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SPEND TODAY OR SPEND TOMORROW?
THE ROLE OF INFLATION EXPECTATIONS IN CONSUMER BEHAVIOUR

by Concetta Rondinelli* and Roberta Zizza*

Abstract

This paper investigates whether Italian households' actual expenditure and willingness to buy durables (cars) are related to their inflation expectations. In a high-inflation regime, as in the early 1990s, consumers with higher inflation expectations tend to have higher current than future expenditure, suggesting that an inter-temporal substitution mechanism is at work. Conversely, in a low-inflation environment, such as the one after the global financial crisis, higher expected inflation lowers households' purchasing power and, thereby, spending (income effect). We also find that the composition of household balance sheets matters for explaining how inflation expectations shape spending behaviour.

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Contents

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1 Introduction[1]

Inflation expectations lie at the centre of modern macroeconomic analysis, particularly when short-term interest rates are at the Zero Lower Bound (ZLB). According to economic theory, the expectations channel is a key determinant of the overall effectiveness of monetary policy. In taking and communicating monetary policy decisions, central banks aim at influencing expectations about future inflation and guide them in a direction that is compatible with their mandate. Moreover, raising inflation expectations should lower real interest rates and hence boost firms' and households' expenditure.

In this paper we focus on the empirical relationship between expected consumer inflation and expenditure for Italian households.[2] Several channels are at work. First of all, on the one hand if nominal interest rates are fixed for all households or are sufficiently low, higher inflation expectations lower the real interest rate (Fisher equation), thus creating an incentive to anticipate spending (intertemporal substitution effect); the positive correlation between consumption and expected inflation at the same horizon is encompassed in the Euler equation as derived from the optimization problem of households in standard DSGE models. On the other hand, increased inflation expectations might reduce the real expected value of wages and wealth and have a negative impact on spending (income effect). Among other possible channels, Doepke and Schneider (2006) show that higher inflation expectations lead to wealth gains for debtors; if borrowers have higher marginal propensity to consume, higher inflation leads to higher spending. Furthermore, inflation is a tax on the holders of highly liquid assets and hence may function as a tax on economic activity, to the extent to which these assets are used as a medium of exchange, as shown by Aruoba and Schorfheide (2011). Finally, higher inflation expectations could be a signal of uncertainty about the economic outlook, which in turn would induce precautionary motives for saving and, thereby, reduce spending. Thus the consequences of higher inflation expectations are a priori ambiguous and deserve an empirical assessment.

Using data on inflation expectations and spending behaviour at the household level

[1]We would like to thank two anonymous referees, Thomas Crossley, Tullio Jappelli, Stefano Neri, Philip Vermeulen and participants at the Conference on Household Expectations (Deutsche Bundesbank and Banque de France), at the Annual Conference for Italian Labour Economists (Novara, September 2019) and at the Household Finance and Consumption Network meeting (Frankfurt, November 2019) for helpful comments and discussion. The views expressed herein are those of the authors and do not necessarily reflect those of the Banca d'Italia.

[2]For Italy Grasso and Ropele (2018) find evidence of a positive and significant relationship between firms' inflation expectations and their propensity to invest. Coibion, Gorodnichenko, and Ropele (2019) show that higher firm inflation expectations lead firms to raise their prices, increase demand for credit, and reduce their employment and capital. However, when policy rates are constrained by the effective lower bound, demand effects are stronger, leading firms to raise their prices more and no longer reduce their employment.

allows to delve properly into this topic, making it possible to assess the role of the different channels and to discover potential heterogeneities in this nexus. Microdata also improve upon aggregate data as the former enable to exploit large samples to focus on rare occurrences - in our context, a very low nominal policy interest rate regime - and to perform comparisons with normal times. Finally, microdata are also superior to aggregate data as average expected inflation rate and aggregate spending are plausibly simultaneously determined, making the assessment of a causal link difficult.

The micro literature has brought forward conflicting evidence on the role of inflation expectations on consumption. On the one hand, Bachmann, Berg, and Sims (2015) using survey data from the Michigan Survey of Consumers find for the US a small and insignificant nexus between inflation expectations and consumption; their findings suggest that the impact could be even negative at the lower bound. Similarly, Burke and Ozdagli (2013), relying on the New York Fed/RAND-American Life Panel household expectation survey, find no evidence that consumers increase their spending on large home appliances and electronics in response to an increase in their inflation expectations; in their preferred specification the effect exerted on durable consumption (excluding cars) is even negative and marginally significant. However, consumers are more likely to purchase a car as their short-run inflation expectations rise. Still, in some models Burke and Ozdagli (2013) show that also spending on non-durable goods increases with short-run expected inflation; this is puzzling to the extent that theory predicts that consumption of durable goods should be more sensitive to real interest rates than consumption of non-durable goods. A more recent and convincing evidence of a sharp negative effect on spending on durables comes from Coibion et al. (2019) who rely on Dutch data and exploit a randomized information treatment of inflation to derive causal estimates; conversely, the effect of expected inflation (π^e, thereafter) on non-durable spending is positive, though imprecisely estimated.

