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What Matters in Households' Inflation Expectations?

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Abstract

We provide survey evidence on how households' inflation expectations matter for their spending highlighting a behavioral distortion compared to the New Keynesian setup. A large share of households expects prices to remain stable instead of increasing. Such a belief is linked to individual experience with non-durable goods frequently purchased. Households expecting stable prices consume less durable goods than those expecting positive inflation. In contrast, differences across households expecting positive inflation are associated with insignificant differences in durable consumption decisions. That distortion implies that managing aggregate demand through households' inflation expectations is limited and can run out of ammunition.

JEL-Codes: D120, D830, E210, E310, E520.

Keywords: behavioural macroeconomics, heterogeneous beliefs, expectation formation, households' spending, inflation expectation channel, stabilization policies.

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1 Introduction

Households' inflation expectations are a central transmission channel in New Keynesian models and key for monetary and fiscal policies that are advocated to bypass the effective lower bound (ELB) on the nominal interest rate.¹ This setup postulates that agents have full information and rational expectations, and that their inflation expectations affect their consumption through their impact on the real interest rate and intertemporal choices.

Such a theoretical channel contrasts with what is observed in households' surveys. There is clear evidence that their inflation expectations do not satisfy the assumption of full information and rational expectation (Coibion and Gorodnichenko, 2012, 2015a). Moreover, while the theory predicts that higher inflation expectations increase current consumption because of the induced lower real interest rate, in the data the effect is often found to be either insignificant or negative (Bachmann et al., 2015; Coibion et al., 2019a). Recent theoretical contributions resort to various cognitive and financial constraints to rationalize these properties. They emphasize that such frictions mitigate the inflation expectation channel and therefore the efficacy of policies dealing with the ELB constraint.² D'Acunto et al. (2019c) provide evidence that indeed inflation expectations do not matter for consumption choices of individuals with relatively stronger cognitive constraints.

In this paper, we highlight a novel and complementary behavioral distortion that also prevails among households which are less prone to cognitive limits or to financial constraints. We show that when expected inflation matters for individual consumption choices it is because of differences in the broad *inflation regime*—rather than the precise inflation rate—that households expect. In our data, the main dimension along which inflation expectations have an impact on their durable consumption decisions is whether they expect that prices will remain stable or will increase. The latter consume more than the formers. By contrast, households with different positive quantitative inflation

¹See Eggertsson and Woodford (2003); Adam and Billi (2006); Werning (2012) among many others. The inflation expectation channel is for instance crucial for the efficacy of the average inflation targeting strategy recently adopted by the Fed.

²See among others Angeletos and Lian (2018); Andrade et al. (2019); Farhi and Werning (2019); Garcia-Schmidt and Woodford (2019); Gabaix (2020); McKay et al. (2016); Wiederholt (2015); Woodford (2019).

expectations make similar consumption choices. Overall, our findings have important implications for how inflation expectations can affect aggregate demand and further limit the inflation expectation channel.

We obtain our results from a unique survey of French households covering about 2,000 individuals every month since January 2004. The survey combines four pieces of information that are relevant to characterize the inflation expectation channel. First, detailed individual information on quantitative inflation expectations. Second, detailed individual information on qualitative inflation expectations. Third, detailed individual information on their own durable consumption decisions. These three dimensions allow us to study the link between individual inflation expectations and consumption decisions. Fourth, we also have access to specific survey waves with information allowing to characterize what underlies individuals' differences in their beliefs of future inflation regime. In comparison, related works use surveys which lack at least one of these four dimensions.

We start by documenting new facts on household inflation expectations. Looking at the qualitative assessment of future inflation reveals that a large share of households expect prices to 'stay about the same' over the next year. On average, they make for almost one third of the total sample of households. This share fluctuates over time and declines when realized inflation increases. Additional ad-hoc survey waves reveal that individuals form their qualitative inflation expectations based on their own experience with non-durable goods they frequently buy like gasoline and food. This is consistent with recent evidence that personal shopping experience and salient prices shape individual inflation expectations (Cavallo et al., 2017; D'Acunto et al., 2019d).³ The novelty here is to show that these also affect the qualitative inflation regime that individuals expect. By contrast, individual socio-demographics characteristics do not matter much. One also finds that the majority of households answering that prices will stay broadly the same think that inflation will be close to zero over the next year. Finally, we show that the fluctuations in the share of households expecting stable prices instead of positive inflation (the *extensive margin* of inflation expectations) account for more than the majority of

³See also Coibion and Gorodnichenko (2015b) who provide evidence that changes in oil prices affect households' inflation expectations, a property that might have contributed to the missing deflation puzzle of the Great Recession.

the fluctuations in inflation expectations averaged across households.

We then assess the impact of inflation expectations on households' consumption decisions. We find that households expecting positive inflation over the next year have a higher probability to buy new durable goods in the current year than households expecting that prices will remain stable over the same period. By contrast, households with different positive inflation expectations have a similar propensity to buy durable goods over the current year. These findings hold true for the individual durable consumption choices but also for the propensity to buy durable goods in general, a measure that has been widely used in previous works.⁴

We also investigate how the link between inflation expectations and consumption decisions varies across subgroups of households. Consistent with [D'Acunto et al. \(2019c\)](#), we obtain that inflation expectations do not have an impact on durable consumption decisions for less educated households, as well as for households making less accurate inflation forecasts—both of which tend to have higher cognitive constraints. This is also the case for poorer and younger households who tend to be more financially constrained. A new result compared to [D'Acunto et al. \(2019c\)](#) is to show that for richer, older, and more educated households, as well as households making more precise inflation forecasts the extensive margin of inflation expectations matters for consumption decisions but not the intensive margin. These results point towards frictions in the process of information that affect every type of individuals.

In addition, we confirm our findings using the short panel dimension of the French survey, showing that our baseline results hold when looking at individual forecast revisions, and more generally when controlling to unobserved fixed individual characteristics. We also show that our results are robust to using alternative imputation of a quantitative expected inflation to households expecting stable prices.

We further qualify our results along two important dimensions. First, we show the im-

⁴As for many surveys, we only have information on durable consumption. Nevertheless, durable consumption is the most important margin of adjustment in total private consumption fluctuations over the business cycle and the component that is the most interest-rate sensitive. So the intertemporal substitution of private consumption induced by variations in expected inflation—hence in the real interest rate—should predominantly go through changes in durable consumption plans (see e.g. [Berger and Vavra, 2015](#)).

portance of considering the extensive margin along with controls for obtaining a positive connection between inflation and consumption. We obtain that inflation expectation has a negative impact on durable consumption when one does not control for individuals' expected future income or financial situation. This is consistent with the stagflation view of inflation that [Coibion et al. \(2019a,b\)](#) obtain in randomized controlled experiments conducted on surveys of respectively Dutch and US households: Higher expected inflation is associated with lower expected income and so with a lower current consumption. Second, we show that households expecting a positive but moderate inflation rate have a higher readiness to spend on durables than households expecting zero or negative inflation in a German survey of households studied in [D'Acunto et al. \(2016\)](#) or a US survey of households studied in [Bachmann et al. \(2015\)](#). Consistent with [Bachmann et al. \(2015\)](#), we find a negative impact of expected inflation on durable consumption when looking at the intensive margin of inflation expectations. Interestingly, what drives this negative link in the German and US households surveys, is that a significant share of individuals expect a high inflation regime and have a lower readiness to consume durable than households expecting a moderate positive inflation regime.

Finally, we discuss some macroeconomic and policy implications of our findings. The distortion that we highlight, together with the fact that it is also present among households who tend to have higher cognitive capacities or lower financial constraints, implies that—unlike the predictions of an aggregate Euler equation—consumption decisions are not a continuously increasing function of inflation expectations. This limits the inflation expectation channel compared to the standard New Keynesian setup. In particular, changes in quantitative inflation expectations have no effect on spending if they are not associated with changes in the share of households expecting a moderate and positive inflation expectation as opposed to stable prices. Our results thus also imply that a rise in the average inflation expectation does not necessarily translate into higher aggregate demand. In addition, that share is bound to reach a maximum. So, managing aggregate demand through households' inflation expectations is limited and can run out of ammunition, at least for economies where inflation stays relatively low and households hesitate between the stable price regime and the (moderately) positive inflation regime.

Literature Our paper is related to the literature studying the formation of macroeconomic expectations. Recent contributions highlight deviations from the usual assumption of full information and rational expectation either in surveys of households, firms, or professional forecasters (Carroll, 2003; Mankiw et al., 2003; Coibion and Gorodnichenko, 2012; Andrade and Le Bihan, 2013; Coibion and Gorodnichenko, 2015a; Andrade et al., 2016; Malmendier and Nagel, 2016; Coibion et al., 2018; Broer and Kohlhas, 2019; Bordalo et al., 2020; Fuhrer, 2018; D’Acunto et al., 2019a; Lewis et al., 2019; Angeletos et al., 2020; Kohlhas and Walther, 2020) or in controlled experiments (Cavallo et al., 2017; Fuster et al., 2018b; Coibion et al., 2019b, 2020; Afrouzi et al., 2020). These papers analyze the properties of agents’ quantitative macroeconomic expectations. We emphasize that changes in the broad inflation regime households expect is an important margin to focus on and provide some analysis of what drives these changes.

We also contribute to the literature using surveys to assess how households’ macroeconomic expectations affect their decisions. Numerous references study whether policies aiming at increasing expected inflation are expansionary or not (see Armantier et al., 2015; Bachmann et al., 2015; Binder, 2017; Burke and Ozdagli, 2013; Coibion et al., 2019a; Crump et al., 2018; D’Acunto et al., 2016; Dräger and Nghiem, 2020; D’Acunto et al., 2019b,c; Ichiue and Nishiguchi, 2015; Duca-Radu et al., 2020; Michelacci and Paciello, 2019a; Vellekoop and Wiederholt, 2019). These studies focus on the effect of the intensive margin of inflation expectation on households’ spending whereas we underline the key role of the extensive margin of inflation expectations. These works also reach different conclusions depending on the country studied, the identification method, or whether the effect on durable, non-durable, and total consumption level or growth is studied. We find evidence that increasing inflation expectations is expansionary when it is associated to a larger share of households expecting that prices will increase rather than stay the same. As a by product, our results also provide an explanation for why these previous works reach different conclusions: Large differences in the quantitative measure of expected inflation (the intensive margin) lead to small differences in durable consumption choices when they do not correspond to individual differences in qualitative measures of inflation expectations (the extensive margin). This can blur the estimated

relation between expected inflation and durable consumption. Finally some studies investigate the role of other expectations, notably house prices (Chahrour and Gaballo, 2021), wages (Nunes and Park, 2020), unemployment (Roth and Wohlfart, 2020), or gains or losses (Fuster et al., 2018a) on households expenditure. We focus on the effect of expected aggregate inflation through the intertemporal substitution channel.⁵

Our work is also connected to the literature rationalizing why the inflation expectation channel is much less potent in the data than what models with sticky prices, complete markets, and rational expectations with perfect information predict (see e.g. Del Negro et al., 2015). This includes models with information frictions and cognitive limits (Angeletos and Lian, 2018; Nakamura and Steinsson, 2018; Andrade et al., 2019; Garcia-Schmidt and Woodford, 2019; Gabaix, 2020; Woodford, 2019), limited intertemporal substitution due to non-diversifiable idiosyncratic risk and credit constraints (see e.g. McKay et al., 2016; Kaplan et al., 2018), a combination of the two (Farhi and Werning, 2019; Auclert et al., 2020; Carroll et al., 2020; McKay and Wieland, 2020), or decisions under Knightian uncertainty (Michelacci and Paciello, 2019b). Our contribution is to underline a new behavioral distortion which (i) limits the inflation expectation channel even when agents update their inflation forecasts, and (ii) is not specific to individuals who do not understand inflation because they have lower cognitive capacities or do not care about inflation and the associated real interest rate because they face financial constraints.

Overall, our findings point to the importance of inattention for macroeconomic outcomes (see Mankiw and Reis, 2002; Sims, 2003; Woodford, 2003; Mackowiak and Wiederholt, 2009; Alvarez et al., 2012; Mackowiak et al., 2018; Gabaix, 2019). More specifically, that households adjust their durable consumption to a limited number of inflation regimes while inflation is a continuous variable is reminiscent of the literature on discretization and consideration sets (see Caplin et al., 2018; Jung et al., 2019, among others) and of models in which individuals make consumption plans by solving simplified optimization problems (see Reis, 2006; Gabaix, 2014; Ilut and Valchev, 2020).

⁵More precisely, we control for the expected aggregate outlook, future income, and future individual durable consumption in our regression analysis. Our results therefore also imply that the growth rate of consumption declines when the share of households expected positive inflation increases. This is consistent with the findings of Crump et al. (2018) who study the reaction of total consumption growth to inflation expectation as a whole without distinguishing between its extensive and intensive margins.

2 Data

In this section, we describe our source of data – the French survey of households. We start by describing the sample and the design of the questionnaire. We then focus on the questions on inflation expectations and consumption decisions. Finally, we provide some descriptive statistics on these two variables.

2.1 Sample and questionnaire

We consider the individual answers to the monthly consumer confidence survey conducted by INSEE (Institut National de la Statistique et des Etudes Economiques, the French public statistical agency) over a January 2004 – December 2018 period.⁶ Every month, about 2,000 interviews are carried out by phone. The sample size is larger than the one of comparable surveys used in the literature – the Michigan Survey of Consumers conducts around 500 interviews each month and the New York Fed Survey of Consumer Expectations is based on a rotating panel of 1,300 household heads. The sample is designed to be representative of the overall French adult population (sampling weights are calculated by city size, age, household composition, job occupation, socio-professional category, diploma). Every household is surveyed over three consecutive months, so our data set contains a panel dimension for households answering to several interviews.⁷

The baseline questionnaire contains about 20 questions on households’ perceptions on the macroeconomic outlook (general economic situation, quality of life, unemployment, prices), as well as on their own economic prospects and decisions (financial situation, savings, durable consumption decisions). In addition, surveyed households provide socio-demographic information like age, gender, diploma, income, employment status, household’s composition.⁸

INSEE also occasionally completes this baseline questionnaire with one-off modules

⁶Before 2008, the survey was not conducted in August.

⁷A total of about 160,000 households are surveyed out of which 42% respond to three consecutive interviews, 25% to two, and 33% to only one.

⁸See Appendix B for the full questionnaire. The harmonized European household confidence indicators released by the European Commission for all countries in the European Union use a subset of this questionnaire.

of additional questions. In particular, in April 2007 and February 2009, households in the survey were asked about their inflation perceptions for some specific items and, in September 2007, households expecting prices to remain the same were asked about what they mean by prices remaining the same. We use these specific survey waves to provide further insights on how households form their inflation expectations.⁹

2.2 Expected inflation

The survey asks individuals about both their *qualitative* and *quantitative* perceptions of the evolution of prices over the next 12 months. While most of the literature focuses on the latter, we take advantage of having access to the two types of inflation expectation to emphasize the importance of the former in how the inflation expectation channel operates.

More specifically, individuals are first asked to provide a *qualitative* assessment on future prices:

Question 1. *In comparison with the past 12 months, how do you expect consumer prices will develop in the next 12 months? They will...*

1. Increase more rapidly, 2. Increase at the same rate, 3. Increase at a slower rate, 4. Stay about the same, 5. Fall, 6. Don't Know.

Note that the set of possible qualitative answers is more detailed than the Michigan Survey of Consumers – this latter survey only distinguishes between three categories “declining prices”, “stable prices”, and “increasing prices”. In what follows, we will refer to the answer “stay about the same” as the expectation of stable prices.

Households are then asked to give their *quantitative* estimation (in percentage) of expected inflation:

Question 2. *By how many percent do you think consumer prices will go up/down over the next 12 months? Consumer prices will increase/decrease by XX.X%*

Importantly, this second question is not asked to individuals who answered “stay about the same” to the previous qualitative question. Following the practice with this survey, we

⁹See the Appendix E for details on the one-off modules of additional questions.

impute a 0% inflation rate for these households to the quantitative question.¹⁰ However, as we will detail later in the paper, we also use additional one-off modules of the survey to consider alternative imputations and to check that our baseline results are robust to these alternatives.

This imputation oversamples households answering 0% to the quantitative question on expected inflation. Indeed, while there is a significant proportion of non-responses to that quantitative question, there is none for households answering “stay about the same” since they are all assumed to answer 0%. To correct for this oversampling, we estimate a model of the determinants of the non-response using information on the characteristics of households who do not respond to the quantitative question but who have responded that prices are going to increase.¹¹ Using these estimates, we compute for each household answering “stay about the same” the estimated probability of non-response to the quantitative question on expected inflation conditional on its observed characteristics. We then impute a “missing value” instead of 0% for households with the highest estimated probability of having a missing observation so that the response rate is similar for the quantitative expected inflation associated with the answer “stay about the same” than the ones observed for other answers to the qualitative question.

2.3 Consumption decisions

The survey asks households about both their *own* durable consumption decisions and about their *general* assessment on whether it is a good time to buy durable goods. More precisely, the survey first asks a question on households’ *own* durable consumption:

Question 3. *Have you made any major purchase over the last 12 months? (washing machine, refrigerator, furniture, dishwasher, ...)*

1. Yes, 2. No, 3. Don't know.

¹⁰See EC (2019), footnote 17: “The two questions are not asked if the response to the qualitative questions is ‘don’t know’ or that prices will ‘stay about the same’, as in this latter case it is assumed that the respondent perceives or expects no change in ‘consumer prices’. When the respondent says that prices will ‘stay about the same’, the interviewer is instructed to automatically impute a zero inflation rate in response to the quantitative questions.” See also Arioli et al. (2017), footnote 8.

¹¹See Appendix C.1 for details.

The survey also asks a question on whether the surveyed individual thinks it is the right time for people in general to make major purchases of durable goods. The exact wording is the following:

Question 4. *In view of the current general economic situation, do you think now is the right time for people to make major purchases (such as furniture, washing machines, electronic or computer equipment ...)?*

1. Yes, now is the right time, 2. It is neither the right time nor the wrong time, 3. No, it is the wrong time, 4. Don't know.

In what follows, we use both qualitative variables as proxies for individual durable consumption. We thus implicitly assume that individuals' views on whether others should increase their stock of durables is linked to their own desired stock of durables.

Several recent works assessing the impact of households' inflation expectations on their consumption decisions only provide information on whether households think that it is the right time to make purchases of durable goods (see [Bachmann et al., 2015](#); [Duca-Radu et al., 2020](#); [D'Acunto et al., 2016, 2019a](#)) or on households' own durable consumption (see [Dräger and Nghiem, 2020](#); [Burke and Ozdagli, 2013](#); [Coibion et al., 2019a,b](#)) among others. Having access to both measures allows us to draw comparisons with these two sets of papers.

Another advantage of having access to the two questions is that they are complementary proxies for individual *own* and *current* durable consumption. Question 3 is a measure of individual *own* durable consumption but goes as far as 12 months back in time.¹² Question 4 is a measure of *current* desired durable consumption but is indirectly linked to personal decisions.

The answers to both questions are qualitative. So we can only observe whether households have decided to adjust (or think it is a good time to adjust) their stock of durable goods (beyond depreciation) but not the amount of money they spend. Another restriction is that the survey focuses on durable goods and more specifically “major purchases” of furniture, washing machines, electronic or computer equipment. So we cannot ob-

¹²In the following section we report evidence that the question captures movements in past realized durable consumption with a peak observed at a 3-month lag.

serve households’ non-durable consumption decisions. However, there is evidence that variations in the share of households who decide to buy durable goods is the margin that matters the most for the fluctuations of aggregate consumption, as emphasized by [Berger and Vavra \(2015\)](#) among others. Moreover, recent studies by [Dräger and Nghiem \(2020\)](#); [Burke and Ozdagli \(2013\)](#); [Coibion et al. \(2019a\)](#) that have information on both durable and non-durable consumption show that the effect of inflation expectation on consumption predominantly goes through durables and, within that category, through the extensive margin of durable consumption.

2.4 Summary statistics

We provide summary statistics on inflation expectations and durable good consumption decisions as well as comparisons with external information on realized inflation and consumption.

