Inflation Expectations, Consumption and the Lower Bound: Empirical Evidence from a Large Micro Panel

Ioana A. Duca†, Geoff Kenny‡, Andreas Reuter§

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Abstract

This paper employs a discrete choice model to investigate empirically the relationship between inflation expectations and spending using individual level consumer data. We document that for the Euro Area and its constituent countries this relationship is generally positive: a higher expected change in inflation is associated with an increase in consumers’ readiness to spend. Moreover, in line with the predictions of macroeconomic theory, the impact is stronger when the lower bound on nominal interest rates is binding. Also, using the estimated probabilities from our discrete choice model, we indirectly estimate the impact of a gradual increase in inflation expectations on actual private consumption. We find the effects to be economically relevant especially when the lower bound is binding.

JEL classification: D12, D84, E21, E31, E52

Keywords: Consumer inflation expectations, Consumption, Lower Bound, Micro data

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†European Central Bank
‡European Central Bank
§European Commision DG-ECFIN
1 Introduction

With an effective lower bound on nominal interest rates binding in several economies around the world, the relationship between consumer inflation expectations and aggregate demand takes on an increasingly important role in policy discussions. According to many mainstream theoretical models of consumption, under sticky nominal interest rates, an expected increase in inflation should lower real interest rates (due to the well-known Fisher Effect) and as a result boost consumption or aggregate demand by lowering consumers’ incentives to save. In an effective lower bound environment, with interest rates bounded from below, it is often argued that this mechanism becomes even more prominent as central banks are deprived of the use of their main conventional policy instrument: the short-term interest rate. A large theoretical literature, among which Krugman et al. (1998), Eggertsson and Woodford (2003), Jung et al. (2005), Eggertsson (2006) emphasizes the stabilization role of inflation expectations at the effective lower bound.

Of course, whether actual consumers behave in line with the simple predictions of theory is an empirical question. Yet, empirical evidence on the inflation expectations - consumption relationship is still scarce. Existing studies have been undertaken at the single-country level and have brought forward conflicting evidence with respect to its sign and significance or, indeed, if there is any such relationship at all. Papers by Ichiue and Nishiguchi (2015) and D’Acunto et al. (2015) find that Japanese and German consumers increase consumption in response to higher inflation expectations. However, Bachmann et al. (2015) and Burke and Ozdagli (2013) have emphasized that there is no significant positive impact on durable goods consumption for US consumers. Indeed, at the lower bound, the findings of Bachmann et al. (2015) suggest that the impact of higher inflation expectations on consumption may be negative.\(^1\) In this paper we exploit a large micro dataset to provide new empirical evidence on this fundamental relationship which lies at the heart of macroeconomic theory.

A necessary requirement to investigating the consumer inflation expectations - consumption relationship empirically is to have the right data. Aggregated time series data do not do the trick as through aggregation a lot of information is lost and the heterogeneity of consumer behaviour cannot be taken into account or controlled for. Figure 1 plots consumer inflation expectations, an aggregate indicator of consumers’ readiness to spend along with actual real total consumption growth in the Euro Area. With such aggregate time series data, investigating this relationship in the more recent effective lower bound (ELB) period would be very challenging since there are only few observations available to help estimate an aggregate model’s multiple parameters, including parameters linked to other variables for which the econometrician would ideally wish to control (e.g. variables capturing a consumer’s real income, wealth or

\(^1\)Also for US consumers, Armanter et al. (2015) attempt to verify whether consumers act on their beliefs about future inflation in an investment decision by combining survey data with a financially incentivised experiment and find evidence that most respondents make their choice in accordance with the predictions of mainstream theory.
financial constraints). In contrast, because of the much greater sample size, microeconomic
data is particularly helpful for identifying this relationship and how it may change over time
due to occasionally binding constraints such as the effective lower bound. This paper benefits
from a very rich multi-country dataset with individual level consumer data collected under the
framework of the EU Joint Harmonised Business and Consumer Survey Programme.  

To investigate the inflation expectations - consumption relationship in the Euro Area (EA),
we follow a two-steps approach. First, we apply a discrete choice probabilistic model to study
the relationship between inflation expectations and the propensity to spend both in the EA as
a whole and for a large collection of its constituent countries. To the best of our knowledge,
this is the first paper to provide evidence of this relationship for the EA and using such a
large multi-country dataset. The granularity and cross-sectional variation of the survey pro-
vides an almost ideal basis to explore this central question in macroeconomics. Since 2003, the
Consumer Survey includes specific quantitative questions about consumers' perceptions about
current inflation and their expectations for inflation over the next 12 months. The availability
of such quantitative data is crucial if one is to obtain a meaningful sense of the strength or
magnitude of any estimated relationship between consumer spending and inflation expecta-
tions. In addition, consumers are asked other questions referring to their financial situation,
the general economic situation, their savings behaviour and intentions with regard to major
consumer purchases and these replies can be directly matched to replies about inflation ex-
pectations. Moreover, the replies can be broken down along several important demographic
dimensions, such as gender, educational attainment, employment status and income levels such
that we are able to validate that our results are not simply driven by heterogeneity in household
characteristics. In a second step, as the survey only provides information about the intention
or readiness to spend at the individual level, we estimate a bi-variate Vector Auto Regression
(VAR) to link the estimated probabilities from our micro-level discrete choice model to actual
consumption. This allows us to estimate indirectly the impact of changes in inflation expec-
tations on real consumption at the aggregate level and conduct scenario analysis to examine
how consumption responds to an expected change in inflation, both when the lower bound is
binding and when it is not.

We find that EA consumers behave in line with mainstream or conventional macro-economic
theories, that is, when they anticipate an increase in future inflation, consumers decide to in-
crease their current spending, holding all other factors equal. There are four main results that

\footnote{The programme is administered by the European Commission (EC). Its consumer survey is the largest of its
kind, covering the 28 European Union (EU) member states, as well as four of the five candidate countries, with
up to 41,060 respondents included in each monthly round (26,440 if only euro area EU countries are included).
For comparison, the University of Michigan Survey of Consumers includes 500 consumers, while the Federal
Reserve Bank of New York Survey of Consumer Expectations (SCE) has 1200 households in the sample.}
support this conclusion. First, pooled EA analysis shows that for a 1.0 pp increase in inflation expectations the likelihood of spending increases by 0.16 pp to 0.34 pp, depending on the model specification.\(^3\) Second, we find that the relationship between consumers’ inflation expectations and the likelihood to spend is stronger when the ELB is binding. This result is robust across all model specifications examined. Third, individual country results confirm the pooled results. With only one exception, all countries in the sample exhibit a positive relationship between consumer inflation expectations and the likelihood of spending today.\(^4\) Fourth, the VAR analysis reveals that - compared to a baseline where inflation expectations remain at zero, a scenario in which future inflation is expected to increase from 0% toward 2% is associated with a 0.2 to 0.4% cumulative increase in real private consumption growth over a three year horizon.