On the other hand, Ichiue and Nishiguchi (2015) find that Japanese households with higher expected inflation increase their real spending and plan to lower it. Ito and Kaihatsu (2016) employ microdata for Japanese households and show that an increase in inflation expectations exerts a positive effect on consumer spending. Arioli et al. (2017) use the very rich micro dataset from the EU Consumer survey and document that households in the euro area tend to behave in line with the Euler equation. When they expect higher inflation they increase their planned spending. Duca, Kenny, and Reuter (2018) exploit the same dataset and reach similar conclusions for the euro area as a whole and for most of the member countries. In a more recent paper, Vellekoop and Wiederholt (2019) link Dutch survey data on quantitative inflation expectations to administrative data on income and wealth and document that households with higher

inflation expectations save less and are more likely to acquire a car. Using the unexpected announcement of a future VAT increase in Germany as a natural experiment, D'Acunto, Hoang, and Weber (2018) find evidence of a causal and positive relationship between inflation expectations and expenditure. Similarly, D'Acunto et al. (2019a) and D'Acunto et al. (2019b), relying upon Finnish data and on Nielsen homescan panel of US households respectively, show again that inflation expectations stimulate consumption.

In the macroeconomic literature, standard representative agent New Keynesian models rely on the intertemporal substitution channel for monetary policy to affect consumption spending; this is however questioned from empirical macro and micro evidence, which shows that this effect is weak possibly not because it is small *per se*, but as it is compensated by the income effect (Kaplan, Moll, and Violante, 2018). The literature has very recently switched to heterogeneous-agent models, where the different endowment in terms of wealth plays a role in spending decisions.

In this paper we re-examine the link between inflation expectations and consumer spending, especially on durables, for the Italian economy using the Survey of Household Income and Wealth (SHIW) conducted by Banca d'Italia. To the best of our knowledge this is the first attempt to study this nexus for Italy.[3] The SHIW is different from the micro data collected by the European Commission in the context of the Harmonised EU Programme of Business and Consumer Surveys and from the US Michigan Survey of consumers, in several important aspects. First, the Survey allows us to exploit quantitative measures of both consumer expenditure and inflation expectations at the individual level; both point and density forecasts on inflation expectations are hence available. Second, the willingness to spend up to three years ahead can be assessed (see Sections 2 and 3 for a comprehensive discussion). Third, we can compare the impact of inflation expectations on expenditure in different inflation regimes, as the Survey has collected similar information in the early Nineties (*high inflation regime*) and in mid 2010s (*low inflation regime*).[4] More importantly, the Survey collects quantitative measures of wealth (financial and real) and income, as well as several socio-demographic characteristics, thus making it possible to estimate a proper consumption function in line with the theoretical advancements of the literature on heterogeneous-agent New Keynesian (HANK) models (Kaplan, Moll, and Violante, 2018).

We find that in a high inflation regime consumers tend to anticipate spending as higher inflation expectations lead to lower real interest rates if nominal rates are fixed,

[3]Jappelli and Pistaferri (2000) use the same information for the early Nineties to test for excess sensitivity of consumption to predicted income growth.

[4]In Italy the low inflation period started in 2014. Our data are referred to 2016 when inflation was on average equal to -0.1%. We keep referring to "low inflation" and not to deflation as inflation expectations and intentions to buy are referred to the subsequent years, when inflation never returned into negative territory.

supporting the working of an intertemporal substitution mechanism. Conversely, in the low inflation period, as higher expected inflation translates into a loss in purchasing power, readiness to buy durables tends to react negatively, thus in line with the income effect argument, as also supported by household expectations on their future income. We show that the higher uncertainty in the most recent years induced to spend less due to precautionary motives. Finally we find that the channels related to wealth are at work in both regimes as spending decisions change depending on the composition of household balance sheets, e.g. homeownership status and endowments of financial wealth.