Inflation expectations. Figure [1](#) plots the average and the median of inflation expectations (calculated date by date over all households) and the actual headline inflation rate. This figure illustrates two well-known facts in the literature: inflation expectations overestimate the actual inflation rate but at the same time are strongly positively correlated with it. Table [1](#) confirms these findings. There, we report the average of inflation expectations – whose value is 2.8% – while the average of this inflation rate over the sample period is about 1.5%.^{[13](#)} We also report in this Table that the correlation between the average expected inflation rates and the actual headline inflation rate is about 0.8.^{[14](#)}

Durable consumption decisions. Table [1](#) also provides summary statistics on the survey measures of durable consumption. Only a minority of households made major purchases over the past 12 months (about 31%). Similarly, only 15% of households think

¹³The overestimation is much smaller when we consider the median expected inflation instead of the mean, suggesting that few but very large - non-plausible - inflation expectations contribute a lot to this overestimation when we use the mean expected inflation rate.

¹⁴The correlation with core inflation is smaller, at nearly .5, but significant. Appendix [C.3](#) shows that the dynamic correlation with realized core inflation peaks at the horizon of 8 months.

that it is the right time to make major purchases. Finally, both variables are positively correlated with the annual growth of consumption.¹⁵

The correlation of the question on individual own past durable consumption with current realized consumption is relatively large at .45. Again, this is consistent with the fact that a large share of aggregate consumption variations comes from variations in the frequency of purchases of durable goods as emphasized in e.g. [Berger and Vavra \(2015\)](#). Moreover, the correlation with current durable decisions is also large, at .41, which shows that, despite the question is about major consumption expenditures over the past 12 months, it is linked with the actual recent decisions.¹⁶

3 The extensive margin of inflation expectations

In this section, we establish a set of new stylized facts characterizing households' inflation expectations. We start by underlining that a large share of households expect prices to “stay about the same” and that this share is strongly correlated with realized inflation: When inflation is higher, a smaller share of households expect prices to remain stable. We then provide micro evidence on what underlies such a belief: What expecting that prices will “stay about the same” means, who answers so, and how this belief on aggregate inflation is connected to individual experience on more specific items. In particular, we show that individuals who perceive that prices of frequently-bought items have been stable have a higher probability to think that aggregate prices will stay about the same. Finally, we show that variations in the share of households expecting “increasing prices”

¹⁵See Appendix [D](#) for the connection between durable consumption and total consumption. Table [D.1](#) in Appendix [D](#) also reports some simple statistics on households' actual spending in durable goods (including home appliances, TV, computers, phones, furniture but excluding cars) in France for the years 2005 and 2011 (based on household consumption survey). Among households reporting durable spending, about 30% of households reports durable consumption of more than 750 euros (which would correspond to the threshold for 'large purchases' in the household survey).

¹⁶One may question whether going as far as one year back in time is not too much to capture the potential effect of current inflation expectations on current consumption. However, because individual durable consumption is an infrequent decision, it also makes sense to survey individuals about their durable consumption over a sufficiently long period of time rather than at a precise date. [Coibion et al. \(2019b\)](#) for instance have access to individual consumption reported over the last three months. Consistent with this, Appendix [C.3](#) shows that the dynamic correlation of the question on past own durable consumption with realized durable peaks at a lag of 3 months. Later in the paper, we further address this potential issue by using panel regressions.

as opposed to “prices will stay about the same” – i.e. the *extensive margin* of inflation expectations – account for the bulk of the variations in the average inflation expectation. In comparison, the *intensive margin* of inflation expectations – i.e. variations in the average inflation expectations of households expecting “increasing prices” – contributes much less.

3.1 A large share of households expect prices to “stay about the same”

Figure 2 displays the cross-section distribution of individual inflation expectations. As it is well known, this exhibits a huge degree of heterogeneity across individuals: While actual inflation realizations are in between -1% and $+4\%$ over the sample period, 40 percent of individual inflation expectations are outside this range over the same period.

However, despite this heterogeneity, there is a clear mode: About one third of households reports to expect prices “to stay about the same” which the survey interprets as a zero expected inflation.¹⁷ The share of households expecting that prices will remain constant over the next 12 months is not constant over time. As Table 1 illustrates, it is strongly negatively correlated with inflation realizations at the date of the survey. With an absolute value of $+0.7$, the correlation of the associated extensive margin of inflation expectation is larger in absolute terms than the correlation between realized inflation and the average of positive inflation expectations (the intensive margin) which equals $+0.6$.

Figure 3 illustrates that the relation is non-linear and that the proportion of households answering that prices will “stay about the same” decreases more rapidly for realized inflation rates below 2% than above. By contrast, the average non-zero inflation expectation is rather flat for inflation between 0 and 2% whereas it increases quite sharply when inflation is above 2% . So, the lower the inflation rate, the more the share of households expecting prices to remain stable fluctuates with realized inflation.

Fact 1. *Inflation expectations are heterogeneous but a large fraction of households expect stable prices. This fraction is negatively correlated with realized inflation, and more so*

¹⁷There are also peaks in the distribution for values of expected inflation equal to 5, 10, 15, 20% but in total these only make about 20% of answers.

for low inflation realizations.

3.2 Micro evidence on what underlies the belief that prices will “stay about the same”

We use ad-hoc modules to the French survey of households to address the following three questions. What do individuals have in mind when they answer that prices will “stay about the same”? Who does answer so? And how does such a belief on aggregate inflation connect to individual perceptions on their actual shopping experience?

What does “stay about the same” mean? As we detailed above, in the French survey, households answering that they expect prices to “stay about the same” are not asked about their quantitative inflation expectation and the common practice is to impute a zero to these unobserved responses. However it might well be that these individuals have a different interpretation of what “stable prices” means when answering so. An additional survey module that was conducted in September 2007 can be used to shed some light on this issue.

More precisely, households who answered that prices will “stay about the same” to the question on inflation expectations over the next 12 months were asked if they meant that “prices will increase at the same rate as today” or if “prices will remain the same over the next 12 months”. In addition, individuals answering that they meant that prices will increase at the same rate as today were asked about their quantitative inflation expectations. The others were imputed a zero to this question.

Among the 1,847 households that were surveyed in September 2007, 16% answered that prices will remain about the same over the next 12 months. Among these households, about 60% declared that they meant that “prices will remain the same over the next 12 months”.¹⁸ So the majority of households actually think that aggregate inflation will not differ from zero. The average expected inflation for individuals declaring they meant that “prices will increase at the same rate as today” is around 3.3% so that the average

¹⁸The full distribution of quantitative inflation expectations in this additional module is reported in Table E.1 of the Appendix.

of individuals answering that they expect stable prices is 1.35%, well below the average obtained for individuals expecting a positive inflation rate.

Who answers that “prices stay about the same”? The short answer is that it can possibly be everyone, no matter age, education, gender or income, with some quantitative differences: more educated and richer households tend to answer relatively less than they expect stable prices.

In Table 2, we report evidence on inflation expectations and their connection with realized inflation across different groups. More precisely, we report the average inflation expectation, the share of households expecting stable prices, the level of non-zero inflation expectation and the correlation with realized inflation. This correlation with realized inflation corresponds to the coefficient of an OLS regression where we take realized inflation as an explanatory variable. For all the groups, we find that a substantial share of households expect stable prices—roughly one third—and that non-zero expectations are around 4% and that average inflation expectation as well as the extensive margin moves with realized inflation.

How does the belief that aggregate “prices stay about the same” connect to the perceived evolution of prices of specific items? Two additional survey modules conducted in April 2007 and February 2009 provide information on individuals’ qualitative perception of how the price of 9 specific items evolved recently. These items cover basics non-durable, durables and services expenditures: bread, beef, food oil, electricity, car repair, gasoline, phone/internet, washing machine and TV set.

Table 3 reports the results. On average over the 9 items, 30% of households perceive that prices remained stable. These shares are smaller for items that change prices more frequently, as, for example, gasoline (10% of stable prices), and larger for those whose prices are arguably more sticky such as services and durable goods (more than 50% for phones and washing machines).

We then investigate whether these perceptions on micro price influence individuals’ aggregate inflation expectations. As Table 4 illustrates, we obtain that when an individ-

ual perceives that the prices of these specific items are broadly stable, he has a higher probability to expect that aggregate prices will remain stable over the next year. This relationship is stronger for the items that are bought more frequently like food (beef, food oil) and gasoline.

These results suggest that households derive their aggregate inflation expectations from their perceptions of micro prices. This latter point is consistent with recent evidence by Cavallo et al. (2017); D’Acunto et al. (2019d) emphasizing that households form their aggregate inflation expectations based on their shopping experience. However, a novelty of our results is to show that one’s individual broad perception of how some micro prices evolve affects the broad regime of aggregate inflation she/he expects.¹⁹

Overall, the following Fact summarizes the findings of this subsection:

Fact 2. *All types of households may expect prices to stay about the same. When having such an expectation, a majority of households actually expect prices to remain stable rather than inflation to remain stable. That belief is also positively correlated with the perception that prices of frequently-bought non-durable items stayed about the same.*

3.3 Fluctuations in the extensive margin explain a lot of the fluctuations in the average expectation

We now investigate how fluctuations in the share of households expecting prices “stay about the same” – that we call the *extensive margin* of inflation expectations – contribute to the overall evolution of the average inflation expectation. We compare this with the contribution of fluctuations of the average expectation of households reporting non-stable prices – the *intensive margin* of inflation expectations.

To decompose the variations of average inflation expectations into their extensive and intensive margins, we follow the approach by Klenow and Kryvtsov (2008) in the case of micro-price data. More precisely, let $\pi_{i,t|t+1}^e$ denote individual i ’s inflation expectation at

¹⁹See also Montag (2019) who shows that French households overweight goods that they purchase frequently when forming their views on current inflation and analyses the welfare consequences of such a bias in a partial-equilibrium model where households save in a single nominal bond subject to inflation risk. We emphasize the effect of frequently purchased items on the broad inflation regime households expect.

date t for date $t+1$, and let I_{it} be an indicator variable verifying $I_{it} = 1$ if $\pi_{i,t|t+1}^e > 0$ and $I_{it} = 0$ otherwise. The average of individual expectations, $\pi_{t|t+1}^e = \frac{1}{n_t} \sum_{i=1}^{n_t} \pi_{i,t|t+1}^e$ can be decomposed into two components:

$$\pi_{t|t+1}^e = fr_t \times dp_{t|t+1}^e$$

with $fr_t = \left(\frac{1}{n_t} \sum_{i=1}^{n_t} I_{it} \right)$ the fraction of households with positive inflation expectations and with $dp_{t|t+1}^e = \left(\sum_{i=1}^{n_t} I_{it} \right)^{-1} \left(\sum_{i=1}^{n_t} \pi_{i,t|t+1}^e \right)$ the average among households having non-zero inflation expectations.

Using a first-order approximation around the average inflation, we can decompose fluctuations in the average inflation expectation of households into an extensive margin and an intensive margin:

$$\pi_{t|t+1}^e - \bar{\pi}^e = \underbrace{(fr_t - \bar{fr}) \bar{dp}^e}_{extensive} + \underbrace{(dp_{t|t+1}^e - \bar{dp}^e) \bar{fr}}_{intensive} + O(t).$$

Figure 4 plots the result of the decomposition between these two margins: the extensive margin matters a lot for variations of the aggregate inflation expectation, in particular when the average inflation expectation is below its long-run average.

From this expression, we can write the contribution to the variance of aggregate expected inflation $\pi_{t|t+1}^e$ of the intensive and the extensive margins as well as the comovement between the two:

$$V(\pi_{t|t+1}^e) = \underbrace{V(dp_{t|t+1}^e) \bar{fr}^2}_{intensive} + \underbrace{V(fr_t) \bar{dp}^e^2 + 2cov(fr_t, dp_{t|t+1}^e) \bar{dp}^e \bar{fr}}_{extensive}$$

Table 5 reports our results for this decomposition. In a first approach, we follow the survey's practice by assuming that households answering prices "to stay about the same" expect zero inflation over next year. In this case, the extensive margin accounts for about 75% of the total variance of the average inflation expectation, with 50% coming from the mere variance of the share of households answering stable prices in the survey.

Table 5 also reports these decompositions when using other imputed values for house-

holds answering that prices “will stay about the same”. While the average inflation expectation increases with the imputed value, the variance and the contribution of the extensive margin decreases. However, the extensive margin still accounts for about 60% of the fluctuations of average inflation expectations when imputing an inflation rate in between 1% and 1.5%, a range consistent with the average inflation expectation observed among households expecting that prices “will stay about the same” in the additional survey of September 2007 discussed above.

Table 5 further illustrates that the extensive margin matters more in a low-inflation environment. It reports the contribution of the extensive and the intensive margins to the variations in the average inflation expectation in low- and high-inflation regimes, that is when inflation is respectively below and above median inflation over our sample. The contribution of the extensive margin to the variance of inflation is about 90% in a low-inflation environment and about 60% in a higher inflation environment. Overall, the contribution of the extensive margin cannot be neglected to assess the variations of the average inflation expectation.

Fact 3. *A large share of the adjustment in the average inflation expectation comes from changes in the share of households expecting stable prices (the extensive margin); changes in the average expectation of households reporting positive inflation (the intensive margin) contribute much less.*

4 The extensive margin of inflation expectations and consumption decisions

In this section, we investigate how households relate their consumption decisions to their inflation expectations. Our main finding is that – in the cross-section – variations in the extensive margin of the consumption of durable goods are significantly related to changes in the inflation regime households expect, and not to changes in the exact inflation number they expect. This finding is robust using different measures of durable consumption choices. Importantly, this aggregate effect is not mainly driven by households that tend

to face relatively stronger cognitive or financial constraints. Moreover, while the baseline identification exploits cross-sectional variations in expected inflation, our results are preserved when using the short panel dimension of the survey to control for unobserved individual characteristics. Finally, these findings are also robust to alternative methods of imputation for inflation expectations of households expecting prices to stay about the same.

4.1 A discrete choice model of durable consumption

We consider that the decision to buy durable goods between $t - 1$ and t , $b_{i,t}$ is a binary process that follows:

$$b_{i,t} = \begin{cases} 1 & \text{if } z_{i,t}^* > 0 \\ 0 & \text{otherwise} \end{cases} \quad (1)$$

with $z_{i,t}^*$ a latent variable which follows:²⁰

$$z_{i,t}^* = \alpha + \beta \pi_{i,t|t+1}^e + \gamma X_{i,t} + \lambda_t + \mu z_i + \epsilon_{i,t} \quad (2)$$

with $\pi_{i,t|t+1}^e$ being the inflation expectation formed at date t by household i over the next year (between t and $t + 1$), X_{it} being a set of individual specific controls, λ_t being fixed-time effects controlling for all aggregate variations, z_i being a set of household fixed characteristics.

Our dataset provides two measures for $b_{i,t}$ that were used in the literature. First, individuals' *own* decision to make major purchases given in answer to Question 3. This gives us information on whether household i bought some durable goods over the past year (between $t - 1$ and t). Second, as an alternative measure, individual beliefs on whether the current time is a right time to consume durables or not reported in response to Question 4.

We also have access to two different measures for the inflation an individual expects

²⁰ $z_{i,t}^*$ can be interpreted as the difference between the desired stock and the current stock of durable goods. The fact that durable consumption is a discrete choice is consistent with the view that it is subject to fixed costs. It is also consistent with our data, as only one-third of the respondents declare they bought durables over the last year.

for the next year. The *qualitative* assessment given in answer to Question 1 and the *quantitative* estimates provided in response to Question 2.

X_{it} include a rich set of controls that allow us to mitigate some potential endogeneity issues resulting from omitted variables. Note that endogeneity issues could be responsible for finding a spurious relation between individual inflation expectations and consumption decisions. But it is harder to rationalize why they would explain the difference between the effect of the extensive and the intensive margins of inflation expectations on durable consumption that we emphasize.

That being said, we can control for three important potential confounding factors. To start with, households who decide to consume more can also expect other households to consume more, thus pushing up inflation and inflation expectations. We can attenuate this potential bias by controlling for individuals' reported perceived inflation. Moreover, higher inflation expectations could be associated with shocks that also affect (positively or negatively, depending on the shock) households' expected future income, hence current consumption. We control for future consumption plans, expected own financial situation, as well as expected future macroeconomic expectations to address this potential issue. Furthermore, because of the central bank reaction function, higher expected inflation could lead to higher perceived or expected nominal interest rate, which could thus affect the real interest rate and thus affect durable consumption choices. We address this concern by controlling for the household's subjective view on whether the time is a right time to save, which is related to the nominal interest rate.²¹ In addition to this proxy for the interest rate perceived by individuals, we also estimate the link between consumption and inflation expectation over the ELB period assuming households did not expect any central bank reaction to inflation at that time (Appendix F.4).

λ_t are time fixed effects controlling for all aggregate variations, and z_i is a set of observed individuals characteristics such as age, composition of the household, occupation, income, working regime, education, gender, region, city size. In our baseline regression, the identification of the effect of inflation expectations on durable consumption will come

²¹The link between interest rates and the average beliefs of whether the time is "a right time to save" is illustrated in Figure D.2 in the Appendix.

mainly from variations in the cross-section (and controlling for all observable households characteristics). In a robustness check, we use the short panel dimension of the data to verify that our results are preserved controlling for unobserved household heterogeneity (Section 4.4).

4.2 What matters for durables consumption?

We now report estimates of the previous model for the two measures of individual durable consumption available in the French survey of households. More precisely, Table 6 reports, in the left panel, the results obtained with households' own purchases of durable goods over the last 12 months and, in the right panel, the results obtained with their views on whether the time is a "right time to purchase durable goods" or not. Overall, we find qualitatively similar results for both variables: the main dimension along which durable consumption varies with inflation expectations is its extensive margin, not the intensive margin.

The intensive margin of inflation expectations does not. Column 1 in the left panel of Table 6 shows the impact of the quantitative measure of inflation expectation on individual own durable consumption decisions when including every individuals in the survey, i.e. including households expecting that prices will remain stable. Column 2 presents the results obtained when restricting the sample to households expecting a non-zero inflation. In this case, the link between inflation expectations and durable consumption is negative and not significant. As the first two columns of the right panel of Table 6 illustrate, the results stay the same when looking at the impact on individual expectations on the perception that the time is a good time to buy durable goods. Overall, quantitative variations of expected inflation have no significant impact on durable decisions. This is reminiscent of the results obtained by Bachmann et al. (2015) on a survey of US households.

The extensive margin of inflation expectation matters. Column 3 in the left panel of Table 6 displays the results of a regression of the two measures for durable

consumption on a qualitative measure of inflation expectation that equals 1 when an individual expects a strictly positive inflation rate and 0 when an individual expects prices to remain stable. Unlike for columns 1 and 2, we now find a strongly significant positive effect: when households expect prices to increase rather than stay the same, the probability that they have made a durable purchase increases by about 1 percentage point. Likewise, the probability that they consider that, in general, it is a good time to buy durable increases by roughly .63 percentage point as reported in the third column of the right panel of Table 6.

Do other expected inflation regimes matter? The previous results could mask an heterogeneous reaction of durable consumption to different subsets of positive inflation expectations. To investigate such a possibility, we run the same regression as above but splitting inflation expectations into different brackets, namely below 0%, 0%, between 0 and 3%, between 3 and 5%, between 5 and 10% and higher than 10%. The results are displayed in the fourth column of the two panels of Table 6. When households report a positive inflation expectation – whatever the value between 0 and 10%, their probability of making large purchases is higher by about 1 pp. than when they report a zero inflation expectation. The only difference is when inflation is expected to be larger than 10% in which case the effect on durable consumption is the same than when answering stable prices.²² As Figure 5 illustrates, this result also holds when considering finer expected inflation brackets of 1 percentage point. This also shows that the absence of effects along the intensive margin is not driven by any particular value of inflation expectations.

We also investigate if other differences in qualitative inflation regimes that households expect matter for durable consumption. Table 7 shows the results obtained when using the qualitative measure of inflation expectations (Question 1) instead of the quantitative measures in the previous regression.²³ Considering qualitative inflation expectations more

²²This finding is consistent with a high-inflation expectation regime in which households consume less. This is consistent with our main result that inflation expectations affect durable consumption through the broad inflation regime and not the precise quantitative inflation that households expect.