Our paper relates also with a broader and rapidly growing literature that looks into how consumer inflation expectations are formed and explains the heterogeneity behind reported inflation expectations. Several studies have emphasised the importance of socio economic and demographic factors in shaping inflation expectations (e.g. Jonung (1981); Bryan et al. (2001); Lombardelli and Saleheen (2003); Souleles (2004); Christensen et al. (2006); Anderson (2008)). Using the Michigan Consumer Survey data, Carroll (2003) fits a model of household inflation expectations in the spirit of the "sticky information" theory of Mankiw and Reis (2001). In this model, households are assumed to form their expectations acquiring information slowly based on the forecasts of professional forecasters or by reading newspapers. In a more recent study, Coibion and Gorodnichenko (2015) illustrate how the missing disinflation puzzle associated with the Great Recession period in the US can be explained once one controls for household inflation expectations in a Philip’s curve setting. Other relevant strands in this literature include Naohito and Yuko (2015) and Arman-tier et al. (2014) who use survey experiments to investigate the effects of providing information to consumers on their inflation expectations. Also Ehrmann et al. (2015) link the observed bias in consumer inflation expectations to household financial difficulties and pessimistic spending attitudes. Finally, Binder (2015) exploits individual consumer data on inflation expectations to propose an inflation uncertainty measure for the US economy.\(^5\)

The remainder of the paper is structured as follows. In section 2 we provide important details about the micro dataset that we use and shortly illustrate our methodology to exploit it. Section 3 includes all the results of our discrete choice probabilistic analysis in which we determine a consumer inflation expectation - propensity to spend relationship. This section also presents the second-step analysis where we translate the results for the consumer propensity

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\(^3\)This result holds under different specifications in which we exploit the granularity of our dataset and control for demographics, expectations about the individual economic context and the overall economic situation.

\(^4\)Country heterogeneity also shows up in the results as the average marginal effects, although generally positive, differ in magnitude across countries.

\(^5\)The measure is built around the idea that round numbers are used by respondents who have high imprecision or uncertainty about inflation. Using this index, Binder (2015) finds that more uncertain consumers are more reluctant to spend on durables, cars and homes, and their spending attitudes are less sensitive to interest rates.
to spend into an impact on actual consumption. Country specific results are also detailed in this section. Section 4 concludes.

2 Data and methodology

Through its level of detail and the focus of the questionnaire, the EU Consumer Survey provides the ideal micro-information set to study the relationship between inflation expectations and the likelihood to spend for the EA consumer. The survey is carried out at a monthly frequency and covers all European Union economies, as well as four of the five candidate countries, although in this paper we focus only on EA countries. Each month we benefit from a sample of 26,440 consumers who provide information on their perceptions of current inflation and their expectations about future inflation. The sample is designed to be representative of the population in each country. Its size varies across countries according to the heterogeneity of their economies and it is generally positively correlated with the country population size. Each month there is a new sample of consumers that are interviewed, so we actually work with a repeated cross-section. The vast majority of the surveys in the euro area countries is conducted by computer-assisted telephone interviews (CATI). Most of the questions in the survey are qualitative and refer to the consumer’s financial situation, the general economic situation, their savings behaviour and intentions with regard to major consumer purchases. Since 2003, the Consumer Survey includes specific quantitative questions about consumers’ perceptions about current inflation and their expectations for inflation over the next 12 months. In addition, the replies can be broken down across several important dimensions (e.g. gender, educational attainment, employment status, income level etc.) and thus allow us ensure our results are not driven merely by specific sources of heterogeneity. The sample employed in this paper covers the period between May 2003 and July 2015.

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6 The anonymised micro data set on quantitative inflation perceptions and expectations is not regularly published and was provided to the ECB by DG ECFIN for joint research purposes, based on the agreement by all national partner institutes from the ”Joint Harmonised EU Programme of Business and Consumer Surveys”. Furthermore, the agreements between DG ECFIN and the ECB concerning data access rights, storage, security and dissemination of the data are governed by a joint Memorandum of Understanding.

7 However, our sample does not include Ireland due to data availability.

8 The actual sample size is lower given that we also draw on other questions and the response rate can vary from question to question.

9 Only in three countries (Germany, Latvia, Slovakia), interviews take place in a face to face (F2F) setting. Two countries apply mixed modes which combine CATI (Austria) or CATI and F2F (Lithuania) with web interviews. The households to be interviewed are determined by random sampling or quota sampling from a frame which, in most cases, is either the country’s telephone directory or its population register.

10 A complete version of the survey can be found in the User Guide of The Joint Harmonised EU Programme of Business and Consumer Surveys (pages 36 - 40): http://ec.europa.eu/economy_finance/db_indicators/surveys/method_guides/index_en.htm
2.1 Data

The EU Consumer Survey data indicates that EA consumers hold very heterogeneous opinions about inflation expectations and perceptions depending on their gender, age, education, income or employment status. Inflation expectations are higher for females, the unemployed, consumers aged below 50, with low income and holding only primary or secondary education (see Table 1). Consumer perceptions about the current rate of inflation follow the same pattern. They are, however, persistently higher than expectations, although the gap between the two has tended to narrow over the available sample. Also, both consumers’ expectations and perceptions of price changes are persistently higher than actual inflation developments, measured by the official Harmonised Index of Consumer Prices (HICP). This positive difference might be explained in several ways: the survey questions are open ended with a generic reference to consumer prices and provide no guidance for the respondent in determining the inflation rate. Also, unusual replies are not probed and respondents are not asked about an objective official price index. Respondents presumably provide an answer that is based on their own subjective inflation experience which could weight price changes differently to an official index or even take account of prices that are excluded from such an index. Nevertheless, the size of the difference has narrowed considerably over time.\footnote{The substantially higher inflation perceptions at the beginning of the sample might have been due to the introduction of the euro notes which was partly corrected in subsequent years as mentioned in Biau et al. (2010). Also, consumers may have become more informed about the objective and actions of the European Central Bank.}

Disregarding this persistent positive difference, both expectations and perceptions co-move very strongly with actual inflation (see Figure 2), and such a strong co-movement provides solid grounds to use this dataset for investigating the consumer inflation expectations - spending relationship.

The main questions that we use from the survey questionnaire are:

Q51: By how many per cent do you think that consumer prices have gone up/down over the past 12 months? Consumer prices have increased by __,.__% / decreased by __,.__%.

Q61: By how many per cent do you expect consumer prices to go up/down in the next 12 months? Consumer prices will increase by __,.__%/ decrease by __,.__%.