The rest of the paper is organized as follows. In Section 2 we describe the dataset, while in Section 3 we illustrate the empirical set-up. In Section 4 we review the data on inflation expectations and provide some descriptive results on their determinants. The link between inflation expectations and expenditure in low and high inflation regime is then addressed in Section 5. Section 6 concludes and provides a discussion of the results.

2 The data

The analysis is conducted using Banca d'Italia's Survey on Household Income and Wealth (SHIW), a large biennial survey meant to assess the income and wealth conditions of Italian households. The survey has been available since the 1960s, it samples about 8,000 households and 22,000 individuals per wave, and provides a representative sample of the Italian population (using specific sample weights). The SHIW collects detailed information on households' income, consumption and real estate wealth, as well as on their portfolio of financial instruments and their access to credit. The SHIW's net income definition is particularly detailed, as it includes labour income, income from real and financial assets and pensions. Finally, a huge number of characteristics of household heads and of every other household member is provided.

Consumption

On the expenditure side, historically the SHIW collects information on actual total consumption in the reference year, with a breakdown into several expenditure items, such as food, other non-durables excluding food, durables (distinguishing between cars and other durables excluding cars), and housing. Table 1 shows that average total consumption (in real terms) decreased between 1991 and 2016 (by about 6%), due to food and durable components. Additionally, the 2016 wave included an hypothetical question on the willingness to buy cars; in particular, households that owned at least one car were asked the following questions:

"*A1. How long has your household owned the car (if more than one car,*

refer to the car used most often)?
A2. How many km does the car have on the clock (the car used most often)?
A3. How likely is it (from 0 to 100) that your household will buy a new car to replace the present one (the car used most often)?"

- before the end of 2017
- in 2018
- in 2019

The probability to buy a car by the end of 2017 is on average equal to 7%; it increases in 2018 and 2019, at 10% and 16% respectively (Table 1).

The focus on cars is particularly interesting as they are big-ticket consumer durables, which are often paid-off over a longer term resorting to debt: the real interest rate is likely to be an important factor contributing to the purchasing decision. As cars are usually expensive items, possible data inaccuracies related to the difficulties in recalling spending levels for the previous year are mitigated (Battistin, Miniaci, and Weber, 2003). Additionally, possible criticisms on using an hypothetical measure on the propensity to buy (as in Burke and Ozdagli, 2013) as a proxy for actual consumption should be less relevant for a car, especially when the question refers to short-term horizons. Despite the fact that cars, and more generally durables, are the most sensitive items to interest rates and to economic conditions (Browning and Crossley, 2009), there are also expenditure items among nondurables and services which share the same characteristics of durables, notably because households resort to consumer credit for their purchase.

Furthermore, our specification for propensity to buy a car can be enriched with either the probability of having bought a car in the recent years or, for the latest wave of the SHIW only, with the characteristics of the car already owned, that can be held important determinants of the decision to buy a new car in the close future.

For spending behavior we are thus endowed with valuable information if compared to the extant literature that so far has examined either the intention to spend or the actual spending behaviour, sometimes even with the limitations of using categorical values for changes in consumption (Bachmann, Berg, and Sims, 2015; Ichiue and Nishiguchi, 2015; Crump et al., 2019). Two notable exceptions are Burke and Ozdagli (2013), who exploit panel high-frequency data for consumption with a high level of disaggregation, and Coibion et al. (2019), who rely on quantitative measures of both actual and planned consumption with a panel dimension.

Inflation expectations

The 1989, the 1991 and the 2016 waves of the Survey collected information on future price developments in Italy; households were asked to assign probabilities for HICP inflation

to fall one-year ahead within several intervals, thus allowing to recover density forecasts at the individual level. Intervals provided to households in 2016 were obviously different from those given in the two previous waves, owing to the different inflation regime in which the survey was conducted.

In particular, in 1989 and in 1991 household heads were asked the following question:

> "*B1. Below you find some intervals for inflation. We would like to know your opinion about inflation in Italy one year head. Distribute 100 points among the following alternatives*"
>
> [more than 25%]/[between 20 and 25%]/[between 15 and 20%]/[between 13 and 15%]/[between 10 and 13%]/[between 8 and 10%]/[between 7 and 8%]/[between 6 and 7%]/[between 5 and 6%]/[between 3 and 5%]/[between 0 and 3%]/[less than 0].