²³Table C.3 in the Appendix reports the connections between the qualitative and quantitative questions (see also Stanislawski et al., 2019, for further facts on these connections). Here we focus on Question 3 on household purchases of durable goods over the last 12 months. The previous results hold when we extend the sample to households reporting only a qualitative answer to the inflation expectation questions.

than double the sample size as a large number of households only reply to this question and not to the quantitative one. Column 1 confirms on this larger sample the previous result that when a household expects something different than “stay about the same”, they are more likely to make major purchases, by .83 percentage point, compared to the case where the household answers “stay about the same”. Column 2 shows that, when splitting the qualitative inflation expectations into the five different regimes available instead of the mere stable prices versus positive inflation distinction, the relation between expected inflation and durable consumption is not monotonic. However, these differences are of second order compared to the difference between expecting stable prices or positive inflation: the distinction that really matters when it comes to consumption decisions is between the “prices stay about the same” regime and the positive inflation regime. Columns 3 and 4 confirm these results on the subsample of households replying both to the qualitative and quantitative questions on inflation expectation.

Main fact. Overall, there exists a positive link between inflation expectations and durable consumption, but mostly through inflation expectations shifting from stable prices to positive inflation. Our findings are summarized in the following fact:

Fact 4. *Households’ durable consumption is positively related to the extensive margin of households’ inflation expectations. In contrast, durable consumption does not significantly vary with the intensive margin of inflation expectations.*

Another way to phrase Fact 4 is that the decision to consume durable goods is uniform across households expecting positive inflation as this appears in Figure 5. Households then do not seem to give value to the exact level of inflation expectation that they report, provided that it leads to non-stable prices.

4.3 Heterogeneity

In this section, we investigate how Fact 4 differs depending on households’ individual characteristics, and the precision of their inflation forecasts. We report the results in Table 9.

High-income, and older households are driving the aggregate effect of the extensive margin. Overall, we find a stronger effect of inflation expectations for high-income and middle-age households. There is no statistically significant difference between men and women. In contrast, for younger, low-educated, low-income—in the bottom quartile of the income distribution—households inflation expectations do not necessarily have a statistically significant effect on durable consumption. As younger and low-income households are more subject to financial constraints, these results are consistent with the fact that financially-constrained households do not link expected inflation and consumption decisions. Overall, even though every type of households tends to adjust their inflation expectations depending on the inflation regime that they perceive (see Table 2 above), their inflation expectations do not systematically affect their consumption decisions.

High-educated, and households with more precise expectations are driving the aggregate effect of the extensive margin. The results in Table 9 also show that our findings in Section 4 are not driven by individuals with low-education or with low precision of inflation forecasts, two variables which correlate with individuals’ cognitive limits.²⁴ Households with lower education level and with less precise inflation forecast have durable consumption decisions that are not related to their inflation expectation.²⁵ In contrast, households with high education levels and more precise forecasts do, but only via the extensive margin.²⁶

This leads to our fifth fact:

Fact 5. *When individuals are more prone to financial constraints or have stronger cognitive limits, their durable consumption react less to expected inflation. When households’ inflation expectation matters this predominantly through the extensive margin rather than the intensive margin of inflation expectation.*

²⁴D’Acunto et al. (2019c) show that these proxies are related, although imperfectly, to IQ which is a more objective and exogenous measure of individuals’ cognitive constraints.

²⁵This is consistent with the findings of D’Acunto et al. (2019c).

²⁶One concern may be that households who bought durable goods are more aware of prices and hence have more precise views on inflation. In Appendix F.1 we provide evidence that the forecast errors on inflation between households who consume and those who do not consume durables do not differ statistically significantly.

4.4 Robustness

Panel regressions. Our benchmark regressions rely on the cross-section of households to identify the effects of inflation expectations on households' decisions to buy durables. More precisely, we rely on a rich set of controls pertaining to individuals' fixed characteristics and to their perceptions of current and future micro and macroeconomic conditions to construct two counterfactual types of households that are identical except for their inflation expectations, and move randomly between two groups of inflation expectations: positive inflation and stable prices. We find that when an individual moves from the positive inflation expectation group into the stable price expectation group, this household will be less likely to make a durable purchase.

We provide further evidence for this result, controlling more generally for any unobserved household's characteristics using the panel dimension of our dataset. As households are interviewed at most over three consecutive months, another interest of panel regressions is that we capture the effect of a change in expected inflation over the next 12 months on a change in past durable consumption decisions over the last three months.

There are several challenges when using this panel dimension. First, the dataset does not always report household identifiers. But we can use several characteristics of households which are arguably fixed over time (geographical location, year of birth (head of household and partner), occupation (household head and partner), household composition, education) to identify households and reconstruct the panel dimension. Second, households are interviewed only three times over three consecutive months, and over our sample only 40% of households answer three times to the questionnaire. So the panel dimension is short which limits the possibility to obtain precise estimates. Table 8 reports the estimation of panel probit models with households random effect, still controlling for observed households heterogeneity. The overall picture does not substantially differ with what we obtain with our benchmark probit regressions.²⁷

²⁷We also report in Appendix F.2 the results of Logit models with fixed household effects using the qualitative answers to expected inflation to keep the sample sufficiently large. The results are very similar with our benchmark specification: Households are more likely to consume when they expect prices to increase instead of remaining stable.

Imputation. In our benchmark regression, we impute a 0% inflation expectation to households expecting prices to “stay about the same”. As Table 7 discussed above illustrates, a similar result holds when using the different qualitative measures of expected inflation. This underlines that our main result is not an artifact of the imputation method. We further confirm this robustness by imputing randomly to households expecting prices to “stay about the same” values of inflation expectations that reproduce the distribution of inflation expectations observed in the complementary survey in September 2007. We run the same regressions and report the results in Appendix F.3. We also obtain that only the extensive margin of inflation expectation matters for durable consumption and that there is no significant effect for the intensive margin.

5 Further results and relation with previous studies

As discussed in the introduction, the literature studying how individual inflation expectations affect households’ consumption has reached different conclusions. We find a positive impact, consistent with D’Acunto et al. (2016).²⁸ In this section, we provide further results on the importance of controls, on the role of households expecting a very high inflation rate, and on surveys of German and US households. These illustrate how our results can be reconciled with the studies that found a negative or insignificant effect of inflation expectations on consumption expenditure like Bachmann et al. (2015); Coibion et al. (2019a,b).

5.1 The role of controls and households expecting high inflation

The first panel of Table 10 illustrates how our results vary when progressively including controls about perceived and expected own and macroeconomic variables. The first column reports how durable consumption decisions vary with individual inflation expectation when one looks at their overall cross-section variations: The effect is significantly

²⁸Our results are on the level of durable consumption. However, they are also consistent with the ones Crump et al. (2018) who find that higher inflation expectation reduces the expected growth rate of consumption and with Vellekoop and Wiederholt (2019) who find that higher inflation expectation is associated with lower saving rates. A difference is that we emphasize that this positive link comes from the extensive margin of inflation expectations.

negative when one does not control for expected future macroeconomic outcomes and personal situation and then becomes non-significant when these controls are added. The second column looks at the impact of cross-section variations of inflation expectations along the intensive margin: Again, the effect is significantly negative when one does not control for expected future macroeconomic outcomes and personal situation and then becomes non-significant when these controls are added. This is consistent with the results of [Coibion et al. \(2019a\)](#) and the stagflation view of inflation whereby higher future inflation is associated with worse perceived economic conditions and prospects. Finally, the third column reports the impact of cross-section variations of inflation expectations along the extensive margin: These have a non-significant impact on durable consumption decisions when one does not control for expected future macroeconomic outcomes and personal situation. However, this impact becomes positive and significant when these controls are added. Overall, controlling for expected future income is important to exhibit the positive link between expected inflation and durable consumption. Crucially, that link goes through differences along the extensive margin. Looking at the intensive margin or the overall variations does not allow to identify this positive link.

The last line in the first panel of Table [10](#) reports the results obtained with the whole set of controls but restricting our sample to households that have relatively reasonable inflation expectations, namely below 10%. The effect of expected inflation on durable consumption becomes positive when looking at the overall cross-section variation of expectations. However, even in that case, the extensive margin of inflation expectations is what drives the overall positive impact the intensive margin has no significant impact.

These results shed some light on why the recent empirical literature assessing the link between inflation expectations and consumption decisions is rather inconclusive. When controlling for a large set of individual perceptions, in particular expected income, our estimates of the link between inflation expectations and consumption decisions shift from being negative to non-significantly positive. When restricting the sample to households with less extreme inflation expectations, estimates turn out to be significantly positive, with this overall positive effect stemming from the extensive margin. By contrast, as Table [6](#) above illustrates, looking at individual perceptions about aggregate consumption or at

individual consumption choices does not matter much to identify the effect of inflation expectations on durable consumption.

5.2 Additional country evidence

We also investigate how the extensive margin of inflation expectations matters for durable consumption in two other surveys that have been used in the literature: The German survey of households and the US Michigan survey of consumers. A limit compared with the French data is that these surveys only have information on whether individuals think it is a right time to make durable good purchases and no information on households' own consumption. However, the set of controls is similar. As for the French survey, we had access to a 2004-2018 sample period for the German data. We had access to a longer sample covering the 1984-2020 period for the US survey.²⁹

We report the results of the baseline regression obtained on these additional data in the bottom panel of Table 10. Like French households, US and German households expecting that prices will increase are more likely to report that the time is a good time to buy durable compared to households expecting stable prices. A difference with the French survey is that the effect of the intensive margin is significantly negative leading to an overall effect that is also significantly negative, which is consistent with Bachmann et al. (2015). Further investigation of the effect of the intensive reveals that this effect is mainly driven by households expecting that inflation is greater than 5%. Like French households expecting that inflation will be greater than 10%, these individuals have a lower readiness to spend than the average.³⁰

Overall, our main result conclusion remains valid on these alternative samples: Differences in the qualitative inflation regime that households expect lead to differences in durable consumption, with households expecting a positive inflation regime having a higher readiness to spend than the others. As a result, considering qualitative regimes

²⁹Differences in survey design as well as lack of information prevent us from implementing an analysis as rich as the one we can conduct with the survey of French households. Appendix G for Germany and Appendix H for the US give a detailed description of the surveys and further replication of the results that we obtain on France.

³⁰See Appendices G and H for details.

of inflation expectations is critical for the connection with consumption decisions and neglecting these regimes may lead to the opposite pattern, with households expecting more inflation consuming relatively less.

6 Macroeconomic implications

Our results have important implications for how expected inflation can affect aggregate demand. First, although significant, the link between inflation expectations and aggregate demand that results from our estimates is lower than the ones that could be obtained from typical NK models. The behavioral friction that we uncover thus limits the inflation expectation channel compared to the standard full information and rational expectation setup. Second, and more specific to such a friction, monetary policy can run out of ammunitions, at least for the specific set of regimes French households have in mind.³¹

Mitigated direct effects of inflation expectations on aggregate consumption.

We first illustrate that the inflation expectation channel is less effective than in the standard NK model. A simple back-of-the-envelope computation of what our estimates mean for aggregate consumption shows that these are also economically significant. The average share of households purchasing durables is 31%. Our estimation gives us $\Delta\text{Share}(\text{Dur}=1) = \beta \times \Delta\text{Share}(\text{Inf}>0)$. Given that the average monthly change in the share of households shifting their expectations from “stay about the same” to “increase” is about 10 percentage points in absolute terms, and that our baseline estimate of the marginal effect β is 1 percentage point, this share of households reporting that they made major purchases will change by $.01 \times .1 = 0.1\%$. Assuming that durable consumption is given by this share of households multiplied by a typical durable expenditure that does not vary across individuals and over time, the variation of total durable consumption in reaction to a typical shift of households’ inflation expectation from prices will “stay about the same” to will “increase” is $\Delta\text{Share}(\text{Dur}=1)/\text{Share}(\text{Dur}=1) = .001/.31 = .3\%$. Since durable consumption accounts for 1/4 of total consumption, this would lead to a .075%

³¹We develop these points more formally in the Appendix A that introduces an inflation expectation channel working through the extensive margin in an otherwise standard New Keynesian model.

increase in monthly aggregate consumption. This is small but significant in comparison to the standard deviation of monthly goods consumption growth which equals .9% over our sample.

However that contribution is limited compared to what the inflation expectation channel would imply in a standard NK model. Given that the average expected inflation of households expecting that prices will increase equals 4.15%, this 10 percentage points increase in the share of individuals thinking that inflation will be positive amounts to a change in the average expected inflation of .415% over a month. With log-utility preference, this shock would imply an increase in consumption on impact of the same magnitude, so much larger than what one obtains with the extensive margin. The reaction would still be much larger for an elasticity of intertemporal substitution of .5 that [Crump et al. \(2018\)](#) obtain on household surveys and that is typically used in medium-scale NK models. The behavioral distortion we highlight thus strongly limits the inflation expectation channel compared to standard calibrations of the NK model.³²

“Limited ammunition” for policies managing aggregate demand through inflation expectations. Note that policy interventions that affect the average inflation expectation need also to change the fraction of households that expect a positive inflation regime to have an effect on durable consumption. By contrast, policies that only change the average expected inflation among households expecting positive inflation will have no effect. This reinforces the fact that our results mitigate the efficacy of these type of policy.

Beyond the attenuation of the inflation expectation channel, a second, and more specific consequence of our results is that the effect of the inflation expectation channel can reach an upper limit. The simple reason is that the share of households expecting prices to “stay about the same” is naturally bounded and it cannot decrease below 0. Consider a situation where, over one year, the overall population shifts from a stable price regime to a positive inflation regime. The direct effect of this increase of 100 percentage

³²With an elasticity of intertemporal substitution of .5, one would need an average annual discounting parameter of $(.075/.5 \times .415) \simeq .36$ in the discounted Euler equation implied by [McKay et al. \(2017\)](#); [Angeletos and Lian \(2018\)](#); [Farhi and Werning \(2019\)](#); [Gabaix \(2020\)](#).

points in the share of households believing that prices will increase rather than stay the same is to add $\beta \times \Delta \text{Share}(\text{Inf} > 0) = .01 \times 100\% = 10\%$ to durable consumption hence 2.5% to total consumption over one year. Given our results, once everybody is in the positive expected inflation regime, increasing expected inflation further does not increase durable consumption. There is thus “limited ammunition” for policies aiming at increasing aggregate demand through inflation expectations—such as forward guidance or average inflation targeting—corresponding to this share of households expecting that prices will stay about the same.³³

This limited ammunition implication of our results holds “locally”, as the inflation regimes that we identify are specific to the low inflation environment that characterizes the sample period considered. One can thus contemplate configurations where policies and inflation realizations could also modify the inflation regimes households have in mind so that the expectation channel could still be at play. But the modification of households’ decision rules would probably require stronger and more persistent policy moves than those usually considered.

7 Conclusion

In this paper, we provide new evidence on how households form their inflation expectations and how they matter for their consumption decisions. Our findings point out that what matters in households’ inflation expectations is the subjective and broad inflation regime that households expect. More precisely, we show that the most important component in the French survey is the share of households that expect prices to “stay about the same”. This extensive margin of inflation expectations is positively related to households consumption decisions whereas the likelihood of durable consumption is uniform across households expecting a positive inflation rate.

³³See McKay and Wieland (2020) for a contribution emphasizing that monetary policy faces a limited ammunition constraint in an heterogeneous agent model with limited participation and adjustment costs on durable consumption.

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Tables

Table 1: Descriptive Statistics

Inflation expectations	Average	Correlation with	
		π , Headline	π , excl. Energy
Whole sample	2.82 (0.64)	0.79	0.48
% of Stable Prices	0.33 (0.11)	-0.68	-0.26
HHs answering non-stable	4.15 (0.46)	0.63	0.63
Durable consumption	Frequency	Corr. with consumption Overall	Durables
<i>Right Time to Purchase</i>			
Yes	0.15	0.38	0.44
Neutral	0.51	0.68	0.64
No	0.34	-0.66	-0.67
<i>Own Major Purchases - Past 12 Months</i>			
Yes	0.31	0.45	0.41
No	0.69	-0.45	-0.41

Note: this table reports simple statistics calculated using individual answers to the quantitative question on inflation expectations and the answers to the 2 questions on durable consumption (“Have you made major purchases during the last 12 months?” and “Do you think it is the right for people to make large purchases?”). The first panel looks at inflation expectations. We first calculate statistics date by date and then compute the average of this time series. The first column reports simple average of the time series. Second and third columns report correlation coefficients of the aggregate moment calculated date by date and the headline HICP inflation (source Eurostat) and HICP inflation excluding energy and unprocessed food (source Eurostat). “Average” is the simple average of all answers (including zeros) to the quantitative question. “% of Stable Prices” is the average proportion of answers exactly equal to 0. “Average of Non-Zero Inflation” is the average of inflation expectations when not equal to 0. The second panel looks at durable consumption. We first compute the average proportion of answers for every answer category date by date and then compute the average of these time series. The first column reports the average proportion of answers in a given category. The other columns report correlation over time of the proportion of answers in a given category and annual growth rate of: col 2. overall monthly consumption (source Insee), col 3. durable expenditures (source Insee).

Table 2: Drivers of Answering "Increase of Prices"

		Average statistics			Correlation with HICP infl.		
		All	Freq. zero	Av. non-zero π^e	All	Extensive	Intensive
All		2.97	32.0	4.48	0.388***	3.05***	0.405***
	High inflation	3.44	26.6	4.79	0.406***	0.71***	0.537***
	Low inflation	2.56	36.9	4.16	0.519***	6.16***	0.485***
Gender	Female	3.03	35.4	4.87	0.353***	2.63***	0.377***
	Male	2.97	30.2	4.34	0.456***	3.26***	0.420***
Age	16-29	3.23	29.9	4.75	0.222***	2.54***	0.202***
	30-49	3.29	27.9	4.69	0.409***	2.80***	0.417***
	50-64	3.15	28.6	4.51	0.458***	2.99***	0.474***
	65+	2.40	40.6	4.11	0.314***	2.81***	0.337***
Education	Primary	2.66	40.2	4.63	0.275***	2.73***	0.263***
	Secondary	3.03	32.8	4.65	0.420***	2.55***	0.470***
	Further	3.04	29.1	4.37	0.402***	3.51***	0.395***
Income	< Q1	2.94	36.6	4.84	0.318***	2.53***	0.335***
	]Q1 – Q2]	3.01	34.0	4.70	0.366***	2.77***	0.385***
	]Q2 – Q3]	3.12	30.4	4.58	0.407***	3.13***	0.417***
	> Q3	2.88	28.2	4.06	0.437***	3.70***	0.445***

Note: the three first columns report average statistics on expected inflation by categories of households. "All" refers the average calculated using all values of expected inflation collected by the survey including 0s. "Freq. zeros" refers the proportion of households reporting "stable prices" or 0 expected inflation. "Av. non-zero π^e " is the average of expected inflation calculated only on non-zero values. The three last columns report results of simple regressions where the endogenous variable corresponds to: i) all expected inflation values (OLS model), ii) a dummy variable equal to 1 if a given household expects a non-zero inflation (Probit model) iii) non-zero inflation expectations marginal effect (OLS model). In all equations, we have reported the coefficient or marginal effect associated with the exogenous variable HICP inflation. Each cell corresponds to the result of a model where the sample is restricted to a given household category. Control variables include year and month dummies, household characteristics (age, location (city, region) education, job, income, survey wave (1,2 or 3), answers to other question on French economic conditions (standard living, unemployment...), answers to the question about future plans for major purchases and a dummy variable for perceived inflation. Regressions also include random household effects and standard errors are corrected for possible heteroscedasticity. *p<0.1; **p<0.05; ***p<0.01.

Table 3: Expectations of individual item price evolutions

	Proportion of Households (in %) – Perceived Price Evolution:				
	Decrease	Stable	Increase	Large increase	It depends
Bread	0.2	19.2	58.1	17.2	5.3
Beef	0.7	23.9	59.9	10.0	5.5
Food oil	0.8	43.3	45.9	3.9	6.0
Electricity	1.1	24.7	60.9	12.1	1.2
Car repair	0.0	16.1	55.9	19.6	8.4
Gasoline	16.5	10.2	30.4	41.2	1.7
Phone/internet	5.0	58.2	27.7	4.1	5.1
Washing machine	11.5	52.8	21.5	0.7	13.5
TV set	35.8	25.0	14.9	2.5	21.9

Note: this table reports the proportions of households answering to product-specific questions on perceived price changes in the one-off modules incorporated in the regular survey of April 2007 and February 2009 (see Appendix E for details on the one-off modules of additional questions). For each product, columns sum to 100.