Q8: In the view of the general economic situation, do you think that now it is the right moment for people to make major purchases such as furniture, electrical/electronic devices, etc.? Survey respondents can answer: i) yes, it is the right moment now; ii) it is neither the right moment nor the wrong moment; iii) no, it is not the right moment now; iv) don't
Questions Q51 and Q61 are quantitative and the answers are expressed as percentage changes over a 12 month period, capturing consumer inflation perceptions and consumer inflation expectations respectively. Q8 is qualitative and shows whether, given the prevailing economic context, the consumer considers it to be a good time to spend on "major purchases". Throughout the paper, we refer to the replies to this question as a measure of the so called "readiness to spend" of the consumer.

2.2 Subjective inflation expectations

When investigating the relationship between consumer inflation expectations and readiness to spend, we focus on a measure of the expected change in subjective inflation defined as the difference between an individual’s inflation expectations and his/her perceptions:

\[ \Delta \pi^e_{it} = \pi^e_{it} - \pi^p_{it} \] (1)

where \( \Delta \pi^e_{it} \) is the expected change in inflation of consumer \( i \) at time \( t \), \( \pi^e_{it} \) is the subjective inflation expectation and \( \pi^p_{it} \) the subjective inflation perception.

This measure is innovative and contrasts with previous empirical studies which have focussed on the level of expected inflation on its own.\(^{12}\) The main reasoning behind this choice is as follows: First, it allows us control for the strong variation in the level of perceived inflation across consumers both over time and in the cross section. When changing their individual spending intentions consumers are likely to take into account not just the level of expected inflation but the level of expected inflation relative to their current perception of inflation. Second, as was shown earlier, both expectations and perceptions about inflation exhibit a positive "bias" compared with official statistics and by focussing on the difference between the two, we are able to potentially eliminate possible distortion associated with excessively pessimistic or optimistic beliefs about inflation on spending intentions.

A first look at the data (see Figure 3) strongly suggests that conditioning on individual perceptions about current inflation may be central to understanding the relationship between expected inflation and consumption. In particular when perceptions are controlled for, we observe a strong positive relationship (see panel (b)). The relationship is much weaker if one does not control for subjective perceptions about inflation (see panel (a)). However, a more

\(^{12}\)D’Acunto et al. (2015) do not focus on the expected change in inflation but rather add a qualitative measure of inflation perceptions as a separate regressor. These authors find that the marginal effects of expected inflation would be virtually identical over several specifications both including and excluding inflation perceptions as a separate regressor. Due to data limitations, Bachmann et al. (2015) control for the current official inflation rate which by definition is common across all consumers and therefore does not control for any differences and heterogeneity in perceptions about current inflation.
robust economic analysis requires a larger empirical model which can control for the wide array of additional factors impacting on survey responses.

[Insert Figure 3 here.]

2.3 Methodology

Our data dictates our modelling strategy: the discrete nature of the spending attitudes that are retrieved from the survey combined with the fact that we observe a repeated cross-section recommend the use of a discrete choice model. In this paper, we employ the ordered logit model. What we model is not the relationship between inflation expectations and aggregate spending, but rather between the expected change in inflation and the individual consumer’s readiness to spend. There is a natural ordering in our dependent variable, the consumer readiness to spend. As it represents the answer to the question whether it is a good moment to spend, it can be ordered into being more or less ready to spend with those consumers responding that it is not the right moment being the least ready to spend. Choosing one response category over another depends on a latent variable (i.e. some continuous measure of readiness to spend) which - though not observable- can be modeled as:

\[ y_{it}^* = X_{it}\beta + \epsilon_{it} \]  

where \( i \) is consumer \( i \) and \( t \) is time, \( y_{it}^* \) is the latent variables, \( X_{it} \) is a vector of controls that will be explained in detail in the next section, \( \beta \) a vector of coefficients and \( \epsilon_{it} \) is the error term.

Each response category can then be defined in relation to the latent variable defined in equation 8:

\[ y_{it} = \begin{cases} 
1 & \text{if } y_{it}^* < \alpha_1 \\
2 & \text{if } \alpha_1 \leq y_{it}^* < \alpha_2 \\
3 & \text{if } y_{it}^* \geq \alpha_2 
\end{cases} \]  

Each alternative response has a probability \( Pr \) attached:

\[ Pr (y_{it} = 1) = Pr (y_{it}^* < \alpha_1) = Pr (X_{it}\beta + \epsilon_{it} < \alpha_1) = Pr (\epsilon_{it} < \alpha_1 - X_{it}\beta) = F (\alpha_1 - X_{it}\beta) \]  

\[ Pr (y_{it} = 3) = Pr (y_{it}^* \geq \alpha_2) = Pr (X_{it}\beta + \epsilon_{it} \geq \alpha_2) = Pr (\epsilon_{it} \geq \alpha_2 - X_{it}\beta) = F (X_{it}\beta - \alpha_2) \]
\[
Pr (y_{it} = 2) = 1 - Pr (y_{it} = 1) - Pr (y_{it} = 3) = \\
= 1 - F (\alpha_1 - X_{it}\beta) - F (X_{it}\beta - \alpha_2) = \\
= F (\alpha_2 - X_{it}\beta) - F (\alpha_1 - X_{it}\beta)
\] (6)

where \( F \) is a function that satisfies \( F (-\infty) = 0, F (+\infty) = 1 \) and \( \frac{dF(x)}{dx} > 0 \). The probabilities of all alternatives must sum up to 1. We model \( F \) through a logit function which ensures that the estimates take values between 0 and 1, i.e. the domain of admissible values for a probability. Alternatively, we could have used a probit function. However, in practice, the probit and logit models generally yield very similar predicted probabilities and marginal effects (see, e.g., Davidson and MacKinnon (2004)).

We use maximum likelihood to estimate the parameters of these probability functions, including the thresholds for the latent variables which determine the response categories a consumer chooses. Nevertheless, parameters \( \beta \) are themselves of limited interest, instead we are interested in how the probability of each alternative changes with a change in our controls. Therefore we will focus on the marginal effects measuring the impact of a change in a given control on our estimated probabilities:

\[
\frac{\partial Pr (y_{it} = j)}{X_k} = [f (\alpha_{j-1} - X_{it}\beta) - f (\alpha_j - X_{it}\beta)] \beta_k
\] (7)

where \( k \) is regressor \( k \) and \( f = F' \), in our case the probability density function of the logistic distribution.