In the 2016 wave, instead, the question involved a lower number of intervals and values closer to the levels of inflation prevailing in that period, including negative ones. An anchor, not available in 1989 and 1991, was also provided, i.e. the average HICP growth over 2016 (-0.1%). Household heads were asked as follows:

> "*B2. We would now know your opinion about future inflation. Distribute 100 points among the following alternatives: give a high score to those considered most likely and a low to less likely. In the average of 2016, consumer inflation, measured by the year-on-year rate of change of the Harmonized Index of Consumer Prices, was equal to -0.1 per cent in Italy. What do you expect to be the average inflation in Italy in next 12 months (distribute 100 points)?*"
>
> [more than 2%]/[between 1 and 2%]/[between 0 and 1%]/[between -1% and 0]/[less than -1%].

Underlying data for inflation expectations are thus similar to those exploited by Burke and Ozdagli (2013), Crump et al. (2019) and Coibion et al. (2019), and improve upon the rest of the literature based on either point estimates of expected future inflation (as in Bachmann, Berg, and Sims, 2015) or on categorical expectations (as in Ichiue and Nishiguchi, 2015). In particular, the design of the question on future HICP developments allows to construct individual measures of central tendency (such as the mean or the median of the distribution) as well as to derive measures of dispersion/uncertainty (such as the standard deviation or the interquartile range). The individual mean is computed weighting the central value of each bin with the amount of probability mass assigned to that bin (for a discussion of possible alternative measures see Engelberg, Manski, and

Williams, 2009).[5] The individual standard deviation is calculated accordingly, comparing the central value of each interval with the individual mean. Similarly, the individual median is the central value of the interval for which the cumulative distribution function becomes greater than or equal to 0.5.

As for the 1991 wave, 8,188 households were interviewed between May and October 1992; for the 2016 wave, the sample is a bit smaller (7,421 households) and interviews took place between January and September 2017. Thus, in the early Nineties inflation forecasts collected in wave w are related with actual consumption as available in wave $w+1$, while in the low-inflation period planned spending and expected inflation both feature in the 2016 wave (see Figure 1). The average probability assigned to each inflation interval in the 1991 and the 2016 waves[6] is depicted in Figure 2; it is right-skewed in 1991 and the mode is between 0 and 1% in 2016 and between 5 and 6% in 1991. The mean (median) of inflation expectation collected in the 1991 wave is 7.01 (6.83) and 0.94 (0.88) in the 2016 wave (Table 1), which must be broadly compared respectively to inflation released in 1993 and 2018, when official annual growth of HICP was equal to 4.5% and 1.2% respectively. Thus, households' expectations as collected by the SHIW anticipate the official data with no systematic bias, while in Arioli et al. (2017) and Duca, Kenny, and Reuter (2018) consumers' expectations are referred to be systematically higher.[7] In the 2016 wave the individual distribution was highly concentrated, while in 1991 inflation assumed a broader range of values, from slightly above zero to two-digit ones (Figure 3). Despite this, the standard deviation of inflation expectations (σ_{π^e}) is broadly the same (0.6; Table 1) in both waves. Interestingly, the correlation between the individual mean and the standard deviation was mildly positive in 1991, while its sign was inverted in 2016 (Figures 4 and 5)[8]: thus, in a high-inflation period higher expectations are associated with higher uncertainty while the opposite holds in a low-inflation regime. This might first of all reflect differences in the monetary policy framework, namely the presence in 2016 of a numeric (and asymmetric) inflation objective which (more) explicitly commits the monetary authority to react when inflation is far from the objective. In periods of high inflation and without an explicit commitment, instead, inflation can in principle assume a broader range of values.

[5] For the unbounded bins, the following values have been chosen: 27.5% and -0.5% in 1989 and 1991; 2.5% and -1.5% in 2016.

[6] Descriptive evidence in the 1989 wave is broadly similar to that for 1991 and is not reported for the sake of brevity.

[7] It might be explained in several ways: the SHIW question is not open ended as households are provided with a reference for the inflation rate. Moreover, as stated in Arioli et al. (2017) the use of personal face-to-face interviews (CAPI) is likely to lead to more accurate results than using Computer Assisted Telephone Interview (CATI) methods, as done by the European Commission for the Consumer and Firm Surveys.

[8] This finding holds also when we consider the 112 households interviewed both in 1991 and 2016. See infra in Section 3.

3 Methodology

As it is typical of expenditure data, values of total yearly spending as collected in the SHIW are nonnegative and rightskewed. Data on consumption of durable goods are similar, but are more skewed and contain a substantial number of zeroes (Table 1). Researchers usually run an OLS regression of spending (or its logarithm) on the explanatory variables of interest (inflation expectations in our context) controlling for income and wealth.