Table 4: Effects of Product-specific Inflation on Aggregate Expectation of a Non-zero inflation

	Perceived Price Evolution (marginal effect in pp)					Nb obs
	Decrease	Stable	Increase	Large increase	It depends	
Bread	-0.626 (5.195)	Ref.	7.626*** (1.409)	3.989*** (0.211)	6.213*** (0.612)	3,534
Beef	5.262 (14.082)	Ref.	10.988*** (6.733)	10.023*** (1.963)	5.609 (4.657)	3,177
Oil	3.968 (14.097)	Ref.	8.231*** (0.125)	7.929*** (2.936)	-2.540 (3.994)	2,786
Electricity	-6.198 (9.836)	Ref.	4.971*** (1.262)	0.804 (2.488)	0.535 (10.015)	3,342
Car repair	-	Ref.	5.481*** (1.720)	7.450* (4.107)	3.721 (3.017)	2,547
Gasoline	0.323 (0.800)	Ref.	7.656*** (2.005)	7.569*** (0.369)	1.988 (5.846)	3,416
Phone/internet	-2.941 (6.174)	Ref.	3.609** (1.696)	2.510*** (0.310)	11.039*** (4.026)	3,520
Washing machine	-2.951 (2.416)	Ref.	9.106*** (0.873)	7.535 (18.803)	3.106*** (0.396)	2,157
TV set	-6.901** (3.623)	Ref.	6.275*** (2.149)	4.524** (2.175)	2.425*** (0.504)	2,871

Note: this table reports marginal effects (in percentage points) from Probit regressions where the endogenous variable is a dummy variable taking the value 1 if an household answers that she expects prices not to remain the same over the next 12 months. We keep only observations for which the quantitative answer on expected price inflation is available. Overall, the sample contains individual observations collected in April 2007 and February 2009 supplementary modules (see Appendix E for details on the one-off modules of additional questions). Control variables include date dummies, household characteristics (age, location (city, region) diploma, job, income, survey wave (1,2 or 3)). *p<0.1; **p<0.05; ***p<0.01.

Table 5: Contribution to average inflation expectation fluctuations: Extensive vs Intensive Margins

Imputed Value (in %)	Average Agg. Expect.	Var. of Agg. Expect.	Contrib. Tot.	Extensive Freq.	Cov.	% of Variance Ext.	Freq.
<i>Baseline</i>							
0 - All sample	2.82	0.41	0.30	0.20	0.10	73.2	49.4
0 - Low inflation	2.43	0.41	0.36	0.26	0.10	88.4	64.2
0 - High inflation	3.20	0.42	0.25	0.15	0.10	58.4	35.0
<i>Robustness</i>							
0.5	2.98	0.35	0.24	0.16	0.09	69.0	44.6
1	3.14	0.30	0.19	0.12	0.07	63.8	39.1
1.5	3.30	0.25	0.15	0.08	0.06	57.5	32.8
2	3.47	0.21	0.11	0.06	0.05	49.7	25.7
2.5	3.63	0.18	0.07	0.03	0.04	40.2	18.2

Note: this table reports simple statistics on the mean and variance of aggregate inflation expectations depending on the average value imputed to households answering prices will stay about the same (col. 1) and assuming no time variation in the average expectations of these households' answers. Assumption '0' is our baseline scenario. Col. 2 is the average aggregate expectation over time (over all types of answers to the quantitative question, imputed or not), Col. 3 reports the time variance of this average aggregate expectation. Col. 4-5-6 report the contribution of the extensive margin to the overall variance of inflation (Total and separately the relative contribution of the time variations of the share of answers 'stay about the same' and the covariance term). Col. 7 the relative contribution of extensive margin to the overall variance (the relative contributions of extensive and intensive margins sum to 100%). Col. 8 the relative contribution of the time variations of the share of answers 'stay about the same'. In Appendix E.3, we provide more details on how to obtain this table and other robustness checks.

Table 6: Effects of Inflation Expectations on Consumption

	Own Major Purchases Over the Last 12 Months					Right Time to Purchase				
	All	Intensive (Excl. 0)	Extensive	All Quali.	All Excl. outliers	All	Intensive (Excl. 0)	Extensive	All Quali.	All Excl. outliers
π^e	0.005 (0.027)	-0.045 (0.037)			0.226*** (0.074)	0.006 (0.015)	-0.021 (0.019)			0.096** (0.045)
$\pi^e \neq 0$			1.021*** (0.337)					0.632*** (0.185)		
π^e by intervals: [10%; +∞[				0.043 (0.574)					-0.096 (0.296)	
[5%; 10%[				1.491*** (0.462)					0.790*** (0.280)	
[3%; 5%[				1.257*** (0.492)					1.176*** (0.300)	
]0%; 3%[				1.240*** (0.417)					0.848*** (0.251)	
0%				Ref.					Ref.	
< 0%				-0.258 (1.332)					-0.070 (0.821)	
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	136,574	92,002	136,574	136,574	114,786	134,117	90,566	134,117	134,117	112,676

Note: this table reports marginal effects (in percentage points) from resp. Probit and and Ordered Probit regressions where the endogenous variable is coded from the answers to the questions “Have you made major purchases during the last 12 months?” and “Do you think now is the right time for people to make major purchases”. For question “Have you made major purchases during the last 12 months?”, the endogenous variable is a dummy variable equal to 1 if the household ‘YES’ to the questions “Have you made major purchases during the last 12 months?”. The endogenous variable is a variable taking 3 different values 0 if the household answers ‘No, it is the wrong time’, 1 ‘It is neither the right time nor the wrong time’, 2 ‘Yes, now is the right time’ to the question “Do you think now is the right time for people to make major purchases”. Marginal effects are calculated for the value ‘Yes’. Control variables include year and month dummies, household characteristics (age, location (city, region) diploma, job, income, survey wave (1,2 or 3), answers to other question on French economic conditions (standard living, unemployment...), answer to the question about future plans for major purchases, right time to save and perceived inflation. Standard errors are clustered at the date level. *p<0.1; **p<0.05; ***p<0.01.

Table 7: Effects of Inflation Expectations on Consumption – Qualitative Answer

	Own Major Purchases Over the Last 12 Months				Right time to purchase			
	All Answers		Non-Missing Quantitative Answers		All Answers		Non-Missing Quantitative Answers	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\pi^e \neq 0$	0.835*** (0.213)		1.021*** (0.337)		0.267** (0.134)		0.646*** (0.180)	
Increase more rapidly		1.721*** (0.333)		1.442*** (0.522)		0.0553 (0.224)		0.443 (0.292)
Increase at the same rate		0.727*** (0.231)		0.924*** (0.361)		0.323** (0.142)		0.758*** (0.197)
Increase at a slower rate		1.277*** (0.284)		1.339*** (0.464)		0.839*** (0.159)		1.080*** (0.238)
Stay about the same		Ref.		Ref.		Ref.		Ref.
Fall		0.821 (0.763)		-0.243 (1.333)		0.270 (0.513)		0.513 (0.779)
DK		-0.677 (0.447)		-		0.256 (0.269)		-
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	312,921	312,921	136,574	136,574	302,330	302,330	138,571	138,571

Note: this table reports marginal effects (in percentage points) from Probit regressions where the endogenous variable is a dummy variable equal to 1 if the household 'YES' to the question "Have you made major purchases during the last 12 months?". The first two columns report results for all answers to the qualitative question on expectations. The last two columns report results excluding households with missing observations on the quantitative question on both inflation expectations and perceptions. Control variables include year and month dummies, household characteristics (age, location (city, region) diploma, job, income, survey wave (1, 2 or 3), answers to other question on French economic conditions (standard living, unemployment...), answer to the question about future plans for major purchases, right time to save and perceived inflation. Standard errors are clustered at the date level. *p<0.1; **p<0.05; ***p<0.01.

Table 8: Effects of Inflation Expectations on Consumption – Robustness

	Panel regression - Probit with Random HH Effect				Alternative Imputation			
	Own Major Purchases Over the Last 12 Months				HH Consumption			
	All	Intensive (Excl. 0)	Extensive	All Quali. Excl. outliers	Extensive	Brackets	Extensive	Brackets
π^e	0.002 (0.023)	-0.027 (0.033)		0.143** (0.065)				
$\pi^e \neq 0$			0.636** (0.285)		0.779*** (0.268)		0.431*** (0.137)	
π^e by intervals: [10%; +∞[						0.051 (0.266)		-0.097 (0.121)
[5%; 10%[						1.223*** (0.291)		0.586*** (0.140)
[3%; 5%[						0.907*** (0.305)		0.788*** (0.169)
]0%; 3%[						0.820** (0.326)		0.501*** (0.192)
0%						Ref.		Ref.
< 0%						-0.226 (0.185)		-0.083 (0.092)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	136,574	92,002	136,574	136,574	136,574	136,574	134,117	134,117

Note: the first panel of this table reports marginal effects (in percentage points) from panel Probit regressions with random HH effect, where the endogenous variable is a dummy variable equal to 1 if the household 'YES' to the question "Have you made major purchases during the last 12 months?".

The second panel of this table reports regressions that are run on 50 different samples in which we have imputed the answers on quantitative inflation expectations for households answering prices will remain the same. For that, we have reproduced the distribution observed in September 2007 in the complementary module. the 50 different samples correspond to different seeds for the DGP of the imputation. We have reported average marginal effects over the 50 regressions and the standard deviation of the distribution of the marginal effects. We then report (first and second columns of the second panel) marginal effects (in percentage points) from Probit regressions where the endogenous variable is a dummy variable equal to 1 if the household 'YES' to the question "Have you made major purchases during the last 12 months?" and (third and fourth columns of the second panel) marginal effects (in percentage points) from Ordered Probit regressions where the endogenous variable is a variable taking 3 different values 0 if the household answers 'No, it is the wrong time', 1 'It is neither the right time nor the wrong time', 2 'Yes, now is the right time' to the question "Do you think now is the right time for people to make major purchases". Marginal effects are calculated for the value "Yes".

Control variables include year and month dummies, household characteristics (age, location (city, region) diploma, job, income, survey wave (1, 2 or 3), answers to other question on French economic conditions (standard living, unemployment...), answer to the question about future plans for major purchases, right time to save and perceived inflation. *p<0.1; **p<0.05; ***p<0.01.

Table 9: Effects of Inflation Expectations on Consumption – Household Heterogeneity

		All	Intensive (Only $\pi^e \neq 0$)	Extensive
Gender	Female	-0.005 (0.034)	-0.013 (0.51)	1.317** (0.550)
	Male	0.012 (0.40)	-0.081 (0.049)	0.725** (0.368)
Age	16-29	0.117 (0.086)	0.187 (0.125)	-0.719 (1.190)
	30-49	0.009 (0.40)	-0.045 (0.52)	0.512 (0.539)
	50-64	0.012 (0.047)	-0.069 (0.075)	1.831*** (0.518)
	65+	-0.036 (0.056)	-0.091 (0.80)	0.944* (0.543)
Education	Primary	-0.087 (0.057)	-0.073 (0.48)	0.200 (0.702)
	Secondary	0.097** (0.041)	0.023 (0.058)	1.689*** (0.527)
	Further	-0.034 (0.037)	-0.073 (0.048)	0.832* (0.443)
Income	< $Q1$	-0.037 (0.040)	-0.104* (0.054)	0.508 (0.556)
	$]Q1 - Q2]$	0.013 (0.46)	-0.097 (0.063)	1.039* (0.622)
	$]Q2 - Q3]$	0.020 (0.046)	0.188 (0.067)	0.029 (0.624)
	> $Q3$	0.033 (0.067)	0.011 (0.094)	1.154** (0.584)
Forecast Error	< median	-0.066** (0.028)	-0.097 (0.105)	1.660*** (0.381)
	> median	-0.069** (0.030)	-0.069** (0.031)	0.631 (1.130)

Note: the two first columns report marginal effects (in percentage points) from Probit models where the endogenous variable is a dummy variable equal to 1 if the household answers Yes to the question “Did you make major purchases over the last 12 months?”, each cell corresponds to the result of model where the sample is restricted to a given household category. Col. 1 “All” we include quantitative answer to the question on inflation expectations, col. 2 we consider only non zero answers to the question on inflation expectations, col. 3 we use a dummy variable equal to 1 if the HH answers 0 to the quantitative question on inflation expectations. Control variables include year and month dummies, household characteristics (age, location (city, region) education, job, income, survey wave (1, 2 or 3), answers to other question on French economic conditions (standard living, unemployment...), answer to the question about future plans for major purchases and perceived inflation. Standard errors are clustered at the date level. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

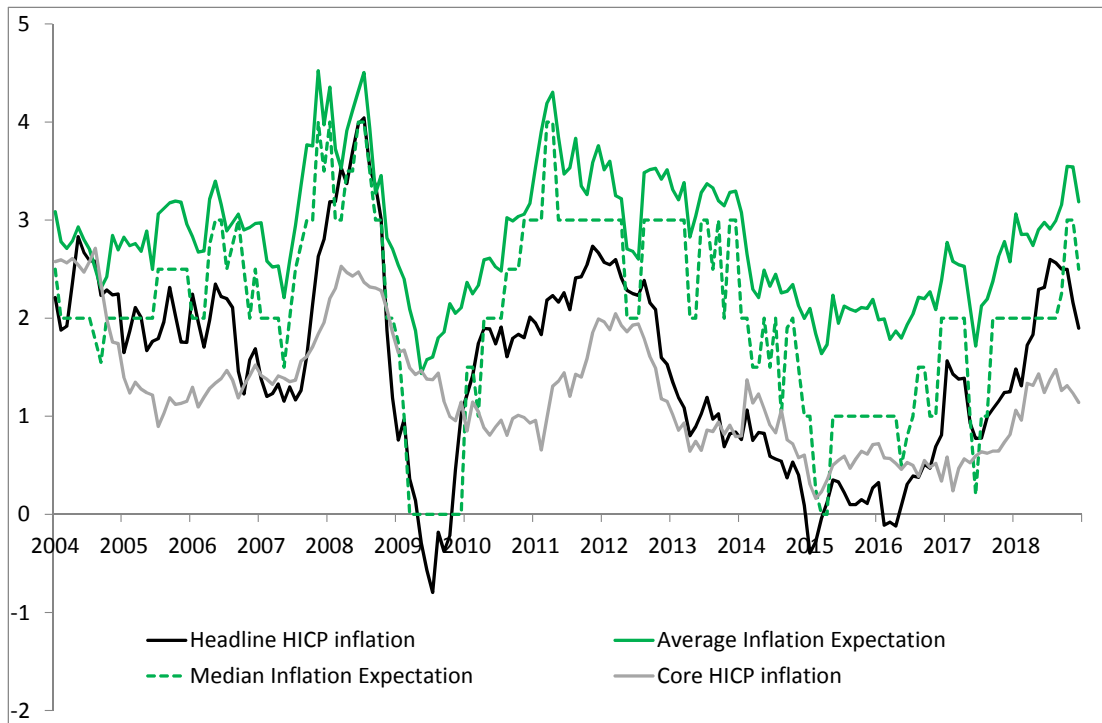
Table 10: Effects of Inflation Expectations on Durable Consumption – Role of controls and additional country evidence

	All	Intensive (Only $\pi^e \neq 0$)	Extensive
<i>A - Role of controls- Own Major Purchases</i>			
No Perceived / Expected Variables	-0.210*** (0.019)	-0.255*** (0.022)	-0.000 (0.297)
+ Perceived Inflation	-0.096*** (0.027)	-0.152*** (0.036)	0.057 (0.338)
+ Expected Own Durable Consumption	-0.065** (0.027)	-0.113*** (0.036)	0.197 (0.335)
+ Expected Own Financial Situation	-0.031 (0.027)	-0.080** (0.036)	0.636* (0.337)
+ Past and Current Own Financial Situation	-0.022 (0.027)	-0.072** (0.036)	0.732** (0.332)
+ Expected Business Cycle & Unemployment	0.000 (0.027)	-0.051 (0.036)	1.016*** (0.330)
+ Good Time to Save (Baseline)	0.005 (0.027)	-0.045 (0.037)	1.021*** (0.337)
Baseline - excluding outliers	0.226*** (0.074)	0.003 (0.109)	1.452*** (0.343)
<i>B- Additional country evidence - "Right Time to Purchase"</i>			
French households (baseline)	0.006 (0.015)	-0.021 (0.019)	0.632*** (0.185)
German households	-0.073*** (0.019)	-0.118*** (0.018)	0.832*** (0.277)
US households	-0.134*** (0.026)	-0.276*** (0.030)	0.743** (0.297)

Note: Panel A of this table reports marginal effects (in percentage points) from Probit regressions where the endogenous variable is a dummy variable equal to 1 if the household 'YES' to the question "Have you made major purchases during the last 12 months?". In all regressions, we keep basic control variables such as year and month dummies, household characteristics (age, location (city, region) diploma, job, income, survey wave (1, 2 or 3). Other control variables include answers to other question on French economic conditions (standard living, unemployment...), answer to the question about future plans for major purchases, right time to save and perceived inflation. 'Excluding outliers' means we remove answers higher than 10%. In the first regression we remove all the other control variables whereas in other regressions, we add control variables one by one. Panel B reports additional country evidence using answers to the question "Do you think now is the right time for people to make major purchases" in France, Germany and in the US. 'French households' reports our baseline marginal effects estimated on the French data. (in percentage points) from Ordered Probit regressions where the endogenous variable is a variable taking 3 different values 0 if the household answers 'No, it is the wrong time', 1 'It is neither the right time nor the wrong time', 2 'Yes, now is the right time' to the question "Do you think now is the right time for people to make major purchases". Marginal effects are calculated for the value "Yes". We control for all observable households characteristics and other answers to the survey. 'German households' reports marginal effects obtained from the equivalent regression using German data (GfK survey on German households, see Appendix G for more details). 'US households' reports marginal effects (in percentage points) from Ordered Probit regressions where the endogenous variable is a variable taking 3 different values 0 if the household answers 'Bad', 1 'Pro-Con', 2 'Good' to the question "Generally speaking, do you think now is a good or a bad time for people to buy major household items?". Marginal effects are calculated for the value 'Good'. We use individual data from the Michigan Survey. We control for all observable households characteristics and other answers to the survey. Extensive margin (US): the dummy variable is equal to 1 if inflation is strictly positive, 0 otherwise. In Appendix, Table H.1 and Figure H.1, we report more detailed results for the US. Standard errors are clustered at the date level. *p<0.1; **p<0.05; ***p<0.01.