2.4 Model specification and controls

One important challenge for empirical analysis is whether any identified relationship between inflation expectations and consumption can be interpreted as a causal effect. With macro data, such a problem of endogeneity is particularly severe because aggregate inflation expectations and aggregate consumption are determined simultaneously and therefore it is very challenging if not impossible to distinguish the causal effect. With micro data, the situation is much improved in particular because individual expectations about how aggregate prices will evolve can have an impact on individual spending, whereas it is less plausible to expect that expectations about the aggregate price level would be driven by a consumer’s own individual spending attitudes\(^{13} \). In addition, to ensure that what we capture is solely the effect of a change in inflation expectations on spending, we control for a series of covariates that are likely to also drive spending intentions. We also include interaction terms that allow the effect of inflation

\(^{13}\)At the same time it must be acknowledged that the phrasing of the question on spending intentions may be interpreted by respondents as referring to spending of all agents in the economy and issues of endogeneity clearly arise if this is the case. Hence, we cannot claim a fully causal interpretation of our empirical results.
expectations to vary depending on certain consumers characteristics and we distinguish be-
tween ELB and non-ELB regimes. Equation (8) below summarizes how we model the latent
variable:

\[ y_{it}^{*} = \beta_0 + \beta_1 ELB + \beta_2 \Delta \pi_{it} + \beta_3 \Delta \pi_{it}^{\circ} ELB + X_{it} \gamma + \epsilon_{it} \] (8)

where \( \Delta \pi_{it} \) is the expected change in inflation, \( ELB \) is a dummy variable taking value 1 from
June 2014 to July 2015, \( X_{it} \) is a vector of controls, \( \epsilon_{it} \) is the error term and \( \beta_1, \beta_2, \beta_3, \gamma \)
represent parameters and vector of parameters respectively.

In the estimation process we gradually control for several potential determinants that could
simultaneously affect both inflation expectations and readiness to spend and we allow several
interactions. First, we control for a rich set of consumer characteristics: age, gender, education,
employment status and income; which we wrap up together under the heading "Demographics".
We have already seen in section 2.1 that there is significant heterogeneity in inflation expec-
tations and perceptions in relation to consumer characteristics. [Souleles (2004)] shows that
variations in inflation expectations can be explained by consumer demographics. The same
characteristics may determine different purchasing propensities and we would want to ensure
that any impact of inflation expectations on spending - if it is to be interpreted as structural -
is not simply driven by these differences.

Second, we consider equally important to control for individual expectations of the general
economic and unemployment situation, e.g. in a booming economic environment, consumers
may increase spending due to a change in expectations about future inflation or, more simply,
because of the favourable economic context. Likewise, controlling for the individual current
or expected financial situation, such as whether the consumer is heavily indebted or not, is
important as most often consumer’s personal situation may have at least as strong an impact
on his/her behaviour compared to the general economic context. For example, if a consumer
expects that his/her own financial situation may deteriorate, his/her consumption plans will
probably decrease even though he/she expects that the economic situation will get a lot bet-
ter and inflation will increase. These controls are grouped under "Expectations and financial
status".

Third, we control for a number of pairwise interactions between the expected change in
inflation and the expected financial situation, debt status, employment status, education and
income. Figure 4 shows in a series of scatterplots that holding the same expectation with
respect to the change in inflation, consumers' readiness to spend is different depending on their
education, income, expected individual financial situation or employment status. Therefore,
by introducing interaction terms in our model specification we capture this heterogeneity in
the inflation expectations - readiness to spend relationship. Fourth, we introduce annual time
dummies to control for any unobserved aggregate macroeconomic developments that may drive spending decisions of all consumers. Fifth, to account for the heterogeneity of the economies that constitute the EA, we include country dummies. Finally, we also include country specific and EA macro aggregates, by drawing on information sources outside the survey. In particular, we control for disposable income, lending rates and measures of macroeconomic uncertainty.

Finally, we also include country specific and EA macro aggregates, by drawing on information sources outside the survey. In particular, we control for disposable income, lending rates and measures of macroeconomic uncertainty.

[Insert Figure 4 here.]

3 Empirical results

This section reports all our empirical findings following the two step approach described in the introduction. In subsection 3.1 we show the EA results for the inflation expectations and the propensity to consume relationship. We discuss what our model implies for the role of other factors in the consumption decision in subsection 3.2. Subsection 3.3 shows how we translate our micro data evidence on the impact of consumer inflation expectations into an impact on actual real private consumption. Subsection 3.4 shows country specific results.

3.1 Main results

We find that there is a robust and statistically significant positive effect of our measure of the expected change in inflation on the probability of being ready to spend across all specifications considered. Table 2 reports average marginal effects of a one unit increase in our measure of the expected change in inflation, across all specifications that we estimate. The average marginal effects are based on the ordered logit estimation and correspond to the alternative that now it is the right time to spend, i.e. they show the impact on the probability of being ready to spend. Outside the ELB average marginal effects range between 0.16 to 0.29 pp and

14 Although the correlation is mostly positive, a review of the simple scatter plot of the expected change in inflation and consumer readiness to spend at a country level certainly points toward considerable heterogeneity among EA economies.

15National sources: household income and national accounts.

16ECB MFI Statistics - Statistical Data Warehouse from national sources: Lending rates for loans for consumption excluding revolving loans and overdrafts, convenience and extended credit card debt.

17We proxy uncertainty by the Survey of Professional Forecasters GDP uncertainty, although we have also estimated our model using two other uncertainty proxies: the VSTOXX and country specific unemployment rates, with similar results.

18We have also run a separate set of ordered logit regressions when instead of the expected change in inflation variable we use inflation expectations and add inflation perceptions as a separate control. Results generally confirm the ones reported in this paper with all marginal effects of inflation expectations estimated to be positive, although they are smaller. Moreover, consistent with our estimates, the average marginal effect of inflation perceptions exhibits a negative sign, most likely capturing the real income impact of higher current inflation on spending. Note that these results are not reported in this paper.

19With the ordered logit model one can separately estimate the probabilities of each alternative, i.e. being a good moment to spend, not a good moment to spend, neither good nor bad moment to spend, and the same for the marginal effects.
thus imply an increase in the probability of being ready to spend for 1.0 pp rise in the expected change in inflation. At the ELB the effects of inflation expectations are generally larger with the marginal effects ranging between 0.24 to 0.34 pp (see Table 2). As in D’Acunto et al. (2015), we find that adding demographics and other consumer expectations significantly improves the Pseudo $R^2$. In addition, in our case, adding country dummies to account for the heterogeneity across euro area countries almost doubles the Pseudo $R^2$ and diminishes the average marginal effects. Nevertheless, in all specifications, EA consumers behave in line with the predictions of mainstream economic theory: a higher expected rate of inflation leads to an increase in individual spending intentions.

In terms of the sign of the impact, our results are qualitatively consistent with results reported by D’Acunto et al. (2015). These authors demonstrate that for German consumers an increase in inflation expectations leads to a 6 to 9 pp increase in the probability that consumers are ready to spend. Nevertheless, this result refers to only qualitative data about inflation expectations and perceptions and, hence, the effect cannot be strictly compared with ours. Our results are also in accordance with Ichiue and Nishiguchi (2015) who use microdata for Japan, which in contrast with other economies, has experienced a prolonged period of near zero interest rates. Thus, the authors argue, even in expectation of higher inflation, consumers are less likely to expect a similar simultaneous movement in nominal rates. In line with this, their results show that consumers with higher inflation expectations tend to increase current consumption relative to future spending.