As already anticipated in Section 2, in the SHIW households participating in wave w (year t) formulate their inflation expectations at time $t+1$ referred to the $t+2$ horizon. As for the period of high inflation (early Nineties), these expectations are related to actual consumption, which is approximated, as also in Jappelli and Pistaferri (2000), with consumption collected in wave $w+1$ (year $t+2$), and to future consumption, proxied with consumption in wave $w+2$ (year $t+4$; see Figure 1).This implies exploiting the panel component of the Survey: regressions for current consumption are estimated at the household level using the 1991 and the 1993 waves for consumption and household characteristics and the inflation expectations formulated in May-October 1990 and 1992, respectively by the same household; estimates for future consumption are obtained by matching the 1993 and the 1995 waves for consumption with inflation expectations elicited by the same household in May-October 1990 and 1992, respectively.

We look at both cross-section and fixed-effects estimates. For the cross-section specification, we estimate the following equation for current consumption:

$$C_{iw} = \beta_0 + \beta_1 \pi^e_{i,w-1} + \beta_2 \sigma^e_{i,w-1} + \beta_3 X_{iw} + \theta_w + \epsilon_{iw} \tag{1}$$

where C_{iw} is the expenditure of the household i in wave w in either 1991 and 1993 (total and sub-components) and $\pi^e_{i,w-1}$ is the inflation expectation of household i formulated in May-October 1990 and 1992, respectively (wave 1989 and 1991) and $\sigma^e_{i,w-1}$ is a measure of individual dispersion of these expectations; X_{iw} is the deterministic component of expenditure that includes total income, net wealth and age, gender, education, number of components and geographical area. θ_w are year dummies and ϵ_{iw} is the error component.

As for future consumption, the model is specified as follows:

$$C_{iw} = \beta_0 + \beta_1 \pi^e_{i,w-2} + \beta_2 \sigma^e_{i,w-2} + \beta_3 X_{iw} + \theta_w + \epsilon_{iw} \tag{2}$$

which differs from the specification for current consumption for the wider lag between consumption and inflation expectations; here the 1993 and 1995 waves are used for consumption and the 1989 and 1991 ones for inflation expectations.

The availability of current and future expenditure allows us to test not only whether inflation expectations shape expected consumption (as in Crump et al., 2019; Bachmann, Berg, and Sims, 2015), but also to see whether current consumption responds to a change in inflation expectations, which is a more direct test for the validity of the Euler equation. In this regard, our paper is similar to that by Coibion et al. (2019).

Moreover, our identification improves upon Bachmann, Berg, and Sims (2015) and Ichiue and Nishiguchi (2015) which rely on the variation in behaviour across households only, as for the early Nineties we can exploit variation within households over time. Unfortunately we cannot extend this identification strategy for a longer period as done in Burke and Ozdagli (2013). In fact, households who were interviewed by Banca d'Italia both in 1991 and 2016 are only 112. For the fixed-effect specification we estimate, respectively for current and future consumption:

$$C_{iw} = \beta_0 + \beta_1 \pi^e_{i,w-1} + \beta_2 \sigma^e_{i,w-1} + \beta_3 X_{iw} + \theta_i + \epsilon_{iw} \tag{3}$$

$$C_{iw} = \beta_0 + \beta_1 \pi^e_{i,w-2} + \beta_2 \sigma^e_{i,w-2} + \beta_3 X_{iw} + \theta_i + \epsilon_{iw} \tag{4}$$

where X_{iw} is limited to time-varying attributes only and θ_i are household fixed effects.

The complication of having zero durable expenditure is addressed by estimating a probit model for the probability of buying durables, as well as their sub-components (cars and other durables excluding cars).

In the low inflation period (2016) we cannot use the panel component of the Survey as inflation expectations are formulated in 2017 over a 12-month horizon and expenditures are referred to 2016 (the last available wave of the SHIW).[9] These expectations can thus be relevant only for future consumption decisions, namely for the readiness to spend in years 2018 and 2019 (Figure 1); accordingly, planned consumption for 2017 is excluded from the empirical exercise. In particular we estimate:

$$C^e_{it} = \beta_0 + \beta_1 \pi^e_{i,2016} + \beta_2 \sigma^e_{i,2016} + \beta_3 X_{i,2016} + \epsilon_{it} \tag{5}$$

where C^e_{it} is the expected probability of household i of purchasing a car in year t, with t equal to 2018 or 2019. These models are estimated through a linear fractional model

[9]Since the field of the Survey was conducted in 2017 between January and September, the reply for 2017 can be thought of as a better proxy for actual consumption. Due to the synchronism between inflation expectations and consumption decisions, usual endogeneity problems could emerge. Replicating the analysis on actual consumption in low inflation times with the next wave of the SHIW is for sure in our research agenda.