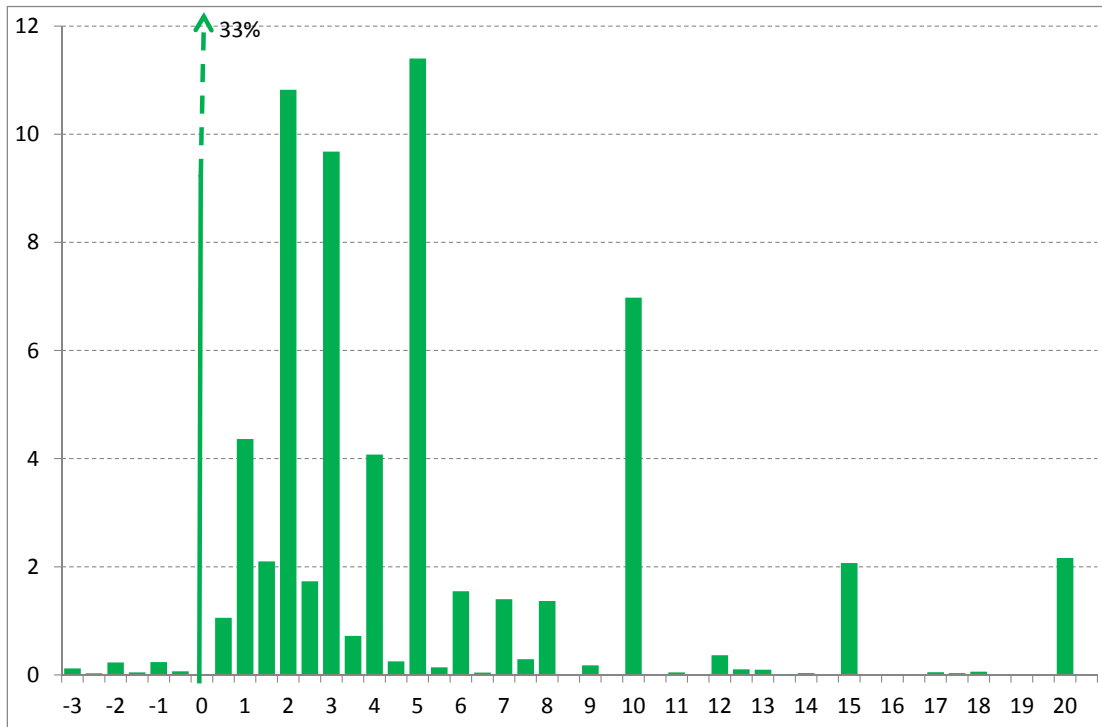
Figures

Figure 1: Expected Inflation and Headline HICP inflation



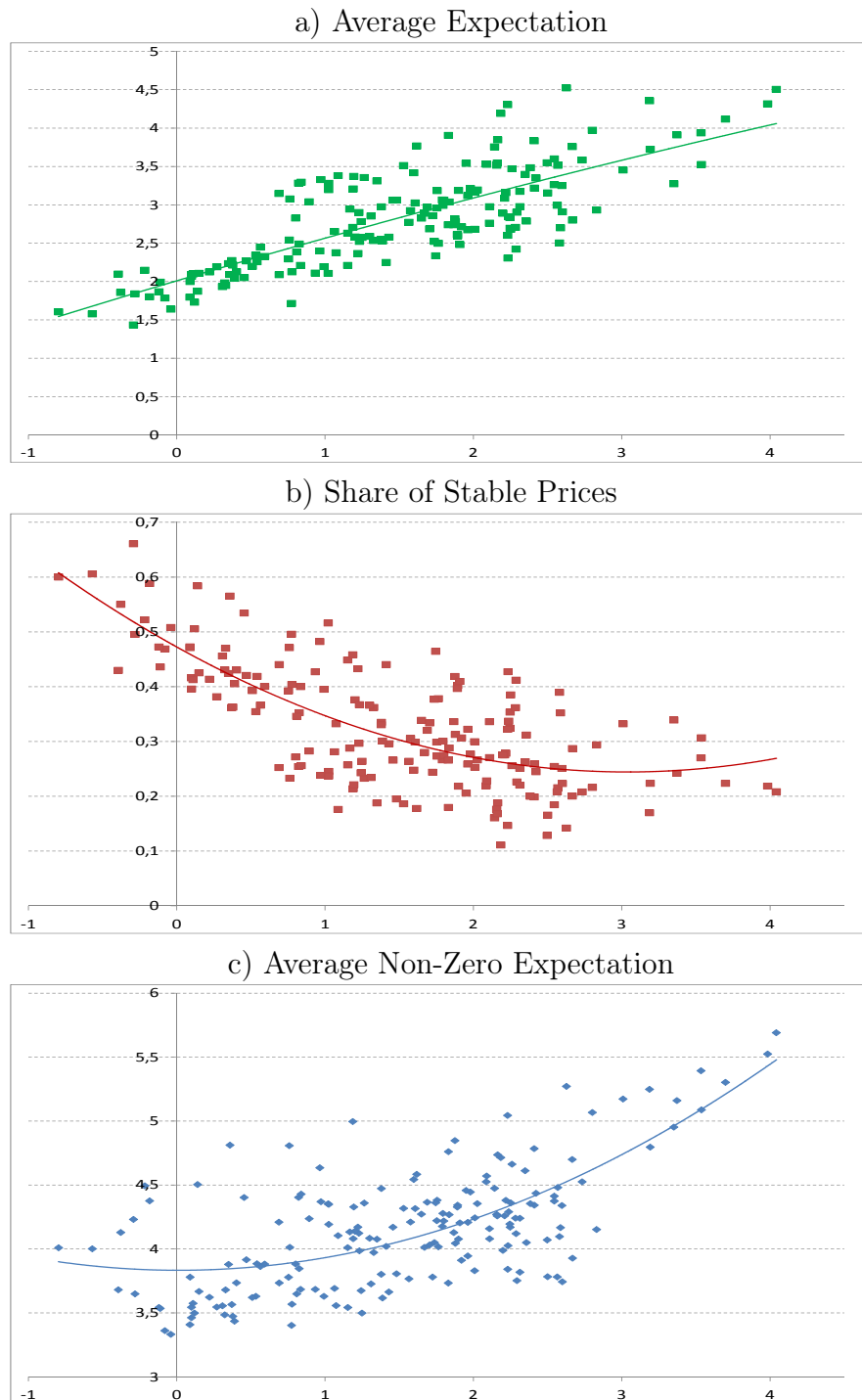
Note: using answers to the quantitative questions on inflation expectations (we have dropped quantitative inflation perceptions larger than 20%), we have computed the simple average/median of all answers date by date. Before 2008, the survey was not conducted in August, in that case, we have replaced aggregate statistics by a simple interpolation between July and September. We have also plotted as benchmarks headline HICP inflation (source Eurostat) and HICP inflation excluding energy (source Eurostat).

Figure 2: Cross Distribution of Inflation Expectations



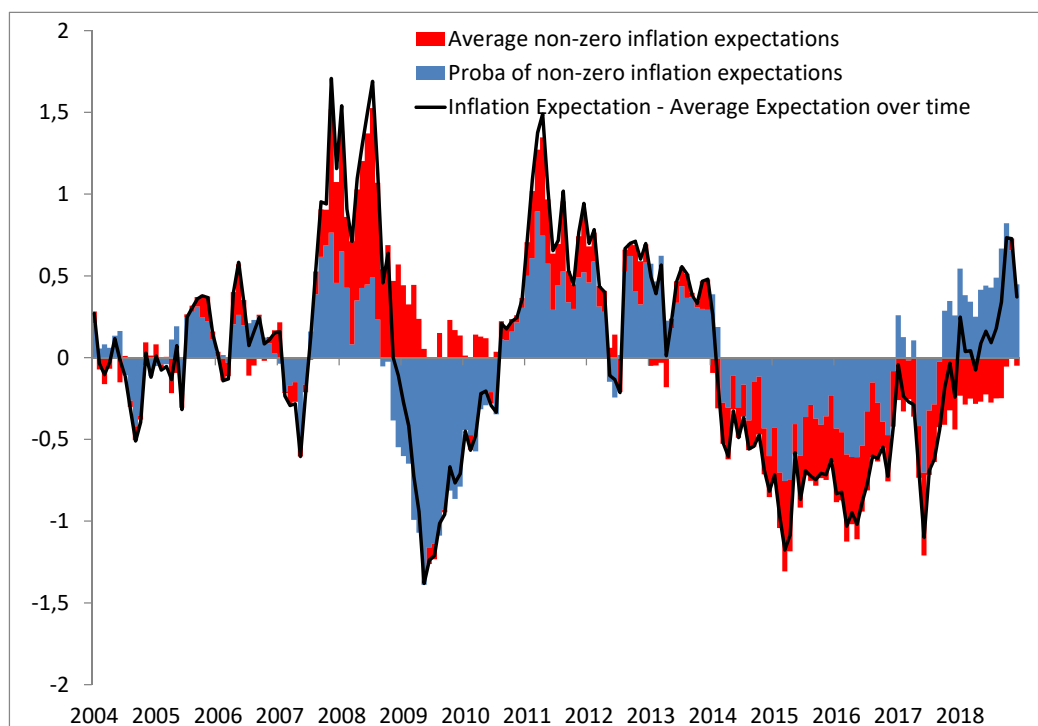
Note: we here represent the distribution of inflation expectations across households computed over the period Jan. 2004 - Dec. 2018. The proportion of answers above 20% is not reported. The distribution is unweighted.

Figure 3: Share of Stable Prices, Average Non-Zero Expected Inflation and Headline CPI Inflation



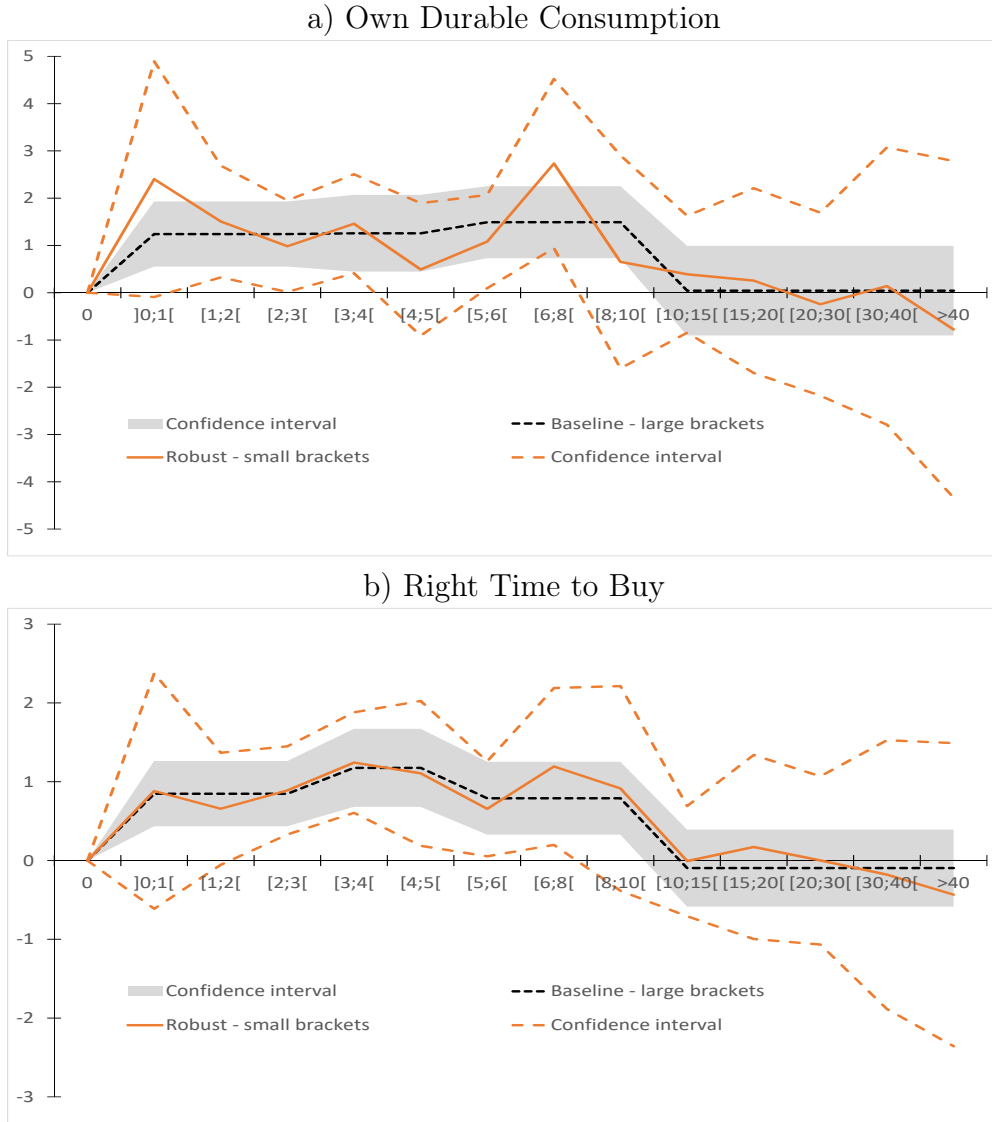
Note: Panel (a) is the scatter plot of average expectation and headline CPI inflation (monthly data). The green line is simple polynomial of degree 2 fitting the data. Panel (b): we have first computed date by date the proportion of individuals reporting expected stable prices (i.e. 0% inflation) and (b) is the scatter plot of this monthly proportion and headline CPI inflation. In red, each dot represents the share of individual answering expecting stable prices over the next 12 months for a given month (and so inflation rate). The red line is simple polynomial of degree 2 fitting the data. Panel (c): we have computed the average inflation expectation (when individuals do not answer stable prices) date by date. The figure is the scatter plot of this monthly average and headline CPI inflation. The blue line is simple polynomial of degree 2 fitting the data.

Figure 4: Aggregate Inflation Expectations Decomposition - Extensive vs Intensive Margins



Note: we plot contributions to aggregate inflation expectations. Black line: aggregate average expected inflation - mean aggregate average expected inflation; blue histogram: contribution of time variations of the probability of non-zero answers (extensive margin); red histogram: contributions of time variations in the average expected inflation (intensive margin).

Figure 5: Marginal Effect of Inflation Expectations on Decision to Buy



Note: These two figures plot our estimates of marginal effects of inflation expectations on decision to buy durables (Panel (a) 'own consumption'; Panel (b) 'Right Time to consume'). The orange line reports results where we have grouped answers by 'smaller' brackets. The reference is 0% (negative answers were grouped in a single bracket but not reported on the graph). Marginal effects are reported in percentage points. Dashed orange lines correspond to the 95% confidence interval. The dashed dark line corresponds to our baseline estimates with 'large' brackets (as reported in Table 6) and the grey shaded area corresponds to the 95% confidence interval associated with these estimates.

Appendix

A A New Keynesian model with an extensive margin of households' inflation expectations

We illustrate the importance of the extensive margin of inflation expectations in a stylized NK model that features (1) households who have heterogeneous views about inflation and (2) households whose consumption decisions react only to shifts between 0- and strictly positive inflation expectations. The importance of the extensive margin for consumption decisions has implications for the transmission of shocks and for policies relying on expectation such as forward guidance.

Model We illustrate our discussion with simulations of a simple three-equation NK model featuring a ZLB constraint and households that are heterogeneous because of their inflation expectations as in [Andrade et al. \(2019\)](#).

$$c_{it} = E_{it}c_{it+1} - \sigma(r_t - mE_{it}\pi_{t+1}) + \delta_t,$$

with c_{it} is log-consumption of individual i at time t , $E_{it}(\cdot)$ is the expectation conditional on individual i 's information at date t , σ is the elasticity of intertemporal substitution, r_t the nominal interest rate, m is an operator mapping expectations into decisions that we specify below, π_t is aggregate inflation between t and $t-1$, and δ_t is a common preference shock. Every variable is expressed in deviation from its steady state.

In addition to this heterogeneity across households we assume that, consistent with our results, individuals map their inflation expectations into their consumption decisions according to the following function:

$$mE_{it}\pi_{t+1} = \begin{cases} c^+/\sigma & \text{if } E_{it}\pi_{t+1} > \epsilon_i \\ 0 & \text{if } E_{it}\pi_{t+1} \leq \epsilon_i \end{cases}$$

with ϵ_i a positive constant. This captures the fact that individuals' consumption adjustment to expected inflation is a discontinuous function, and that two inflation regimes matter: c_{it} is equal to a positive constant if individual i at date t thinks inflation is going to be positive over the next period, and $c_{it} = 0$ if individual i at date t thinks prices will remain broadly stable. The threshold ϵ_i between the two regimes is individual specific as individuals can differ on how they define that prices will "remain broadly stable".

Integrating across households, one gets an aggregate Euler equation of the following kind:

$$c_t = \int c_{it} di = ME_t c_{t+1} - \sigma(r_t - ME_t \pi_{t+1}) + \delta_t$$

where $ME_t c_{t+1} = E_t s_{t+1} c^+$ and $ME_t \pi_{t+1} = s_t c^+$, with s_t the share of households expecting a positive inflation rate at date t .

The distortion between individual beliefs on future inflation and individual consumption choices gives rise to a discounted aggregate Euler equation as in [Angeletos and Lian \(2018\)](#) and [Gabaix \(2020\)](#). Note that the usual Euler equation holds as a subcase when one assumes that every household has access to complete information, so that beliefs about future inflation and consumption are homogenous $E_{it}c_{t+1} = E_t c_{t+1}$ and $E_{it}\pi_{t+1} = E_t \pi_{t+1} \forall i$, and a simple identity mapping between inflation expectations and individual consumption decisions, $M = 1$. One

then gets

$$c_t = E_t c_{t+1} - \sigma(r_t - E_t \pi_{t+1}) + \delta_t.$$

For simplicity of exposure, we assume that firms behave as in the standard NK setup, so that the usual Phillips curve holds

$$\pi_t = \beta E_t \pi_{t+1} + \kappa c_t.$$

We also postulate that the monetary policy authority keeps the interest rate (in deviation from its steady-state value) constant at $-r$ over a given number of periods T before switching to an inflation targeting rule (for instance because of a ZLB constraint or as a result of a strategy making-up for past inflation realizations below target)

$$r_t = \begin{cases} -r, & t = 1, \dots, T, \\ \phi \pi_t, & t > T. \end{cases}$$

Calibration In what follows, we calibrate the model using standard parameter values as in e.g. (Galí, 2015) and our estimation results.³⁴

σ	.5
β	.99
κ	.1
ϕ	1.5
c^+	$3 \times .00075$

We compute the equilibrium path for inflation and output under the following scenario. We consider that a sequence of deterministic preference shocks puts the economy at the ZLB for T_{ZLB} periods and lowers the fraction of households thinking that inflation is positive to s^- . Absent any policy intervention, that fraction goes back to its steady state at the end of the trap. Alternatively, we consider that the central bank gives forward guidance that it will keep its interest rate at zero for T_{MP} additional period of accommodation and convince a fraction s^+ of households that inflation will be positive at the end of the trap.

In these exercises, we calibrate the preference shock to $\delta_t = -1\%$ for the periods where the ZLB is binding and to zero otherwise. We assume that the preference shocks last for 12 quarters. We choose $c^+ = .215\%$ consistent with our estimation results on monthly durable goods. We also assume that the intensive margin of durable consumption does not change over time and that non-durable goods do not react to changes in the real interest rate. Finally we assume that the trap has a one standard deviation negative impact on the share of households believing that prices will increase next period $s_t = -.1$, $t = 1, \dots, T_{ZLB}$. Symmetrically, we assume that the central bank has the ability to steer households' expectations and that forward guidance increases the share of households expecting a positive inflation at the end of the trap by one standard deviation $s_t = .1$, $t = 1, \dots, (T_{ZLB} + T_{MP})$ and leaves this share at its steady state value before.

³⁴See table 1 and section 6 in the main text.

The mitigation of the expectation channel: Missing deflation and forward guidance Figures A.1a and A.1b illustrate the reaction to the above sequence of shocks obtained under a standard 3 equation NK model, and compare it to the reaction obtained when one introduces the behavioral distortion described above. As is well known, in the standard NK model, this shock is extremely detrimental. The ZLB constraint induces a deflationary spiral which makes the output contraction and the initial deflation quite dramatic with a quarterly output loss of more than 10% and a quarterly deflation of about 7% at impact. This reaction seems to be extreme compared to what happened during the Great Recession.

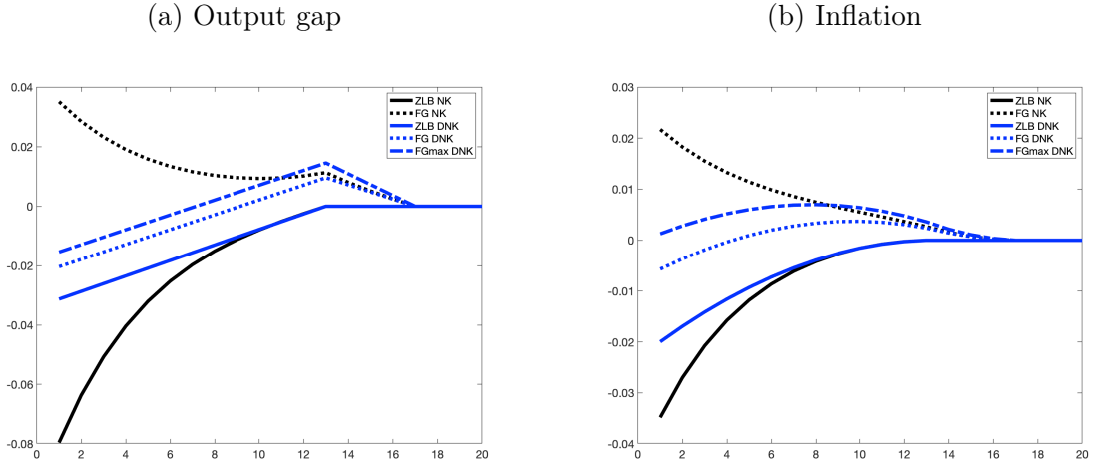
By contrast, the presence of households with discrete views makes this deflationary spiral much less potent so that the recession to the same shock while significant is more than two times lower at impact both for inflation and output. From this point of view, the importance of extensive margin limits the extent to which expected inflation becomes negative in a trap. This is consistent with the fact that individuals' inflation expectations helped to stabilize the economy during the Great Recession as emphasized in e.g. Coibion and Gorodnichenko (2015a).³⁵

. As figures A.1a and A.1b also highlight, forward guidance on interest rates is much less potent in the model with heterogeneous and discrete beliefs than in the standard NK model. A central bank committing to keep interest rates at zero for 4 extra periods at the end of the trap has an extremely expansionary impact on the economy. This is the well-known FG puzzle underlined in e.g. Del Negro et al. (2015). By contrast, the expectation channel hence forward guidance are much less potent with discrete beliefs. Note that to be effective, forward guidance policies need to convince a substantial share of households expecting prices to remain stable to switch to a positive inflation regime. The conditions under which such policies will achieve this remain to be explored.