Our results constrast with findings of Bachmann et al. (2015) which relate to the US economy. Using the Michigan Survey, these authors find that the effect of higher inflation expectations for US consumers is very close to zero and statistically not significant during normal times. Moreover, in periods when the ELB is binding, the relationship is shown to be negative (i.e. higher expected inflation which reduces real interest rates is associated with a drop in consumption). Also with respect to US consumers, Burke and Ozdagli (2013) finds that consumers do not increase their spending on large home appliances and electronics in response to an increase in inflation expectation, but they do increase spending on non-durable goods and they are more likely to purchase a car.

What might explain these starkly contrasting results for US and Euro Area consumers? A first possible explanation relates to our focus on the subjective expected change in inflation. A second is that the different results may relate to differences in sample size. The study of Bachmann et al. (2015) is based on a total of 67,855 observations covering a time span of 24 years. Every month the authors are left on average with a sample of 195 consumers out of the

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20 They use data provided by the market research firm GfK, which conduct the consumer survey for Germany.

21 These conclusions are based on data from the New York Fed/RAND-American Life Panel household expectations survey. This dataset contains detailed information on actual consumer spending, including the ability to distinguish durable and non-durable consumption.
500 who are interviewed. This is a consequence of the fact that for these baseline results only a subsample of first interviews (the Michigan Survey has a rotating panel structure, i.e. about 40% of the respondents are interviewed also in the next round) is used and observations that are larger than 20 percent in absolute value are excluded. As a consequence, the amount of cross-sectional units that can be obtained in any given month is actually relatively modest. In working with the EU Consumer Survey, we benefit from a total sample size of 1,793,110 but over a much shorter period of approximately 12 years. This amounts to an average of 6,427 matched cross-sectional observations per month. One potential concern with our findings is the possibility that the impact of inflation may be driven by outliers in our dataset. We therefore performed an exercise in which we estimate our model specifications on a reduced sample, in which we eliminate statistical outliers, i.e. above 3 standard deviations from the mean and we find that marginal effects remain positive and are even stronger in this case (see the last two rows of Table 2).

As previously highlighted, the average marginal effects at the ELB are always higher than the ones outside the ELB for each of the model specifications that we have employed. In line with this, the coefficient of the interaction term "ELB x expected change in inflation" is positive and statistically significant at the 1% level. This is very much in line with what one would expect: in a ELB environment, nominal interest rates are bounded from below. Of course, this bound can be breached by negative interest rates, although if this happens one would still not expect interest rates to go too far below zero. Thus the real interest rate responds one-for-one with expected changes in inflation. This may make the latter even more relevant to the spending decision than would otherwise be the case. Our results therefore offer support to the potential stabilisation role of inflation expectations at the ELB, e.g. because a higher expected change in inflation imparts a stronger stimulus to consumption when policy is constrained by the ELB.

[Insert Table 2 here.]

3.2 Detailed model results

To get a broader sense of how successful we have been in modelling consumer spending intentions, Table 3 shows in detail the average marginal effects associated with all controls that we have used in the estimation. All are statistically significant, except the marginal effect associated with the SPF macro uncertainty measure, disposable income and some of the age and unemployment situation variables. Also, these marginal effects are generally similar across the ELB and outside the ELB regimes. Being older decreases the propensity to spend, while being a female as opposed to being a man, having a higher level of education, higher income, being employed as opposed to unemployed, or a non-debtor instead of a debtor, all increase the consumer propensity to spend. A 1 pp increase in bank lending rates decreases the probability of consumers being ready to spend by approximately 0.60 pp, approximately two times more
than the effect of a 1 pp change in inflation expectations. This indicates that while inflation expectations are important for the consumption decision, nominal interest rates may be even more important. In the case of aggregate disposable income, the impact is positively signed but insignificant. This suggests that the effects of income on consumer spending are well captured by the other general and consumer specific controls included in the model (see also the further discussion below).

Table 3 also shows the average marginal effects for individual expectations about individual or aggregate economic and financial developments. Average marginal effects of expectations of a better individual financial situation are generally quite close to the marginal effects related to expectations for a better general economic situation. Expecting that the general economic situation gets a lot better relative to getting a lot worse increases the propensity to spend by approximately 14.0 pp, while expecting that unemployment levels will increase sharply as opposed to falling, decreases the probability to spend by approximately 9.55 pp. Importantly, the impact of these expectations on the consumer probability to spend cannot be compared in quantitative terms with the impact of a 1 pp change in inflation expectations because the latter is a continuous variable while the former variables are all discrete. Even so, such results highlight the potential importance of other policies, including structural policies aimed at increasing prospects for long-term growth and lowering structural unemployment in driving consumers’ willingness to spend.

3.3 Linking micro and macro: A VAR analysis

In the previous section we have estimated the impact of consumer inflation expectations on the propensity to spend. Nevertheless, the question of whether or not this relationship translates into an impact on actual consumption remains unanswered. For this purpose, we use a bivariate VAR to model the relationship between aggregate real consumption\(^22\) and the average estimated consumer propensity to spend derived from our ordered logit model. Such a VAR provides a bridge which can link the micro evidence in our discrete choice panel regressions with macroeconomic aggregates and, as we illustrate below, can also enable macro level simulations and scenario analysis.

We first estimate the spending readiness of the "representative consumer" in the euro area as a weighted average of the individual fitted probabilities obtained from our logit regressions. In constructing the average probability we use individual consumer weights based on the representativeness of a consumer in total population and therefore control for variation in survey

---

\(^22\)Source: Eurostat. Individual consumption expenditure Euro Area changing composition, world concept, Households and non-profit institutions serving households, Euro, chain linked volumes, calendar and seasonally adjusted.
sample size across countries. This probability summarizes all the micro and macro level information that we have included in our ordered logit specification. Hence, a bivariate VAR capturing the interaction between real total consumption and this spending propensity measure seems most appropriate and a multivariate analysis which adds other relevant macroeconomic controls in the VAR is not necessary.

Figure 5 shows the impulse response functions based on a Cholesky decomposition, with the average propensity to spend variable (Prob) ordered first. Thus, we assume that in the first period the consumer’s readiness to spend does not react to a shock in log consumption (lnC) \(^{23}\). Impulse response functions behave in an economically intuitive manner: an initial positive shock leads to a persistent increase in the spending probability which slowly decays toward zero. Consumption slowly increases after a shock in the probability to spend and the positive effect lasts for eight to ten quarters after the initial shock. Interestingly, the propensity to spend does not react at all to a shock in real consumption which suggests that it can largely be treated as exogenous within the VAR. After a consumption shock, consumption increases and then the effect slowly decays.