(Papke and Wooldridge, 2008).

Despite the absence of an exogenous source of variation for inflation expectations, such as the change in the VAT in Germany (D'Acunto, Hoang, and Weber, 2018) or the randomized information treatment (Coibion et al., 2019), the timing of the Survey allows to rule out in the high inflation regime (when the panel component is available) concerns for both reverse causality (namely, changes in consumption which translate into changes in aggregate demand, in turn affecting inflation expectations) and endogeneity (such as income shocks hitting jointly consumption and inflation expectations). Additionally, the use of fixed effects and of a rich set of household characteristics (like change in the job status, income, wealth, family size, etc.) may further help in controlling for possible economic and personal shocks that could have an impact on consumption choices. For the low inflation period, when panel estimates cannot be obtained yet, we address endogeneity and reverse causality issues considering expenditure further apart from the moment in which inflation expectations are elicited, i.e. 2018 and, even better, 2019.

4 What's behind inflation expectations?

Several studies have shown that socio-demographic characteristics play a role in shaping consumers' inflation expectations and perceptions (Pfajfar and Santoro, 2013) and (Binder, 2015). In 1991 inflation expectations are significantly lower for oldest household heads: 6.8% for those aged 50 and over compared to 7.2 for those younger than 50. Conversely, in 2016 inflation expectations are significantly higher for older households: 0.95 versus 0.89.

The literature argues that age may influence the formation of inflation expectation, which are shown to depend on the inflation experience that people accumulate during their lives. From a theoretical point of view, theories based on psychological insights - commonly labeled as 'behavioral economics' - posit that agents estimate the probability of future outcomes in a non-statistical, subjective manner, using simple rules of thumb called subjective probability heuristics. Under the so called 'availability heuristic' agents predict that the probability of an event depends on how easily an example that matches the event can be brought to mind (is mentally 'available'). An individual in the assessment of future inflation may be influenced by her own life experience (e.g. if she is able to recall the first and second oil shocks or the Great Depression; see Gnan, Langthaler, and Valderrama, 2010). On an empirical ground, Malmendier and Nagel (2011) show that differences in experienced inflation (in terms of both level and persistence) among US consumers generate heterogeneity in inflation expectation between cohorts (e.g. by birth year). The experience of younger individuals is dominated by re-

cent observations whereas older individuals draw on a more extended historical dataset in forming their expectations. Ichiue and Nishiguchi (2015) find a higher sensitiveness of spending to expected inflation for older individuals, as the latter are more likely to remember vividly the high inflation episodes in the 1970s. Conversely Bachmann, Berg, and Sims (2015) show that having lived through different periods of inflation levels and volatility as well as different monetary policy regimes does not affect the nexus between inflation expectation and buying attitude.

In our data differences in inflation expectations by age found in 2016 vanish in a multivariate setting (Table 2), while in 1991 expected inflation decreases with age, confirming the univariate evidence. Education and gender affect π^e during high inflation times only: more educated households on average expect higher inflation; on average male have higher expectations compared to women. In 2016 the variable accounting for the difficulty in making ends meets play instead a major role: households whose head can easily make ends meets have lower inflation expectations compared to those struggling to make ends meet; consistently, most affluent households have lower inflation expectations, as suggested by the coefficients for income and wealth. People living in the South expect higher inflation, but this effect vanishes when we control for household economic conditions.

In our definition, lowly financially educated households are those whose head replied wrongly to all the three questions on financial education included in the SHIW, related to the economic concepts of accrual of interest rates, inflation and risk diversification (see Appendix A for the full set of questions posed). Contrary to what is assessed in Burke and Manz (2011), for the Italian case the level of financial literacy does not help to explain the tendencies in inflation expectations.

As a whole, in both low and high inflation times cross-sectional variation is weakly correlated with observables (as also in Kaplan and Schulhofer Wohl, 2017) and most of the effect is captured by the constant, equal to about 1% and 7.3% in 2016 and 1991, respectively (Table 2).

5 Results

In this Section we estimate the effect of π^e on household expenditure in high and low inflation regimes delving into possible channels at work.