Limited ammunition An important consequence of discrete inflation expectations is that when households already expect positive inflation, a further increase in their expectations would not translate into more households purchasing durable goods. This finding thus suggests that forward guidance can be effective when it has an impact on the households expecting prices to remain stable. Once all households are out of this regime, there is no possibility to raise consumption by increasing inflation expectations further. More generally, the expectation channel of policies is limited and less powerful: once it has been used, it cannot be further used. This finding is illustrated in A.1a and A.1b under the FG max DNK scenario which assumes that 100% of households expect a positive inflation regime at the end of the trap. This limit in the impact of FG is consistent with McKay and Wieland (2020) who obtained it in a model with sticky prices and adjustment costs on durable consumption.

³⁵Note that this mitigation of the inflation could be reinforced if one assumed that firms have the same behavior than households, as assumed in e.g. Coibion and Gorodnichenko (2015a), so that their discrete view on aggregate inflation expectation imperfectly transmits to pricing decisions in ones of firms.

Figure A.1: ZLB and FG with discrete beliefs



Note: The plain black line (ZLB NK) corresponds to the reaction of the standard NK model to a shock pushing the economy to the ZLB and the dotted black line (FG NK) to a forward guidance shock. The plain blue line (ZL DNK) corresponds to the reaction of the NK model with discrete adjustment of consumption to inflation expectations to a shock pushing the economy to the ZLB and the dotted blue line (FG DNK) to a forward guidance shock. Finally the dashed blue line (FGmax DNK) corresponds to a case where 100% of households expect positive inflation after the shock.

B Questionnaire

We here provide a translation of the full questionnaire of the survey. all socio-demographic questions are only asked during the first interview and are pretty standard (age, occupation, diploma, income, number of members in the HH, marital status, region, city size...), the wording is not reported here. Since the wording of the questionnaire is harmonized across European Union countries, for the questions which are common to all countries, we use the wording of the UK survey (see https://ec.europa.eu/info/sites/info/files/questionnaires_uk_cons_en.pdf), the French version is highly similar. We have grouped questions by general topics (general eco. situation, prices, consumption/saving and own financial situation) and this order does not follow the actual order in which questions are asked to households.

General Economic Situation

- Q1. How do you think the general economic situation in France has changed over the past 12 months? It has...
1. Got a lot better, 2. Got a little better, 3. Stayed the same, 4. Got a little worse, 5. Got a lot worse, 6. Don't Know.
- Q2. How do you expect the general economic situation in France to develop over the next 12 months? It will...
1. Get a lot better, 2. Get a little better, 3. Stay the same, 4. Get a little worse, 5. Get a lot worse, 6. Don't Know.
- Q3. How do you think the quality of life in France, as a whole has changed over the past 12 months? It has...

1. Got a lot better, 2. Got a little better, 3. Stayed the same, 4. Got a little worse, 5. Got a lot worse, 6. Don't Know.

Q4. How do you expect the quality of life in France to develop over the next 12 months? It will...

1. Get a lot better, 2. Get a little better, 3. Stay the same, 4. Get a little worse, 5. Get a lot worse, 6. Don't Know.

Q5. How do you expect the number of people unemployed in this country will change over the next 12 months? The number will...

1. Increase sharply, 2. Increase slightly, 3. Remain the same, 4. Fall slightly, 5. Fall sharply, 6. Don't Know.

Prices

Q6. How do you think consumer prices have developed over the last 12 months? They have...

1. Risen a lot, 2. Risen moderately, 3. Risen slightly, 4. Stayed about the same, 5. Fallen, 6. Don't Know.

(If answer different than "Stayed about the same" at Q6, ask:)

Q7. By how many percent do you think consumer prices have gone up/down over the past 12 months? Please give an estimate. Record up to one decimal place.

Consumer prices have increased/decreased by XX.X%

Q8. In comparison with the past 12 months, how do you expect consumer prices will develop in the next 12 months? They will...

1. Increase more rapidly, 2. Increase at the same rate, 3. Increase at a slower rate, 4. Stay about the same, 5. Fall, 6. Don't Know.

(If answer different than "Stayed about the same" at Q8, ask:)

Q9. By how many percent do you think consumer prices will go up/down over the next 12 months? Please give an estimate. Record up to one decimal place.

Consumer prices will increase/decrease by XX.X%

Consumption / Savings

Q10. In view of the current general economic situation, do you think now is the right time for people to make major purchases (such as furniture, washing machines, electronic or computer equipment ...)?

1. Yes, now is the right time, 2. It is neither the right time nor the wrong time, 3. No, it is the wrong time, 4. Don't Know.

Q11. In view of the general economic situation, do you think that now is?

1. A very good time to save, 2. A fairly good time to save, 3. Not a good time to save, 4. A very bad time to save, 5. Don't know.

Q12. Over the next 12 months, how likely will you be to save any money?

1. Very likely, 2. Fairly likely, 3. Not likely, 4. Not at all likely, 5. Don't know.

Q13. Have you made any major purchases over the last 12 months? (washing machine, refrigerator, furniture, dishwasher, ...)

1. Yes, 2. No, 3. Don't know.

Q14. How likely are you to make major purchases over the next 12 months?

1. Very likely, 2. Fairly likely, 3. Not likely, 4. Not at all likely, 5. Don't know.

Q15. How likely are you to buy a car over the next 12 months?

1. Very likely, 2. Fairly likely, 3. Not likely, 4. Not at all likely, 5. Don't know.

Q16. Are you planning to buy or build a home over the next 12 months (to live in yourself, for a member of your family, as a holiday home, to let etc.)?

1. Very likely, 2. Fairly likely, 3. Not likely, 4. Not at all likely, 5. Don't know.

Q17. How likely are you to spend any large sums of money on home improvements or renovations over the next 12 months?

1. Very likely, 2. Fairly likely, 3. Not likely, 4. Not at all likely, 5. Don't know.

Own Financial Situation

Q19. Which of these statements best describes the current financial situation of your household?

1. We are saving a lot, 2. We are saving a little, 3. We are just managing to make ends meet on our income, 4. We are having to draw on our savings, 5. We are running into debt, 6. Don't know.

Q20. How has the financial situation of your household changed over the last 12 months? It has...

1. Got a lot better, 2. Got a little better, 3. Stayed the same, 4. Got a little worse, 5. Got a lot worse, 6. Don't Know.

Q21. How do you expect the financial position of your household to change over the next 12 months? It will...

1. Get a lot better, 2. Get a little better, 3. Stay the same, 4. Get a little worse, 5. Get a lot worse, 6. Don't Know.

C Further descriptive statistics of the survey

C.1 Statistics on response rates

As illustrated by Table C.1, non-response rates are very low for the questions regarding one's household own consumption (less than 1% in general). There is less frequent answers to the questions on the right time to make purchases of durable goods in general (the non-response rate is about 5%).

Table C.2 provides estimates of a qualitative model of the main determinants of the non-response probability for the quantitative questions on inflation expectations (as well as perceptions). Households with a higher income and better educated are more likely to respond whereas older people and women are less likely to respond.

Table C.1: Non-response Rates (in %) to Price and Consumption Questions

	Non-Response		
	Quali.	Quanti.	Outlier ($\geq 10\%$)
Perceived Inflation	0.96	52.21	29.60
Expected Inflation	5.22	59.83	21.88
Right Time to Purchase Own Major Purchase	4.05	-	-
Past 12 Months	0.07	-	-
Next 12 Months	0.75	-	-

Note: this table reports the percentage of non-response calculated as the ratio between the number of households who answer "do not know" to a question. We also report the percentage of outliers or implausible values for quantitative inflation expectations, we set a threshold at 10% of inflation and the percentage is calculated as the number of answers above or equal to 10% over the total number of answers (among households answering to the question).

Table C.2: Determinants of Non-Response / Outliers to Quantitative Price Questions - Marginal Effects

		Non-Response		Outlier (more than 10%)	
		Perception	Expectation	Perception	Expectation
HH Income (Ref: < Q1)	[Q1; Q2]	-1.460*** (0.214)	-0.786*** (0.210)	-5.242*** (0.424)	-5.452*** (0.488)
	[Q2; Q3]	-3.182*** (0.242)	-1.328*** (0.228)	-8.922*** (0.452)	-9.292*** (0.514)
	> Q3	-5.390*** (0.272)	-1.750*** (0.250)	-15.629*** (0.472)	-14.969*** (0.529)
Education (Ref: Primary)	Secondary	-5.255*** (0.224)	-2.230*** (0.228)	0.631 (0.428)	0.356 (0.486)
	Further	-6.833*** (0.226)	-2.904*** (0.228)	-3.158*** (0.420)	-3.171*** (0.474)
Age (Ref: 16-29)	30-49	1.162*** (0.373)	-0.015 (0.312)	-0.422 (0.594)	-1.908*** (0.646)
	50-64	2.579*** (0.377)	1.049*** (0.318)	-2.407*** (0.607)	-3.233*** (0.663)
	65+	8.782*** (0.447)	2.676*** (0.392)	-6.646*** (0.732)	-7.708*** (0.789)
Gender (Ref: Male)	Female	5.643*** (0.180)	1.750*** (0.165)	10.441*** (0.317)	8.988*** (0.350)
Occupation (Ref: Yes)	No, Unemployed	-1.726*** (0.610)	0.211 (0.568)	3.567*** (1.030)	2.963*** (1.094)
	No Retired	-0.367 (0.450)	0.076 (0.440)	-1.996** (0.790)	-0.862 (0.869)
	No Inactive	3.217*** (0.414)	0.908** (0.407)	3.249*** (0.732)	1.805** (0.782)
HH Size (Ref = 1)	2	-1.224*** (0.317)	-0.384 (0.292)	3.997*** (0.515)	3.774*** (0.533)
	3	-1.595*** (0.358)	0.050 (0.326)	6.459*** (0.584)	5.150*** (0.604)
	> 3	-1.499*** (0.376)	0.532 (0.343)	8.407*** (0.617)	7.585*** (0.645)
Survey Wave (Ref: 1)	2	0.196 (0.281)	-0.763*** (0.263)	-4.398*** (0.499)	-3.520*** (0.545)
	3	0.240 (0.342)	1.279*** (0.316)	-6.057*** (0.597)	-4.376*** (0.649)
Controls	Yes	Yes	Yes	Yes	Yes
Obs		262,113	211,674	126,378	211,674

Note: this table reports marginal effects (in percentage points) from Probit regressions where the endogenous variable is a dummy variable taking the value 1 in case on non-response to the quantitative price question. Control variables include date dummies, household characteristics (age, location (city, region) diploma, job, income, survey wave (1,2 or 3)). *p<0.1; **p<0.05; ***p<0.01.

C.2 Descriptive statistics on qualitative and quantitative inflation expectations

Table C.3: Inflation Expectations: Qualitative vs. Quantitative Answers

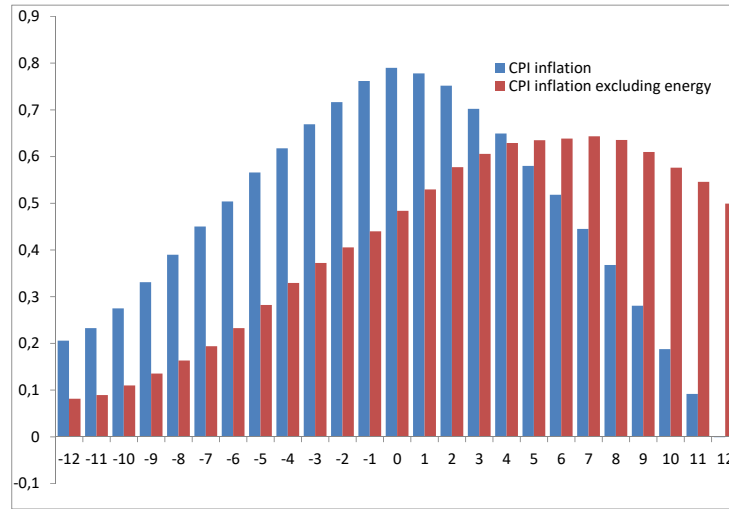
		Quantitative answers			
	%	Mean	Q1	Q2	Q3
<hr/>					
Qualitative answers					
Increase more rapidly	9.1	4.93	3	4.5	7
Increase at the same rate	44.6	4.35	2	3.5	5
Increase at a slower rate	13.8	3.15	2	2.5	4.5
Stayed about the same	26.1	0	0	0	0
Fall	1.2	-3.59	-5	-2	-1
Don't know	5.2	-	-	-	

Note: this table reports the main statistics on quantitative inflation expectations according to the answer given to the qualitative question on inflation expectation (we here use the whole cross-section of the data set). The first column reports the share of households answering to the different qualitative categories. The second to fifth columns report the moments of the distribution of quantitative inflation expectations conditional on providing a given answer to the qualitative question.

C.3 Dynamic correlations

Inflation expectations Figure C.1 shows the dynamic correlations between the average expected rate of inflation with the actual headline or core inflation rates. The maximum correlation of average expectation with inflation is obtained for dates $t - t + 1$. Part of this correlation comes from large fluctuations of energy prices but even when we exclude energy prices, this correlation is still quite strong (about 0.6). In terms of dynamic correlations, the largest correlation is obtained for dates between $t + 3$ and $t + 6$.

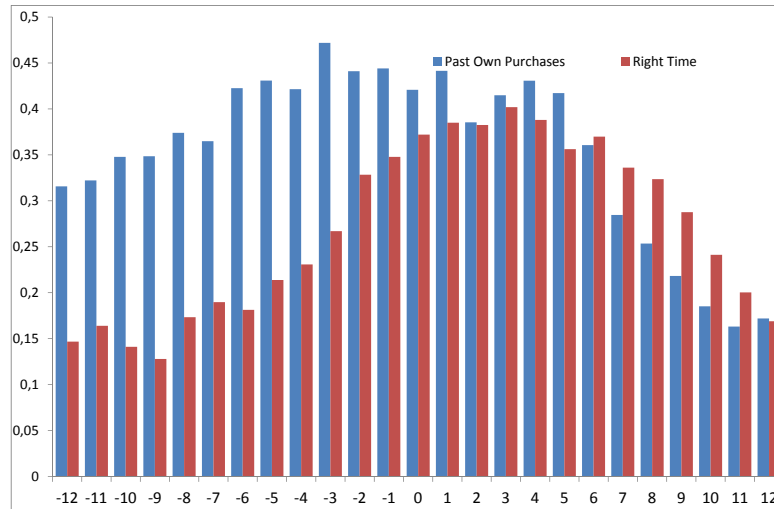
Figure C.1: Dynamic Correlation Between Inflation and Average Inflation Expectation



Note: we have first computed date by date the simple average answer to the quantitative questions on inflation expectations. This figure plots the dynamic correlation between the average expected rate of inflation and actual headline CPI inflation / CPI inflation excluding energy. Dynamic correlations are calculated using lagged and forwarded values of actual inflation (between $t-12$ months until $t+12$ months).

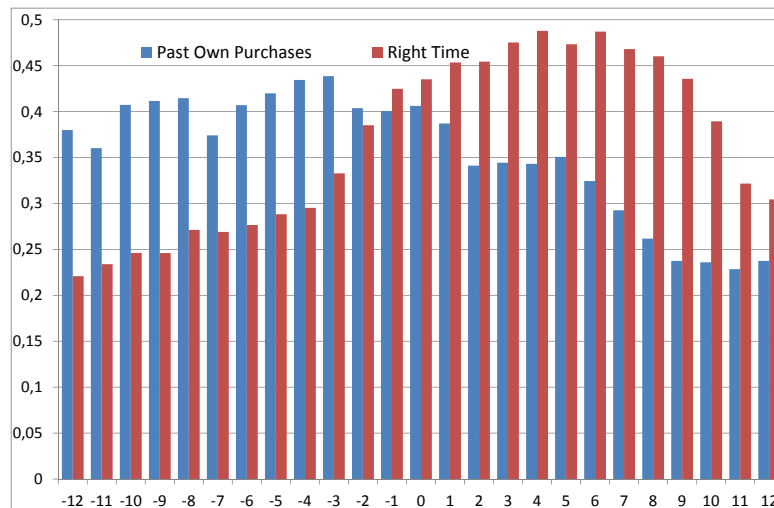
Durable consumption Figures C.2 and C.3 plot the dynamic correlation between actual durable consumption growth rate and the share of individuals answering positively to survey questions on consumption. The correlation between aggregate durable consumption growth is a little higher for the lagged series of past own purchase decisions whereas for the question “Right time to purchase”, the maximum correlation with aggregate consumption growth is obtained at $t + 6$, suggesting that the question ‘right time to purchase’ captures better intentions of future purchases. The main conclusions are quite similar if we look at the correlation with aggregate consumption growth excluding transport equipment.

Figure C.2: Dynamic Correlation Between Aggregate Actual Durable Expenditures and Aggregate Answers on Durable Expenditure in the Survey



Note: we have first calculated date by date the proportion of individuals answering: Yes to the question "Over the last 12 months, have you made durable expenditures?", and Yes to the question, "Is it the right time to make large purchases?". Then, we have calculated the correlation between these time-series of share of individuals answering Yes to questions on durable consumption and the annual growth rate of monthly durable expenditures (source Insee). Dynamic correlations are calculated using lagged and forwarded values of the actual growth rate of durable consumption between $t-12$ months and $t+12$ months.

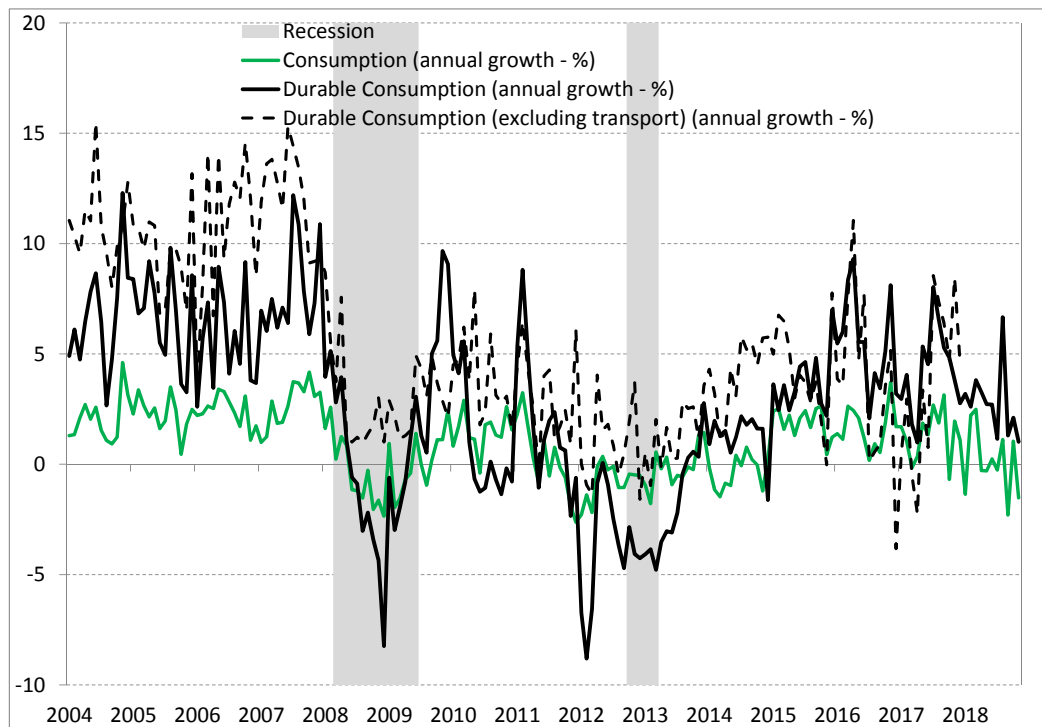
Figure C.3: Dynamic Correlation Between Aggregate Actual Durable Consumption (excluding Cars) and Aggregate Answers on Durable Expenditure in the Survey



Note: we have first calculated date by date the proportion of individuals answering: Yes to the question "Over the last 12 months, have you made durable expenditures?", and Yes to the question, "Is it the right time to make large expenditures?". Then, we have calculated the correlation between these time-series of share of individuals answering Yes to questions on durable consumption and the annual growth rate of monthly durable expenditures (source Insee). Dynamic correlations are calculated using lagged and forwarded values of the actual growth rate of durable consumption between $t-12$ months and $t+12$ months.