[Insert Figure 5 here.]

Based on this VAR, we implement two scenarios capturing the effects of a 2.0 pp change in inflation expectations. These scenarios can be interpreted as illustrating the impact of moving from a situation of undesirably low inflation (e.g. at 0%) to a rate of inflation more in line with price stability (e.g. of 2%). A first scenario depicts the effects of such a change when the ELB is binding while a second is intended to capture the impacts when the economy is away from the ELB. The 2.0 pp expected increase in inflation is implemented gradually as a 0.5pp increase that takes place over four consecutive quarters. We compute the change in the spending probability associated with 0.5 pp increase in inflation expectations based on the specification that excludes outliers. A 0.5 pp increase in inflation expectations is associated with a 0.17 pp increase in the spending probability when the ELB is binding and a smaller 0.11 pp increase when it is not.

We then use the estimated results of the above VAR to trace out the impacts of the corresponding "shocks" to the spending probability on real consumption under each scenario. \(^{24}\) Figure 6 shows the difference in the annual real consumption growth rates relative to a baseline scenario where inflation expectations and consumers’ spending probabilities are kept constant.

\(^{23}\)This identifying restriction is justified by the fact that we average spending probabilities using only data from the first month of each quarter. Hence we should not expect survey responses to be contemporaneously impacted by real consumption shocks which cannot be anticipated at the start of the quarter.

\(^{24}\)In the ELB scenario, the path of the aggregate consumer propensity to spend increases by 0.17 pp in each of the four consecutive quarters and then remains constant for the next eight quarters. Outside the ELB scenario, in line with the above estimates, the shock to the consumer propensity to spend is lower and is fixed to 0.11 in each of the first four quarters.
throughout the 12 quarter simulation period. In cumulative terms, real consumption rises by approximately 0.4% over the three year horizon when the ELB is binding and by just over 0.2% when it is not. Overall, we would therefore conclude that the impact of inflation expectations on consumption is not just significant in a statistical sense, but it is also highly quantitatively relevant in economic terms.

[Insert Figure 6 here.]

The above approach, focussing on the estimated probabilities from our micro level model differs somewhat from previous attempts in the literature to convert survey findings into quantitative effects on actual consumption spending. Bachmann et al. (2015) also use a bivariate VAR in which they include an aggregate index for buying conditions, which is measured by the fraction of people saying that now it is good moment to buy durable goods minus those reporting that now it is a bad moment to buy, and the HP-filtered natural logarithm of real durable consumption expenditures. These authors then report impulse response functions for which they calibrate the size of the innovation corresponding to the aggregate index such that it corresponds to the marginal effect of a 1pp point increase in inflation expectations as computed based on their micro-data analysis. In line with their negligible and insignificant estimated marginal effects, they find that the impact is almost zero outside the ELB and about -0.1% at the ELB. In order to estimate the impact on real consumption, D’Acunto et al. (2015) perform a "back-of-the-envelope" calculation and simply regress the natural logarithm of real durable consumption expenditure on the end of quarter value of the average durable purchasing propensity and quarterly dummies. They find 4.8% higher real durable consumption if all Germans would expect higher inflation as opposed to prices not changing. This impact is in line with the direction of the effect that we estimate but appears at first pass to be considerably higher in magnitude. However the quantitative differences with our results should not be overstated given differences in the underlying scenario. In particular, the higher impact of D’Acunto et al. (2015) relates to a general and qualitative increase in inflation expectations and not to a 2.0 pp quantitative increase spread over four quarters. Moreover, their results relate only to durables instead of total consumption and to the specific case of Germany.

3.4 Country results

All of the above reported results capture pooled effects for the euro area sample as a whole. It is of clear interest to consider in detail how the estimated impact of inflation expectations may differ across individual countries in the euro area. In general, we find that country results confirm aggregate EA results: all countries except one, show a positive relationship between the expected change in subjective inflation (see Figure 7). The only exception is Malta for

\footnote{At a country level we do not report results for Estonia, as information for the consumer inflation perceptions was available only at the beginning of the sample.}
which we find average marginal effects of -0.13 outside the ELB and an even stronger negative one of -0.24 at the ELB. Of course, among the countries which exhibit a positive marginal effect, we do find heterogeneity as the range for the effects stands between 0.02 and 0.60 pp. Most countries show effects around the EA estimates both outside the ELB and at the ELB. Spain and Portugal seem to have a weak, close to zero impact, meaning that for consumers in these countries inflation expectations do not matter much in the consumption decision. Finland exhibits a marginal effect close to 0.60 both outside and at the ELB, making the Finish consumers the most sensitive to inflation expectations. Also, for 13 of the 17 country cases that we consider, the impact when positive is also stronger when the ELB is binding.

[Insert Figure 7 here.]

For consumers in Germany and Slovakia the relationship between inflation expectations and consumption has become significantly stronger at the ELB, with average marginal effects standing between 0.50 and 0.60. Note that German consumers have been experiencing deposit rates below 1% since mid-2012, which have been decreasing to reach levels around 0.3% in July 2015 (which is the end of our sample). Just like the findings in Ichino and Nishiguchi (2015) for Japanese consumers, it is possible that once confronted with a prolonged period of low and close to zero deposit interest rates, German consumers have become more sensitive to the importance of inflation expectations when deciding between current consumption relative to saving and consuming in the future. Also note that the period that we have chosen to define the ELB coincides almost perfectly with this period of very low deposit rates in Germany. Finish consumers, on the other hand, have continued to experience deposit rates around 1% during the corresponding period.

4 Conclusion

In this paper we analyse the relationship between consumer inflation expectations, consumer’s readiness to spend and actual consumption. Although this relationship stands at the very heart of most standard macroeconomic models, there are very few papers that have provided robust empirical evidence on its nature and magnitude, or in a way that allows for a robust comparative analysis across countries. We investigate this relationship for the Euro Area and 17 of its constituent countries. To the best of our knowledge, we are the first to provide such

26D’Acunto et al. (2015) have indeed reported average marginal effects between 6 and 9 pp for an increase in inflation, nevertheless these are not directly comparable with our results as their marginal effects are based only on qualitative information and reflect the effect of an increase in inflation as opposed to prices remaining at the same levels.

27ECB MFI Statistics - Statistical Data Warehouse from national sources: Bank interest rates - deposits from households with an agreed maturity of up to one year (new business)

28We have chosen June 2014 as the beginning of the ELB period, as at that time the rate of the deposit facility became negative.
a comprehensive view on this central issue for understanding Euro Area consumer behaviour. We benefit from a very rich micro dataset provided by the EU Consumer Survey which provides information about consumers expectations concerning different economic and financial concepts, and which can be broken down according to a detailed set of demographic characteristics. Most important for our analysis, the survey includes quantitative consumer expectations and perceptions and gives information about the consumers’ intentions to spend.

