings: likelihood** What is the probability (in %) that your household will save more in the next 4 weeks than in the last 4 weeks? Savings are income that your household will not spend in the next 4 weeks, but rather put aside in the bank or savings account, or invest in the stock market or in other financial assets.

**Durable spending: likelihood** What is the probability (in %) that your household will make at least one major purchase of a durable good in the next four weeks? Durable consumer goods include, for example, cars, electrical appliances, kitchen and household appliances, renovations, jewelry, etc.

**Non-durable spending: growth** How many percent higher or lower do you think your household's total expenditure on consumer goods and services will be over the next four weeks compared to the last four weeks? If you assume lower total expenditure, please enter a negative percentage. Note: Consumables and services include groceries, food-stuffs, health and personal care products, dining out, gasoline, clothing, hairdressing visits, mobility, hotel stays, leisure and entertainment, and other non-durable services and consumables.

### **Distance to border and shopping**

How many minutes by car do you live from the Swiss-German border?

How many minutes by car do you live from the Swiss-Austrian border?

How many minutes by car do you live from the Swiss-Italian border?

How many minutes by car do you live from the Swiss-French border?

How often have you been shopping in Germany, France, Austria or Italy in the last 3 months?

### **Other descriptives**

Over the last 3 months, how frequently did you follow news about...

the exchange rate of the Swiss franc and the euro?

(never, once per month, twice per month, once per week, twice per week, daily)

### **Subjective processing costs**

How difficult do you typically find it to understand and interpret information about the economy (e.g. exchange rate fluctuations)? (very easy, easy, neither easy nor difficult, difficult, very difficult)

### **Subjective acquisition costs**

Imagine that you wanted to inform yourself about the development of the economy (e.g. exchange rate fluctuations) in Switzerland. How difficult would it be for you to find relevant information about the development of the economy? (very easy, easy, neither easy

nor difficult, difficult, very difficult)

### **Risk protection**

Do you protect yourself against exchange rate fluctuations, e.g. with financial products?  
I use them frequently.  
I use them occasionally.  
I do not use them at all.

### **Information about the employer**

**Revenue** How many percent of your employer's revenues are achieved domestically and abroad?

Share of total revenue achieved inside Switzerland in %

Share of total revenue achieved in the euro area in %

Share of total revenue achieved outside Switzerland and outside the euro area in %

**Import** Does your employer process or sell goods that are imported from the euro zone? If you are self-employed, please think of your own business. (yes, no)

### **Travels to eurozone**

How many times have you traveled in the eurozone countries in the past 12 months? (not at all, once, twice, ..., ten times or more)

### **Additional background information**

How many people are there in your household?

What is your highest level of education?

In which industry do you work?

Which of the following categories best describes your occupation?



## Numeracy

Next we would like to ask you three questions to see how people use numbers in everyday life.

Let's say you have 200 franc in a savings account. The account earns ten per cent interest per year. Interest accrues at each anniversary of the account. If you never withdraw money or interest payments, how much will you have in the account at the end of two years?

—

Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After one year, how much would you be able to buy with the money in this account?

More than today - The same as today - Less than today

Please tell me whether this statement is true or false: Buying a single company's stock usually provides a safer return than a share of a stock mutual fund with the same value.

True - False

## Preferences

Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks when it comes to financial investment? 1 - Unwilling to take risk; 10 - Fully prepared to take risk.

Are you generally a patient person or an impatient person? 1 - Very patient; 10 - Very impatient.

## Additional background information II

To what degree do you agree with the following statement? fully agree, rather agree, neither agree nor disagree, rather disagree, fully disagree

- I usually follow news about the economy.

Who is the main earner in your household?

You - Your spouse - You and your spouse earn the same amount - Another person

Who in your household is most knowledgeable regarding the finances of your household? By this we mean the household member who has the best overview of income, financial accounts, pension schemes, and real estate holdings.

I am most knowledgeable about the household's finances. - My spouse is most knowledgeable about the household's finances. - My spouse and I are equally knowledgeable about the household's finances - Another person.

Does your household use your main residence ...  
... as main owner - ... as partial owner - ... as renter - ... for free

Does your household own stocks or stock mutual funds?  
Yes - No

### **Sign-up for the reminder message**

**Exchange rate** The KOF special analysis of the exchange rate will be available exclusively from December 2021 via the following link: [LINK]

If you would like to be reminded of the publication of the special analysis by the panel provider in December, click on the following box:

- Yes, I would like to be reminded by the panel provider via a message on my account.

**Inflation rate** The KOF special analysis of the inflation rate will be available exclusively from December 2021 via the following link: [LINK]

If you would like to be reminded of the publication of the special analysis by the panel provider in December, click on the following box:

- Yes, I would like to be reminded by the panel provider via a message on my account.

**Unemployment rate** The KOF special analysis of the unemployment rate will be available exclusively from December 2021 via the following link: [LINK]

If you would like to be reminded of the publication of the special analysis by the panel provider in December, click on the following box:

- Yes, I would like to be reminded by the panel provider via a message on my account.

### **Beliefs about the study hypothesis**

Did you truthfully answer the questions in this survey?

What do you think is the hypothesis that the researchers in this study are trying to test?  
[open text box]

How certain are you about your answer? (very uncertain - uncertain - certain - very certain)