D Statistics on durable consumption

Figure D.1: Aggregate Consumption Growth in France - Total and Durables



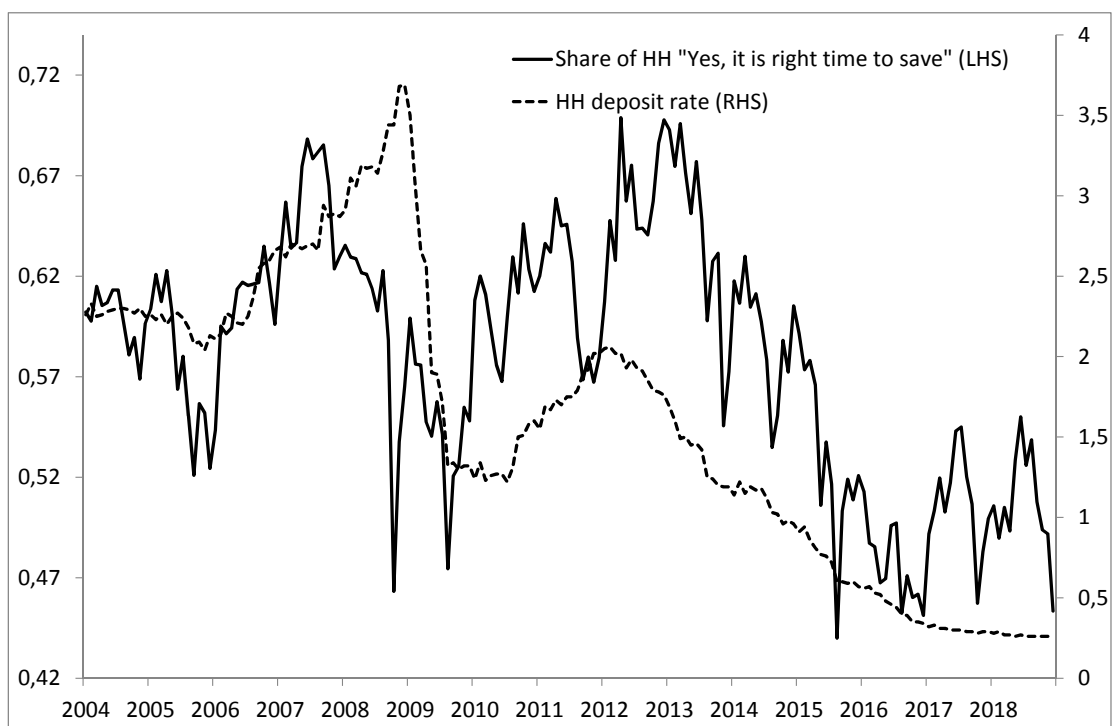
Note: Annual growth rate of household consumption of goods (including, food, manufactured goods and energy), durables (including transport equipment, housing equipment and other durables), durables excluding transport equipment (source Insee)

Table D.1: Distribution of Durable Consumption (Household Budget Surveys 2005-2011)

	Year	Freq.	Moments - in euros			
			Q1	Q2	Q3	P90
<hr/>						
Overall	2005	0.59	340	740	1559	2941
	2011	0.62	400	749	1450	2605
Home Appliances	2005	0.27	270	458	744	1213
	2011	0.30	280	422	700	1103
TV, computers, phones...	2005	0.35	200	416	990	1600
	2011	0.41	269	500	850	1370
Furniture	2005	0.30	240	531	1260	2846
	2011	0.28	270	549	1200	2570

Note: this table reports some moments of the distribution of durable spending over a year. Individual data comes from the survey "Enquete Budget des Familles", every 5 years Insee collects individual data on consumption for more than 10,000 households, HH report their durable spending over the last 12 months, product by product. We have dropped individual product spending less than 100 euros. We have calculated for every household in the survey the total durable spending. 'Freq.' reports the share of households reporting durable spending over the last 12 months. The four last columns report moments of the distribution conditional of having reported a positive durable consumption.

Figure D.2: Right Time to Save and the Deposit Interest Rate



Note: we have calculated date by date the share of households answering "Yes, this is the right time for people to save" using individual answers of survey and we plot the monthly nominal interest on households' short-term deposits over the same period (source: Banque de France)

E Additional survey modules

E.1 Determinants of Answers Prices Expected to Stay about the Same

In this Appendix, we document how we can relate expectations of prices to stay about the same and the perceptions about prices of specific goods. For that, we use the supplementary modules of the survey conducted in April 2007 and February 2009 where questions on perceived inflation are asked for 9 different goods/services: bread, beef, food oil, electricity, car repair, gasoline, phone/internet, washing machine and TV set. For each of the good/service, the question is the following:

Question 5. *In your opinion and in general, the price of the good/service i...*

1. *Has increased more than other prices*
2. *Has increased like other goods*
3. *Has stayed about the same*
4. *Has fallen*
5. *It depends (on characteristics of the good, on outlet type...)*
6. *Don't know*

E.2 What stable prices means?

We use the complementary quarterly module of the monthly survey conducted in September 2007. This module contains specific questions asked to all households of the monthly sample. Most of the time, this quarterly module is a one-shot module with specific questions about very different topics: IT equipment, environmental concerns, consumption habits, financial difficulties, housing issues... These modules contain several questions. In September 2007, households were asked to answer questions about what they mean by saying that prices will stay about the same to the question on inflation expectations over the next 12 months and on perceived inflation over the last 12 months.

Question 6. *About the evolution of prices over the next 12 months, you said that prices would remain about the same. Do you mean that: 1. Prices will increase at the same rate as today 2. Prices will remain the same over the next 12 months*

Question 7. *If answer 1., by how much prices will increase over the next 12 months? XX.X%*

In September 2007, 1847 households were surveyed, 292 households (i.e. 16%) answer that prices will remain about the same over the next 12 months. About 60% of households answering that prices will remain about the same do mean that prices will remain about the same over the next 12 months.

Table E.1: Simple Statistics on Inflation Expectations – September 2007

	Mean	Q1	Q2	Q3
Stay about the same	1.35	0	0	2
Fall	-9.33	-15	-10	-3
Increase at a slower rate	3.80	2	3	5
Increase at the same rate	6.31	3	5	7
Increase more rapidly	7.92	4	4.5	10

Note: the table reports descriptive statistics on quantitative answers to inflation expectations for each modality of the qualitative question in September 2007. For the modality "Stay about the same", we use answers from the complementary quarterly module of questions. Answers are in %. For comparison, Table C.3 in Appendix reports similar statistics for the full sample of households.

E.3 Aggregate Inflation Expectation: Variance Decomposition

Baseline variance decomposition As described in Section 3, the average of individual expectations, $\pi_{t|t+1}^e = \frac{1}{n_t} \sum_{i=1}^{n_t} \pi_{i,t|t+1}^e$ can be decomposed into two components:

$$\pi_{t|t+1}^e = fr_t \times dp_{t|t+1}^e$$

with $fr_t = \left(\frac{1}{n_t} \sum_{i=1}^{n_t} I_{it} \right)$ the fraction of households with positive inflation expectations and with $dp_{t|t+1}^e = \left(\sum_{i=1}^{n_t} I_{it} \right)^{-1} \left(\sum_{i=1}^{n_t} \pi_{i,t|t+1}^e \right)$ the average among households having non-zero inflation expectations.

We can then decompose fluctuations in the average inflation expectations of households into changes in both the extensive and the intensive margins:

$$\pi_{t|t+1}^e - \bar{\pi}^e = \underbrace{(fr_t - \bar{fr}) \bar{dp}^e}_{extensive} + \underbrace{(dp_{t|t+1}^e - \bar{dp}^e) \bar{fr}}_{intensive} + O(t).$$

Following Klenow and Kryvtsov (2008), we can thus write the variance of $\pi_{t|t+1}^e$ as:

$$V\left(\pi_{t|t+1}^e\right) = \underbrace{V\left(dp_{t|t+1}^e\right) \bar{fr}^2}_{intensive} + \underbrace{V(fr_t) \bar{dp}^2 + 2cov\left(fr_t, dp_{t|t+1}^e\right) \bar{dp}^e \bar{fr}}_{extensive}$$

Alternative imputation assumptions As discussed in subsection 3.3, the average inflation expectations and its variance, but also the contribution of the extensive margin to inflation variations depend on the value imputed to answers ‘Prices will stay about the same’. If we assume that a non-zero inflation expectation for households answering ‘Prices will stay about the same’, the average of individual expectations, can be decomposed into two components:

$$\pi_{t|t+1}^e = (1 - fr_t) \times s_{t|t+1}^e + fr_t \times dp_{t|t+1}^e$$

with $fr_t = \left(\frac{1}{n_t} \sum_{i=1}^{n_t} I_{it} \right)$ the fraction of households with positive inflation expectations and with $dp_{t|t+1}^e = \left(\sum_{i=1}^{n_t} I_{it} \right)^{-1} \left(\sum_{i=1}^{n_t} I_{it} \pi_{i,t|t+1}^e \right)$ the average among households having non-zero inflation expectations, and $s_{t|t+1}^e = \left(\sum_{i=1}^{n_t} (1 - I_{it}) \right)^{-1} \left(\sum_{i=1}^{n_t} (1 - I_{it}) \pi_{i,t|t+1}^e \right)$ the average among households expecting prices to ‘stay about the same’.

We can then decompose fluctuations in the average inflation expectations of households into changes in both the extensive and the intensive margins:

$$\pi_{t|t+1}^e - \bar{\pi}^e = \underbrace{(fr_t - \bar{fr}) (\bar{dp}^e - \bar{s}^e)}_{extensive} + \underbrace{(dp_{t|t+1}^e - \bar{dp}^e) \bar{fr} + (s_{t|t+1}^e - \bar{s}^e) (1 - \bar{fr})}_{intensive} + O(t).$$

In a first approach, we consider no time-variation in the average expectation for households expecting prices to remain about the same (i.e. we assume a constant average answer equal to

\bar{s}^e). In that case, the average inflation can be decomposed as the following:

$$\pi_{t|t+1}^e - \bar{\pi}^e = \underbrace{(fr_t - \bar{fr}) (\bar{dp}^e - \bar{s}^e)}_{extensive} + \underbrace{(dp_{t|t+1}^e - \bar{dp}^e) \bar{fr}}_{intensive} + O(t).$$

and the variance decomposition is the following:

$$V(\pi_{t|t+1}^e) = \underbrace{V(dp_{t|t+1}^e) \bar{fr}^2}_{intensive} + \underbrace{V(fr_t) (\bar{dp}^e - \bar{s}^e)^2 + 2cov(fr_t, dp_{t|t+1}^e) (\bar{dp}^e - \bar{s}^e) \bar{fr}}_{extensive}$$

When we compare this expression with our baseline variance decomposition, the contribution of the intensive margin to overall variance does not depend on \bar{s}^e and is the same as the one in our baseline case. However the contribution of the extensive margin (and so, the overall variance) will decrease with \bar{s}^e (in particular through the term $V(fr_t) (\bar{dp}^e - \bar{s}^e)^2$).

If we relax the assumption of no time-variation in the average expectation for households expecting prices to remain about the same. For instance, we can assume that the time variance of the average expectation for households expecting prices to remain ‘about the same’ is the same as the one observed for households expecting prices to increase. In that case, one additional covariance term will add to the contribution of the extensive margin to the overall inflation variance (increasing both the contribution of the extensive margin and the overall variance of inflation):

$$V(fr_t) (\bar{dp}^e - \bar{s}^e)^2 + 2cov(fr_t, dp_{t|t+1}^e) (\bar{dp}^e - \bar{s}^e) \bar{fr} + 2cov(fr_t, s_{t|t+1}^e) (\bar{dp}^e - \bar{s}^e) (1 - \bar{fr})$$

Similarly, two terms will add to the contribution of the intensive margin, one is the variance of the answers imputed to households expecting prices to remain the same (here, both are equal) and the other is a covariance term between the two average answers:

$$V(dp_{t|t+1}^e) \bar{fr}^2 + V(s_{t|t+1}^e) (1 - \bar{fr})^2 + 2cov(dp_{t|t+1}^e, s_{t|t+1}^e) (\bar{fr}) (1 - \bar{fr})$$

We report results associated to these variance decomposition exercises in Table 5 in the main text and Table E.2 in this Appendix. In the first one, we assume different average values for the answer imputed to households expecting prices to ‘stay about the same’ (but we assume no time variation in this average answer). In the second table, we relax the assumption of no time variations in the average answer and assume that the time variance of the average answer imputed to households expecting prices to ‘stay about the same’ is the same as the one observed for households expecting prices to ‘increase’.

In our first exercise (Table 5 in the main text), when we increase the average answer imputed to households answering prices to stay about the same, as expected, it increases the average aggregate inflation expectation and reduces its variance over time because the contribution of the extensive margin decreases (in particular because of the term: $V(fr_t) (\bar{dp}^e - \bar{s}^e)^2$ whereas the intensive margin remains unchanged.

In our second exercise, assuming some time variation in the average imputed answer has a large positive effect on the overall variance of inflation (relative to the previous exercise): in our baseline scenario with 0% imputed answer the overall variance is now 0.56 compared to 0.41 in the case without time-variation. This additional variance comes mainly from the intensive

margin (i.e. the term $V\left(s_{t|t+1}^e\right)\left(1-\overline{f r}\right)^2$). This leads to a smaller contribution of the extensive margin (62% in the 0% scenario versus 76% in our baseline scenario). When we increase the average answer imputed to households answering prices to ‘stay about the same’, results are quite similar as the one described above, the overall variance decreases since the contribution of the extensive margin decreases.

Table E.2: Variance Decomposition - imputation with time-variations

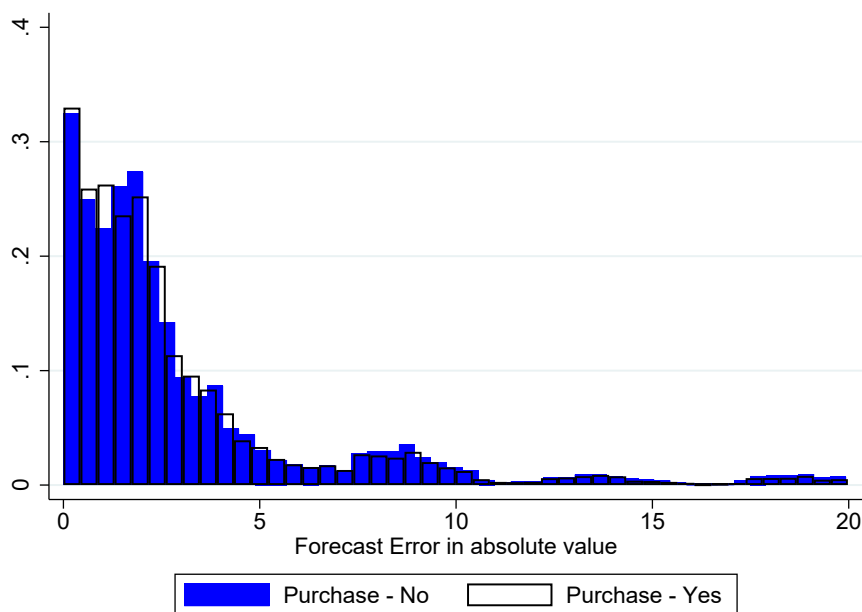
Imputed Value (in %)	Average Agg. Expect.	Var. of Agg. Expect.	Tot.	Contrib. Freq.	Extensive Cov.1	Cov.2	% of Variance Ext.	Freq.
0	2.80	0.56	0.35	0.20	0.10	0.05	62.0	36.3
0.5	2.96	0.50	0.29	0.16	0.09	0.04	57.1	31.6
1	3.12	0.44	0.23	0.12	0.07	0.04	51.5	26.7
1.5	3.29	0.39	0.17	0.08	0.06	0.03	45.0	21.4
2	3.45	0.34	0.12	0.05	0.05	0.02	37.7	16.0
2.5	3.61	0.30	0.09	0.03	0.04	0.02	29.5	10.6

Note: this table reports simple statistics on the mean and variance of aggregate inflation expectations depending on the average value imputed to households answering prices will stay about the same (col. 1) and assuming no time variation in the average expectations of these households’ answers. Assumption ‘0’ is our baseline scenario. Col. 2 is the average aggregate expectation over time (over all types of answers to the quantitative question, imputed or not), Col. 3 reports the time variance of this average aggregate expectation. Col. 4-5-6-7 report the contribution of the extensive margin to the overall variance of inflation (Total and separately the relative contribution of the time variations of the share of answers ‘stay about the same’ and the two covariance terms). Col. 8 the relative contribution of extensive margin to the overall variance (the relative contributions of extensive and intensive margins sum to 100%). Col 9 the relative contribution of the time variations of the share of answers ‘stay about the same’.

F Additional regressions

F.1 Additional Regressions - Forecast Errors and Purchases

Figure F.1: Distribution of Forecast Errors by Answer to the Question on Own Durable Purchases



Note: we have calculated the difference in absolute value between the quantitative expectation of inflation (over the next 12 months) with the actual value of inflation 12 months after the date of the survey. This figure plots the distribution of this error forecast according to the answer to the question "Did you make major purchases over the last 12 months?" (Yes / No).

Table F.1: Effect of Durable Consumption Decisions on Forecast Errors

	All (1)	Less than p99 (2)	All (3)
Yes, Durable Purchase	0.013 (0.012)	0.014 (0.012)	0.018 (0.012)
Perception error	-	-	0.320*** (0.004)
Controls	Yes	Yes	Yes
Obs.	141,123	134,093	136,574

Note: this table reports fixed effect panel regressions where the endogenous variable is the log difference between household level inflation expectation at date t for the horizon $t+12$ and the actual inflation at date $t+12$; exogenous variables include a dummy variable equal to 1 if the household answers Yes to the question "Did you make major purchases over the last 12 months?" and the perception error which is the log difference between perceived inflation at date t and actual inflation at date t , we have included controls for date and household fixed effects. Standard errors are clustered at the date level. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

F.2 Additional Regressions - Panel Dimension

Panel construction - Methodology Each household is surveyed at maximum during three consecutive months but the survey does not contain any household identifier provided by the statistical office before 2014 – after 2014, we use the variable NUMFA.

To construct the unique household identifier before 2014, we use all the variables describing the characteristics of the head of household (location (region, size of the city), gender, year of birth, education, but also the same characteristics for the partner and also variables describing the composition of the household. We consider that 3 observations are associated with the same household over time if all these variables characterizing the household are the same over the period.

This identification of household through time might quite conservative, in particular if over the 3-month period some characteristics changed. Overall, we find that our sample contains about 159,000 different households, 66,475 are surveyed three times, 39,492 twice and 52,771 only once.