Our evidence is based on 1,793,108 observations which were carefully collected to reflect EA population over approximately a 12 years period, from May 2003 to July 2015. As the survey does not include information about actual consumption, we perform our analysis in two steps. First, we estimate the relationship between a consumer’s inflation expectations and their readiness to spend based on the survey data. To do so, we use an innovative measure of the consumer’s subjective expected change in inflation, which reflects simply the difference between consumers expectations about future inflation and their subjective perceptions about current inflation. We find this measure the most economically relevant as it reflects the fact that when changing their spending intentions, consumers consider expected inflation relative to the currently perceived level of inflation. Indeed, the data reveal that the latter can vary widely across households and time and, hence, a failure to take this into account would likely bias any estimated impacts on individual consumer behaviour based on inflation expectations alone. In a second step, using macro level information, we employ a simple VAR framework to translate the estimated impact of inflation expectations on current spending readiness into an effect on real actual private consumption expenditure in the Euro Area.

Our results suggest that Euro Area consumers behave in line with the central predictions of economic theory. When they expect higher inflation in the future, all other factors held constant, they adjust positively their intention to spend at the current moment. The result is robust across several specifications, in which we gradually control for demographics, other consumer expectations, the consumers’ financial situation, interactions of inflation expectations with various controls, time dummies, country dummies and other common measures of macroeconomic conditions. Our pooled results suggest that for a 1 pp expected increase in inflation the consumers’ probability to spend increases by between 0.16 pp and 0.34 pp. This is confirmed by country level results, where for almost all countries, we find a positive relationship between consumer inflation expectations and propensity to spend, though there is some notable heterogeneity. This result complements and extends the existing empirical literature on consumer behaviour using survey data: [Bachmann et al. (2015), Ichue and Nishiguchi (2015), D’Acunto et al. (2015), Burke and Ozdagli (2013), Armantier et al. (2015)]. While our results for the EA and most of its constituent countries confirm previous findings for Germany and Japan, they differ to recent findings for the US, like the ones in [Bachmann et al. (2015) and Burke and Ozdagli (2013)].

29This is the number of observations that we are left with after eliminating those belonging to consumers that did not reply to the full question set that we use in this analysis.
Another key finding in our study is that the relationship between consumer inflation expectations and consumption becomes stronger at the ELB when interest rates are bounded from below. At the ELB, fluctuations in the real interest rate respond one for one to changes in expected inflation because nominal rates can no longer adjust to mitigate the real effects of a change in inflation expectations. Our results thus suggest that once confronted with a lower bound on nominal rates, consumers become more aware of and sensitive to changes in real interest rates and the effect of inflation expectations on real spending behaviour is augmented as a result. We observe this change in the relationship due to the lower bound both in our pooled results and also in our country specific results. These differences are also shown to be economically relevant. When comparing a scenario in which inflation expectations increase by 2.0pp relative to a scenario where inflation expectations remain unchanged, we find that real consumption rises by 0.4% over a three year period at the ELB and by only 0.2% outside the ELB.

Overall, from a monetary policy perspective, our micro analysis of consumer spending behaviour provides strong support to central bank concerns about a drop in inflation expectations because such developments have the potential to weaken aggregate demand further by reducing consumers’ readiness to spend. Moreover, perceptions about weak overall aggregate demand linked to weak consumption and declining inflation expectations may equally restrain firms’ incentives to invest. Our results therefore highlight the important role that monetary policy can play in helping to avoid an undue drop in inflation expectations and thereby provide support to the economic recovery and aggregate demand.

References


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Charts and tables

Figure 1: Consumer inflation expectations, real total consumption and readiness to spend

Note: Quarterly data, 2003Q4 - 2015Q3. Consumer Inflation Expectations - price trends over next 12 months (balanced statistics); Readiness to spend - major purchases at present, percent positive replies, source: DG-ECFIN Consumer Survey; Real total consumption - household consumption expenditure, Eurostat
Figure 2: Mean inflation expectations and perceptions vs HICP


Figure 3: Scatterplots

(a) Readiness to spend vs inflation expectations.

(b) Readiness to spend vs expected change in inflation.
Figure 4: Scatterplots of expected change in inflation vs readiness to spend differentiating by consumer characteristics

Note: One dot represents a simple average of a particular category of consumers (as defined by education, income, expected financial situation and employment status) at one moment in time (identified by month and year).
Figure 5: Bivariate VAR: impulse response functions

**Response to Cholesky One S.D. Innovations ± 2 S.E.**

**Prob to Prob**

**Prob to lnC**

**InC to Prob**

**lnC to lnC**

Note: Impulse response functions based on a Cholesky decomposition of a bivariate VAR(1) including consumer aggregate propensity to spend and log real total consumption (quarterly frequency), in this order. Prob refers to the fitted aggregated probability, i.e. the aggregated propensity to spend and lnC refers to log real total consumption.
Figure 6: Impact on real consumption of a gradual increase in consumer inflation expectations

Note: The difference in the annual growth rates results from conditional forecasts based on a VAR(1) which includes a quarterly aggregate measure of the consumer propensity to spend and the natural logarithm of real total consumption, in this order. We implement two scenarios, which we then compare to a baseline scenario. The first scenario, assumes four consecutive quarters increase of 0.1705 in consumer propensity to spend at the ELB (equivalent to 0.5 pp increase in inflation expectations) and eight quarters following the last increase constant consumer propensity to spend. The second scenario is similar except that a 0.112 pp increase is assumed outside the ELB. The baseline scenario assumes that consumer inflation expectations remain constant throughout the 12 quarters.
Figure 7: Country average marginal effects

Note: This figure presents average marginal effects based on the ordered logit specification which includes the following groups of controls: "Demographics","Other expectations and current financial status", "Interactions", "Time dummies", "Country dummies", "Macro-aggregates". The "Macro-aggregates" group does not include SPF GDP uncertainty, as we did not have country specific information. For Slovenia we report results based on an ordered logit specification which excludes "Macro-aggregates" due to convergence issues. All average marginal effects are statistically significant at 1% or 5% level, except average marginal effects at the ELB for Greece and Portugal.
Table 1: Mean and median inflation expectations and perceptions over 2003 - 2015

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Table 2: Propensity to spend: average marginal effects, Euro Area

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Note: Clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. The table shows the average marginal effect of a unit increase in the expected change in inflation on the probability that consumers are ready to spend given current conditions, estimated by the ordered logit model. "Demographics" includes age, gender, education, employment status, income; "Expectations and financial status" includes expectations of individual financial situation, general economic and unemployment situation and consumer current financial status, i.e. debtor or non-debtor; "Interactions" includes pairwise interactions as follows: expected change in inflation _ the expected financial situation, expected change in inflation _ debt status, expected change in inflation _ employment status, expected change in inflation _ income, expected change in inflation _ education; "Time dummies" includes year dummies 2004 to 2015; "Country dummies"; "Macro aggregates": SPF GDP uncertainty, lending rates, log disposable income; ELB dummy takes value 1 from June 2014 to July 2015.
Table 3: Full specification, no outliers: average marginal effects