5.1 High inflation regime

Our first set of estimates looks at expenditure decisions by Italian households in a high inflation regime. We first provide estimates for the effect of inflation expectations on

total consumption and on available breakdowns (non durables and durables) and then, since data gathered on durable goods are notably characterized by a substantial number of zero values, we assess the spending decision at the extensive margin (to spend versus not to spend).

Table 3 (panel a) shows pooled ordinary least squares estimates for current consumption regressed against expected inflation as well as on households' characteristics. Consumption, income and wealth are expressed in real terms (at 2016 prices), using appropriate deflators. Among the different categories of consumption, we find a positive and significant effect only for total expenditure. Other things being equal, inflation expectations higher by one percentage point imply a higher annual total spending by 80 euros. In all the specifications for the sub-categories of consumption the coefficient for expected inflation is always positive but not significant. Evidence on the role of inflation uncertainty is mixed: when significant, the impact is positive (e.g. non durables). In the literature this effect is generally found negative for home, car and other non-durables, but it is also usually economically small (Ben-David et al., 2018; Binder, 2017)). Income and wealth have plausible coefficients in terms of sign and magnitude.

With reference to future consumption, Table 3 (panel b) shows that the coefficient for inflation expectations is never significant (negative for durables).

The fact that we find an effect for total current consumption and not for its subcategories is only apparently puzzling, as especially regressions for durables refer to a small fraction of households only (about one third for durables and 15 per cent for cars). This motivates the use of probit models in order to estimate the propensity to buy. Table 4 (panel a) shows indeed a positive and mildly significant effect of expected inflation on car purchases: inflation expectations higher by one percentage point translate into a 0.003 higher probability of having bought cars, equal to 0.14 in our sample. The effect on car expenditure has the same sign of that found for US households by Burke and Ozdagli (2013), but its magnitude is much lower. As for future consumption, Table 4 (panel b) shows negative but not significant coefficients for durables.

Furthermore, we exploit the panel component of the SHIW to obtain estimates with fixed effects. As shown in Table 5, the impact of expected inflation on current consumption is positive for total consumption and durables (basically nil for non-durables) and negative for all the definitions of future consumption; however, none of these estimates is statistically significant.

Despite the effects that we estimate are rather small, all in all the estimates provide support for the hypothesis that higher inflation expectations stimulate current consumption, so that the intertemporal substitution effect encompassed in the Euler equation holds in this period. Higher inflation expectations lead to lower real interest rates if

nominal rates are fixed, thus creating an incentive to spend now rather than in the future.

Indeed, the absence of a relevant income effect is not surprising against the background of the automatic wage-indexation mechanism ("scala mobile") that was in place at that time and later abolished in July 1993. Given this feature of the Italian collective bargaining system, an increase in inflation was expected to be fully compensated by salary increases, involving no loss of purchasing power. Our evidence is also consistent with the vast majority of the available literature, and in particular with studies for European economies and Japan (see for example Ichiue and Nishiguchi, 2015; D'Acunto, Hoang, and Weber, 2018).

5.1.1 The role of liquidity constraints and wealth

Unfortunately the SHIW does not allow to derive a direct measure of liquidity constraints, which the literature posits as one of the main factors affecting consumption choices. Following Parker (1999) and Ni and Seol (2014), we first use the age of the household head as a proxy for the presence of liquidity constraints: typically, young-headed households are more likely to be liquidity constrained than old-headed households.

We focus on current consumption (where we detect significant coefficients) and split the sample into the categories 'below 50 years old', 'between 50 and 69 years old', '70 years old and beyond'. The positive response of consumption to higher inflation forecasts is by and large driven by households with youngest heads (Table 6, top panel). Inflation expectations higher by one percentage point imply a higher annual total spending by around 185 euros, an effect which is more than twice that for the whole population. For this category of households we also find a positive effect for durables (234 euros), driven by cars (203 euros), though the latter is not significant. It is however significant when the dependent variable is the probability of buying cars: households expecting a higher inflation by one percentage point are more likely to purchase a car by 0.007 percentage points, which compares with an average probability of 0.19 (Table 6, bottom panel).