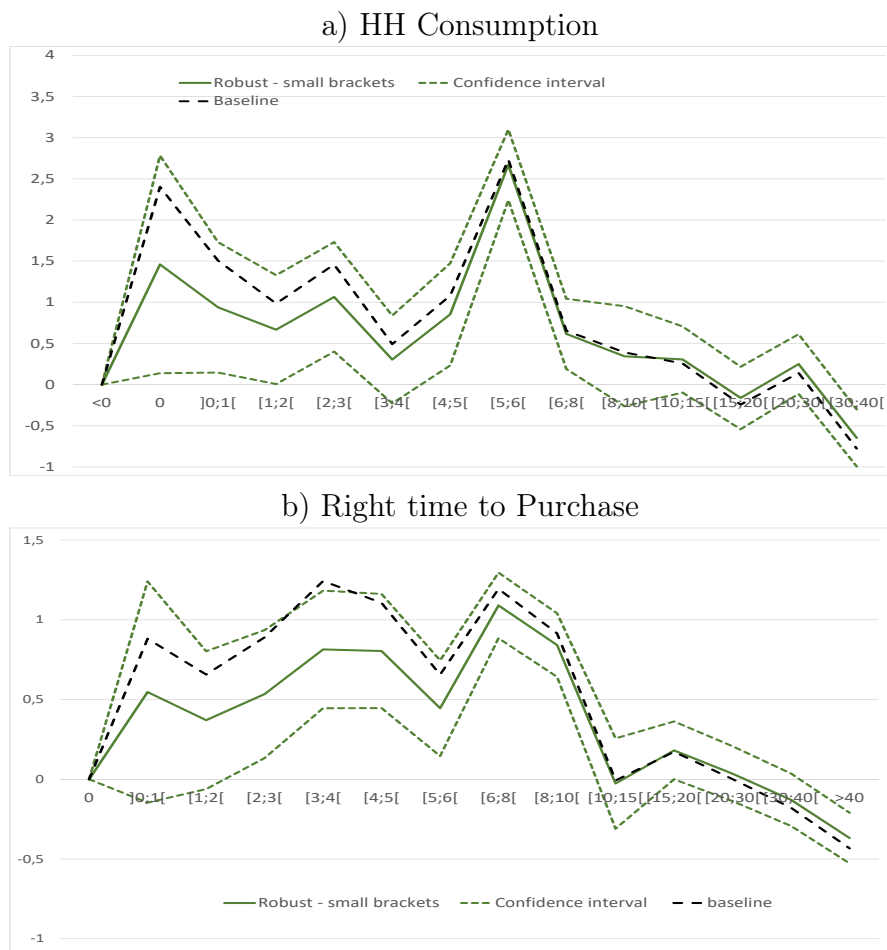
Table F.2: Marginal Effects of Inflation Expectations on Own Major Purchases Over the Last 12 Months: Qualitative Answer - Panel Regressions

	Fixed Effect Logit		Random Effect Probit	
	(1)	(2)	(3)	(4)
$\pi^e \neq 0$	0.551 (0.383)		0.584*** (0.179)	
Increase more rapidly		0.744 (0.648)		1.040*** (0.294)
Increase at the same rate		0.556 (0.448)		0.531*** (0.198)
Increase at a slower rate		0.937* (0.553)		0.951*** (0.245)
Stay about the same		Ref.		Ref.
Fall		-0.033 (1.430)		0.578 (0.670)
DK		-0.552 (0.926)		-0.775* (0.412)
Controls	Yes	Yes	Yes	Yes
Obs.	71,099	71,099	312,921	312,921

Note: this table reports marginal effects (in percentage points) from Panel Probit regressions with Random HH effects and Conditional logit where the endogenous variable is a dummy variable equal to 1 if the household 'YES' to the question "Have you made major purchases during the last 12 months?". Control variables include year and month dummies, (when including random effects: household characteristics (age, location (city, region) diploma, job, income), but also survey wave (1, 2 or 3), answers to other question on French economic conditions (standard living, unemployment...), answer to the question about future plans for major purchases, right time to save and perceived inflation. *p<0.1; **p<0.05; ***p<0.01.

F.3 Alternative imputation

Figure F.2: Small brackets - Imputation



Note: These two figures plot our estimates of marginal effects of inflation expectations on decision to buy durables (Panel (a) ‘own consumption’; Panel (b) ‘Right Time to consume’). The reference is 0% (negative answers were grouped in a single bracket but not reported on the graph). Marginal effects are reported in percentage points. Dashed black line correspond to the marginal effects obtained in our baseline regressions whereas the other lines correspond to the marginal effects obtained with our rule of imputation using the complementary module of the questionnaire conducted in Sep 2007. the solid line is the average marginal effect from regressions run on 50 different imputed samples whereas the dashed lines correspond to the 95% confidence interval.

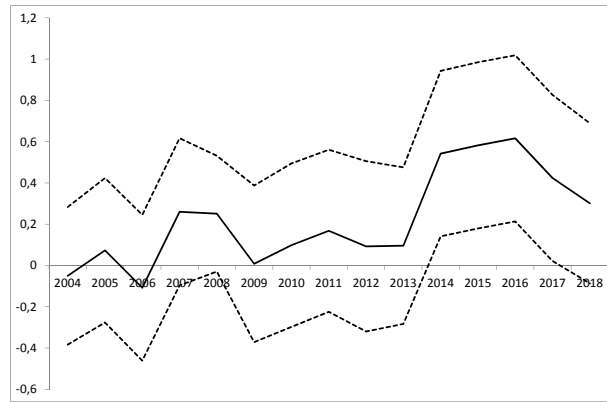
F.4 The response to inflation expectations across years

In this subsection, we investigate whether the connection between inflation expectations and consumption decisions is stable across years. Our sample covers years both before and after the 2008 financial crisis, periods where effective lower bound arguably bind as well as periods where the European Central Bank made forward guidance announcements.

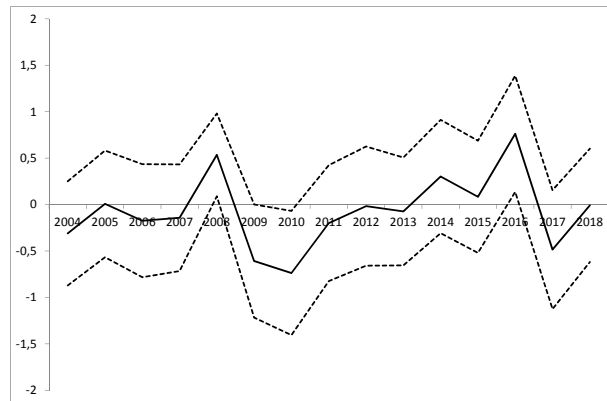
To this purpose, we run regressions by year to test whether the effect of inflation expectations on consumption decisions has moved over the sample period. In particular, we would like to test whether the effect of inflation expectations is stronger during the period during which the ECB signaled it was at the ELB and gave explicit forward guidance on future rates. Figure F.3 reports the evolution of the coefficient in the regression for inflation expectations. As it can be observed, the patterns that we identified in Table 6 are relatively stable across our sample.

If anything, we find that the effect of quantitative inflation expectations on the decision to make large purchases has increased, especially since 2014, which corresponds to the ELB/FG period.

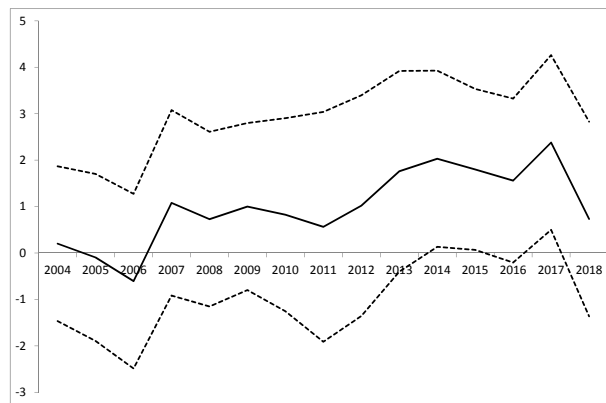
Figure F.3: Marginal Effects of Inflation Expectations Over Time



(a) All



(b) Intensive margin



(c) Extensive margin

Note: black solid lines report marginal effects from Probit models estimated year by year where the endogenous variable is a dummy variable equal to 1 if the household answers Yes to the question "Did you make major purchases over the last 12 months?"; "All" we include all quantitative answers to the question on inflation expectations; "Intensive margin" we only use non-zero answers; "Extensive margin" we use a dummy variable equal to 1 if the answer is different from 0, 0 otherwise. Control variables include year and month dummies, household characteristics (age, location (city, region) education, job, income, survey wave (1, 2 or 3), answers to other question on French economic conditions (standard living, unemployment...), answer to the question about future plans for major purchases, right time to save, and perceived inflation. Regressions also include random household effects and standard errors are corrected for possible heteroscedasticity. Dashed black lines correspond to the 90% confidence intervals.

G Germany

Data set. We use the underlying individual data from the monthly consumer confidence survey conducted by GFK in Germany. This survey is part of the harmonized European household confidence indicators released by the European Commission for all countries in the European Union. The micro data are collected at a monthly frequency over the period January 2004 – December 2018.³⁶ Every month about 2,000 interviews are carried out via phone calls. The sample contains a little more than 360,000 individual observations over the 15-year period, i.e. about 2,000 observations per month on average. The questionnaire is very similar to the French questionnaire except that the German questionnaire does not include any question on the household's own consumption of durables.

Table G.1: Simple Statistics on Inflation Expectations

	Aggregate Moments	Correlation with Headline π π excl. Energy	
Average Expectation	2.76 (0.84)	0.75	0.30
% of Stable Prices	0.31 (0.10)	-0.76	-0.31
Average of non-zero inflation	3.91 (0.65)	0.72	0.25

Note: In this table, we report simple statistics calculated using individual answers to the quantitative question on inflation expectations. We first calculate statistics date by date and then compute the average of this time series. The first column reports simple average of the time series. Second and third columns report correlation coefficients of the aggregate moment calculated date by date and the headline HICP inflation (source Eurostat) and HICP inflation excluding energy and unprocessed food (source Eurostat). "Average" is the simple average of all answers (including zeros) to the quantitative question. "% of Stable Prices" is the average proportion of answers exactly equal to 0. "Average of Non-Zero Inflation" is the average of inflation expectations when not equal to 0.

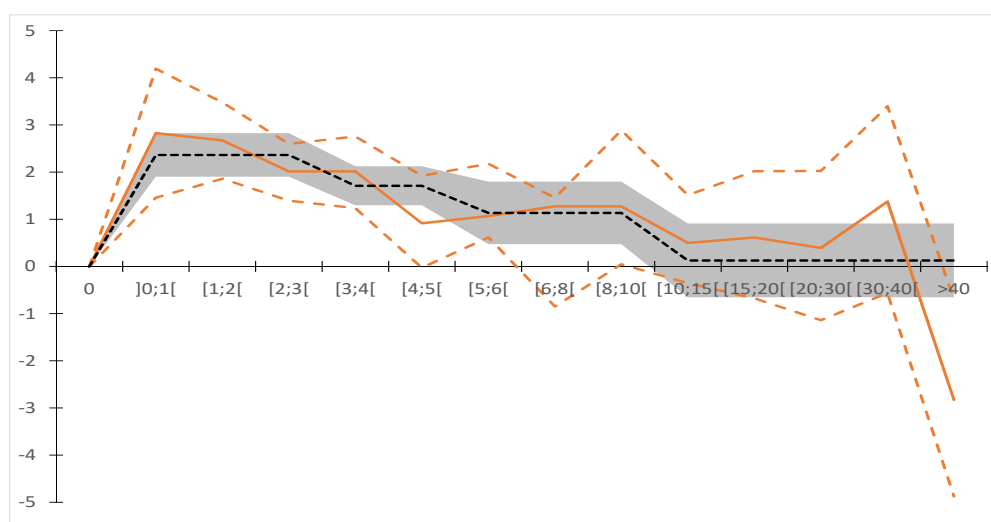
³⁶Between Aug and Oct. 2007, quantitative answers to inflation are not available.

Table G.2: Marginal Effects of Inflation Expectations on Right Time to Purchase: Germany

	All	Intensive (Excl. 0)	Extensive	All Quali.	All Excl. outliers
π^e	-0.073*** (0.019)	-0.118*** (0.018)			0.144* (0.074)
$\pi^e \neq 0$			0.832*** (0.277)		
π^e by intervals:					
[10%; + ∞ [0.128 (0.474)	
[5%; 10%[				1.134*** (0.402)	
[3%; 5%[				1.710*** (0.251)	
]0%; 3%[				2.364*** (0.380)	
0%				Ref.	
< 0%				2.620** (1.144)	
Controls	Yes	Yes	Yes	Yes	Yes
Obs.	256,540	182,714	256,540	256,540	217,308

Note: In this table, we report marginal effects (in percentage points) from Ordered Probit regressions where the endogeneous variable is a variable taking 3 different values 0 if the household answers 'No, it is the wrong time', 1 'It is neither the right time nor the wrong time', 2 'Yes, now is the right time' to the question "do you think now is the right time for people to make major purchases". Marginal effects are calculated for the value "Yes". Control variables include year and month dummies, household characteristics (age, location (city, region) diploma, job, income, survey wave (1,2 or 3), answers to other question on German economic conditions (standard living, unemployment...), answer to the question about future plans for major purchases, right time to save and perceived inflation. Standard errors are clustered at the date level. *p<0.1; **p<0.05; ***p<0.01.

Figure G.1: Marginal Effect of Inflation Expectations on “Right Time to Buy”



Note: These two figures plot our estimates of marginal effects of inflation expectations on perceptions of whether it is a ‘right time’ to buy durables. The orange line reports results where we have grouped answers by ‘smaller’ brackets. The reference is 0% (negative answers were grouped in a single bracket but not reported on the graph). Marginal effects are reported in percentage points. Dashed orange lines correspond to the 95% confidence interval. The dashed dark line corresponds to our baseline estimates with ‘large’ brackets (as reported in Table G.2) and the grey shaded area corresponds to the 95% confidence interval associated with these estimates.

H US Michigan survey

In this Appendix, we report some robustness results on the US Michigan survey. We first describe how the survey is designed and the questions that we are using. We then report our results.

Design of the survey and questions. To investigate our point, we look at the different questions related to future (short-term) inflation. As for the euro-area survey, we look at both the qualitative and the quantitative variables on inflation expectations.

Question 8 (Question A12). *During the next 12 months, do you think that prices in general will go up, or go down, or stay where they are now?*

1. Go up, 2. Stay the same, 3. Go down, 4. Don't know.

If households answer “Go up” or “Go down”, they are then asked the following question:

Question 9 (Question A12b). *By about what percent do you expect prices to go (up/down) on the average, during the next 12 months?*

In the case where a household answers a number above 5%, the questionnaire requires to further probe the answer.

If households answer “stay the same” to question 8, they are asked the following question:

Question 10 (Question A12a). *Do you mean that prices will go up at the same rate as now, or that prices in general will not go up during the next 12 months?*

1. Go up, 2. Will not go up.

In the case where households answer “go up” to that question, they are asked Question 9. Otherwise a 0% inflation is imputed.

Remark. *It is important to note that the questions on inflation expectations in the Michigan survey share some similarities but also differences with the euro area surveys. As in the euro area surveys, households are first asked about their qualitative inflation expectations and then about their quantitative ones. In contrast with the euro area surveys, they are offered a smaller menu of qualitative questions – in the euro area surveys, households can give different answers regarding positive inflation, while in the Michigan survey, they can only answer that prices will go up. On the other hand, households answering that prices will stay the same are asked again about their qualitative inflation expectations. Arguably, both sets of questions allow to elicit households' inflation expectations but using different routes in terms of qualitative questions.*

Finally, we consider the following question on the “right time” to purchase as a proxy for durable consumption:

Question 11 (Question A18). *About the big things people buy for their homes—such as furniture, a refrigerator, stove, television, and things like that. Generally speaking, do you think now is a good or a bad time for people to buy major household items?*

1. Good, 2. Pro-con, 3. Bad, 4. Don't know.

Controls. We use the same controls as for euro-area but with two important differences: as the corresponding variables are not available, we do not control for *perceived inflation* and for *expected own consumption*.

Results. We look at the 1984-2020 period.³⁷ We report the results in Table H.1 that we confirm with “finer brackets” in Figure H.1.

We are able to identify several inflation regimes and confirm that households actually “discretize”.

First, we find that households expecting inflation between 0 (excluded) and 3% consume more than the households expecting no inflation. This result is robust to considering the qualitative answers ‘go up’ to Question 8 or ‘same’ at Question 8 and then ‘go up’ at Question 10. For values between 0 and 3%, consumption is roughly constant as this can be observed in Figure H.1.

Second, households expecting higher inflation rates than 3% do not consume more than households expecting prices to remain stable. A first step starts above 3% to go to almost 7%, where the connection between inflation expectations and durable consumption is positive but not significant.³⁸ Finally, as in the euro-area, when inflation becomes sufficiently high, consumption can be even lower.

Third, 3% of households expect prices to fall on average in our sample (three times more than in euro area surveys). On average, these households consume strictly less than households expecting no inflation. A closer look at this connection in Table H.1 indicates that the fall in consumption is in fact is not statistically different from being constant for all negative inflation expectations.

³⁷Focusing on a shorter time period as the one we have for the euro-area does not lead to different results.

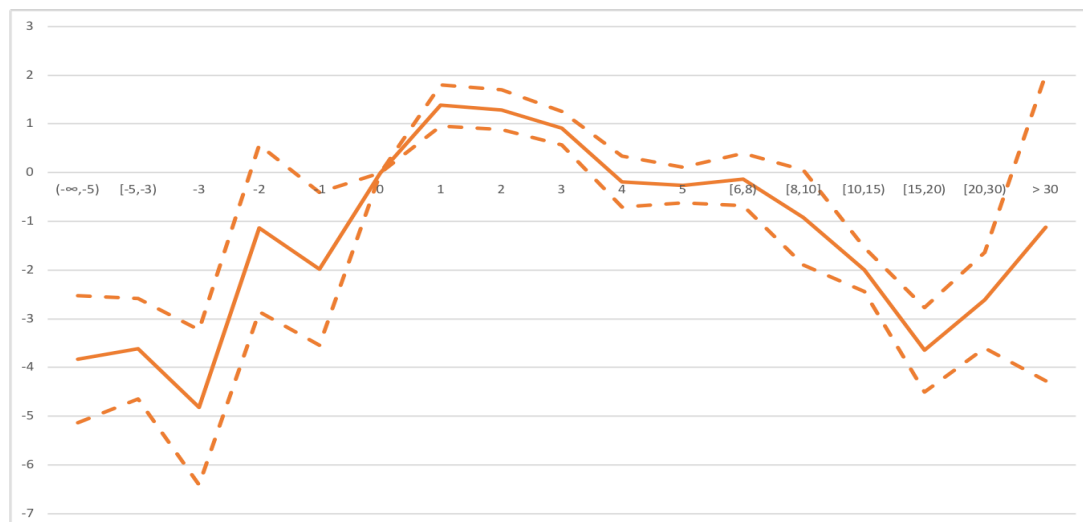
³⁸Note that we do not have access to all the controls that we have for the euro-area surveys. As put forward in Section 5.1, controls are important to obtain positive and significant response of consumption to inflation expectations.

Table H.1: Effects of 12M Inflation Expectations on Durables Consumption Outlook

	(1)	(2)	(3)	(4)	(5)	(6)
<u>π^e Quantitative</u>						
By intervals:						
>10%			-2.275*** (0.410)	-3.119*** (0.396)	0.731 (0.997)	-2.700*** (0.434)
[5%,10%)			-0.265 (0.342)	-0.949*** (0.317)	0.568 (0.599)	-0.465 (0.365)
[3%,5%)			0.663* (0.340)	0.053 (0.312)	0.772 (0.543)	0.581 (0.364)
(0%,3%)			1.333*** (0.348)	0.560* (0.321)	1.900*** (0.491)	1.114*** (0.377)
0%			Ref.	Ref.	Ref.	Ref.
[-3%,0%)			-2.799*** (1.023)	-3.314*** (1.018)	-2.625*** (0.976)	-2.825*** (1.033)
[-5%,-3%)			-3.611*** (1.025)	-4.125*** (1.023)	-3.344*** (0.980)	-3.681*** (1.035)
< -5 %			-3.823*** (1.304)	-4.331*** (1.310)	-3.548*** (1.249)	-3.892*** (1.320)
<u>π^e Qualitative</u>						
Go up	-0.207 (0.303)					
Same/go up	0.943** (0.372)					
Same/infl :	Ref.					
Go down	-3.930*** (0.697)					
Extended intervals:						
go up		-0.648*** (0.250)				
same		Ref.				
go down		-4.350*** (0.696)				
Observations	165,651	165,651	155,911	155,911	50,176	135,645
controls	Yes	Yes	Yes	Yes	Yes	Yes

Note: this table reports marginal effects (in percentage points) from Ordered Probit regressions where the endogenous variable is a variable taking 3 different values 0 if the household answers 'Bad', 1 'Pro-Con', 2 'Good' to Question 11. Marginal effects are calculated for the value 'Good'. Control variables include household characteristics (age, location (city, region) diploma, job, income, ... Standard errors are clustered at the date level. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. In regression (1), we report the regression with the qualitative inflation expectation. Regression (2): qualitative inflation expectations when households answering 'same' at Question 8 are pooled together. Regression (3) with quantitative inflation expectations (Question 9). Regression (4) with households answering 'same' at Question 8 and then 'go up' at Question 10 are imputed a 0%. Regression (5) on the subsample without households answering 'go up' at Question 8. Regression (6) on the subsample without households answering 'go up' at Question 10.

Figure H.1: Effects of 12M Inflation Expectations on Durables Consumption Outlook – finer brackets



Note: This figure plots our estimates of marginal effects of inflation expectations on decision to buy durables ('Right Time to consume'). The orange line reports the point estimates. The reference is 0%. Marginal effects are reported in percentage points. Dashed orange lines correspond to the 95% confidence interval.