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<td>0.122</td>
</tr>
<tr>
<td></td>
<td>(0.0824)</td>
<td>(0.0854)</td>
</tr>
<tr>
<td>Age (30-49)</td>
<td>-0.0168***</td>
<td>-0.0173***</td>
</tr>
<tr>
<td></td>
<td>(0.00334)</td>
<td>(0.00347)</td>
</tr>
<tr>
<td>Age (50-64)</td>
<td>-0.00529</td>
<td>-0.00545</td>
</tr>
<tr>
<td></td>
<td>(0.00923)</td>
<td>(0.00952)</td>
</tr>
<tr>
<td>Age (65+)</td>
<td>-0.00170</td>
<td>-0.00175</td>
</tr>
<tr>
<td></td>
<td>(0.0139)</td>
<td>(0.0143)</td>
</tr>
<tr>
<td>Gender (Female)</td>
<td>-0.0152***</td>
<td>-0.0157***</td>
</tr>
<tr>
<td></td>
<td>(0.00463)</td>
<td>(0.00471)</td>
</tr>
<tr>
<td>Education (Secondary)</td>
<td>0.0252***</td>
<td>0.0260***</td>
</tr>
<tr>
<td></td>
<td>(0.00282)</td>
<td>(0.00287)</td>
</tr>
<tr>
<td>Education (Further)</td>
<td>0.0370***</td>
<td>0.0382***</td>
</tr>
<tr>
<td></td>
<td>(0.00507)</td>
<td>(0.00532)</td>
</tr>
<tr>
<td>Income (2nd Quartile)</td>
<td>0.0202***</td>
<td>0.0209***</td>
</tr>
<tr>
<td></td>
<td>(0.00463)</td>
<td>(0.00467)</td>
</tr>
<tr>
<td>Income (3rd Quartile)</td>
<td>0.0346***</td>
<td>0.0358***</td>
</tr>
<tr>
<td></td>
<td>(0.00827)</td>
<td>(0.00849)</td>
</tr>
<tr>
<td>Income (4th Quartile)</td>
<td>0.0606***</td>
<td>0.0626***</td>
</tr>
<tr>
<td></td>
<td>(0.0120)</td>
<td>(0.0124)</td>
</tr>
<tr>
<td>Employment status (Employed)</td>
<td>0.0331***</td>
<td>0.0342***</td>
</tr>
<tr>
<td></td>
<td>(0.00710)</td>
<td>(0.00724)</td>
</tr>
<tr>
<td>Debt status (non-debtor)</td>
<td>0.0349***</td>
<td>0.0360***</td>
</tr>
<tr>
<td></td>
<td>(0.0105)</td>
<td>(0.0110)</td>
</tr>
<tr>
<td>Expected financial situation (a little worse)</td>
<td>0.0433***</td>
<td>0.0453***</td>
</tr>
<tr>
<td></td>
<td>(0.00930)</td>
<td>(0.00979)</td>
</tr>
<tr>
<td>Expected financial situation (the same)</td>
<td>0.0772***</td>
<td>0.0804***</td>
</tr>
<tr>
<td></td>
<td>(0.0123)</td>
<td>(0.0128)</td>
</tr>
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</table>
Table 3 Continued: Full specification, no outliers: average marginal effects

<table>
<thead>
<tr>
<th>Variables</th>
<th>ELB=0</th>
<th>ELB=1</th>
</tr>
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<tbody>
<tr>
<td>Expected financial situation (a little better)</td>
<td>0.0929***</td>
<td>0.0966***</td>
</tr>
<tr>
<td></td>
<td>(0.0137)</td>
<td>(0.0143)</td>
</tr>
<tr>
<td>Expected financial situation (a lot better)</td>
<td>0.118***</td>
<td>0.122***</td>
</tr>
<tr>
<td></td>
<td>(0.0146)</td>
<td>(0.0152)</td>
</tr>
<tr>
<td>Expected general economic situation (a little worse)</td>
<td>0.0363***</td>
<td>0.0377***</td>
</tr>
<tr>
<td></td>
<td>(0.00473)</td>
<td>(0.00483)</td>
</tr>
<tr>
<td>Expected general economic situation (the same)</td>
<td>0.0517***</td>
<td>0.0536***</td>
</tr>
<tr>
<td></td>
<td>(0.00621)</td>
<td>(0.00625)</td>
</tr>
<tr>
<td>Expected general economic situation (a little better)</td>
<td>0.0894***</td>
<td>0.0925***</td>
</tr>
<tr>
<td></td>
<td>(0.00986)</td>
<td>(0.0101)</td>
</tr>
<tr>
<td>Expected general economic situation (a lot better)</td>
<td>0.140***</td>
<td>0.144***</td>
</tr>
<tr>
<td></td>
<td>(0.0146)</td>
<td>(0.0150)</td>
</tr>
<tr>
<td>Expected general unemployment situation (fall slightly)</td>
<td>0.00487</td>
<td>0.00499</td>
</tr>
<tr>
<td></td>
<td>(0.0102)</td>
<td>(0.0104)</td>
</tr>
<tr>
<td>Expected general unemployment situation (the same)</td>
<td>-0.0284*</td>
<td>-0.0292*</td>
</tr>
<tr>
<td></td>
<td>(0.0146)</td>
<td>(0.0151)</td>
</tr>
<tr>
<td>Expected general unemployment situation (increase slightly)</td>
<td>-0.0504***</td>
<td>-0.0519***</td>
</tr>
<tr>
<td></td>
<td>(0.0161)</td>
<td>(0.0168)</td>
</tr>
<tr>
<td>Expected general unemployment situation (increase sharply)</td>
<td>-0.0955***</td>
<td>-0.0988***</td>
</tr>
<tr>
<td></td>
<td>(0.0192)</td>
<td>(0.0203)</td>
</tr>
<tr>
<td>Observations</td>
<td>1,756,373</td>
<td>1,756,373</td>
</tr>
</tbody>
</table>

Note: Clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. The table shows the average marginal effect estimated with an ordered logit model. The results show the average marginal effect of a one unit increase in inflation expectations on the probability that consumers are ready to spend. For the discrete variables, the reported marginal effect shows the discrete change from a base alternative, e.g. Income (1st Quartile) to another alternative, e.g. Income (4th Quartile). The ordered logit regression includes all groups of controls: "Demographics","Other expectations and current financial status","Interactions","Time dummies","Country dummies","Macro-aggregates".