Second, we assess whether the response of consumption to inflation expectation depends on the wealth status of the household: as higher expected inflation boosts (lowers) expected real wealth among debtors (creditors), debtors should accordingly spend more out of wealth. Inflation is indeed a tax on the holders of highly liquid assets, and hence a negative wealth effect can arise from an expected inflation tax, as found in Aruoba and Schorfheide (2011). In this respect we can exploit the very comprehensive definition of wealth collected in the SHIW, including both real and financial assets, as well as debts. In particular, we present different estimates according to the homeownership status - homeowners versus renters - and split the sample according to three definitions for

identifying financial constraints: (1) having or not enough liquid savings to cover three months of non-durable good spending; (2) high- and low financial activity households (using 6,800 euros as a threshold, equal to the median of the distribution of financial wealth); (3) high- and low financial activity households (using 2,000 euros as a threshold, corresponding to the 25th percentile). The first two measures are borrowed from Coibion et al. (2019).

The breakdown by homeownership status reveals that the effect of total consumption is not statistically different in the two categories (Table 7, columns 2-3). For less affluent households we detect that non-durable goods respond positively to inflation expectations (about 36 euros). We also find that the positive impact of inflation expectations on the probability of buying cars is driven by high-financial activity households and by those who have enough liquid saving to cover consumption; this kind of purchase indeed is less connected to the availability of liquidity on the household side. As for total consumption, the evidence is mixed, being the combination of the effects for the sub-items.[10]

5.2 Low inflation regime

To gain insights on consumption behaviour in a low-inflation regime, we look at spending attitude as measured by the readiness to buy a car in the years 2018 and 2019, collected in the 2016 wave.

We employ linear fractional models (Papke and Wooldridge, 2008) where the dependent variable is the reported probability, with the usual wide set of household attributes on the right-hand side augmented with a dummy accounting for a low degree of financial literacy (finlow=1). In the baseline specifications (Table 8, columns 1-2) we find that the impact of inflation expectations on the reported intention to buy a car in 2018 and in 2019 is significantly negative, in line with Coibion et al. (2019): expected inflation higher by one percentage point is associated with a lower probability of purchase by about 1.2 and 1.6 percentage points respectively in 2018 and 2019, which compares with average probabilities by 10% and 16% respectively. Financial education in principle might have its own explanatory power on consumption behaviour beyond formal education, as pointed out in Burke and Manz (2011). We find a significant coefficient only for the further time horizon considered: being financially illiterate is associated with a probability of buying cars lower by 2.3 points, which compares with an average probability by 16.3%.

A second specification includes a dummy accounting for having bought a car in 2016 (Table 8, columns 3-4), which as foreseeable affects negatively the probability of buying

[10]Estimates obtained using median and interquartile range are very similar and not reported for the sake of brevity (available upon request).

a new car in the subsequent years: the effect ranges from -3 to -2 percentage points, quite intuitively decreasing (in absolute value) and with lower significance the further is the horizon. Results of the baseline model are confirmed as a whole.

A third and richer specification accounts for the characteristics of the car already owned (columns 5-6). The coefficients have the expected sign: an additional year in car's age raises the probability of purchase by 0.5 points; additional 10,000 km covered by the owned car raise the probability by 0.4-0.5 points, depending on the horizon considered. Even the inclusion of car's attributes confirms that the impact of inflation expectations is negative, but slightly attenuated for 2019 (-0.8 points in 2018 and -1.2 in 2019). This is reasonable given the nature of the good which can be held a necessity and for which issues of functionality and safety arguably are more relevant than those of cheapness.

In the majority of estimates uncertainty on price developments appears to have no effect on consumption choices.

5.2.1 Which channels behind a negative response of spending?

We have shown that intentions of purchasing a car respond negatively to higher expected inflation. There are several economic explanations compatible with higher inflation expectations that actually discourage consumption. While in high-inflation periods the intertemporal substitution effect was found to dominate the income effect, this is not the case in the 2010s. The income effect could have more than compensated the substitution effect: unless income is fully and continuously indexed to inflation, which is definitely not the case in the current Italian bargaining system - when contracts are signed every three years, the link to inflation is much weaker and the reference for inflation is its forecast in the next three years - a higher inflation means a loss of purchasing power in the short run. An indirect evidence that this channel is at work comes from a question included in the SHIW: only 8% of households interviewed expect their real income to increase in 2017, which compares to a percentage of 44 foreseeing a lower real income. Table 9 (columns 1 and 2) shows that in both 2018 and 2019 the negative effect is concentrated among households who are more pessimistic about their income conditions, i.e. expecting their income not to increase in real terms. Consistently, in a context of European Central Bank's policy rate around the effective lower bound, Coibion et al. (2019) invoke a stagflationary view of inflation: Dutch households interpret higher inflation as temporarily reducing their future income in real terms, which leads to either delay or reduce purchases of durable goods.

A second channel refers to households with positive net wealth, who experience losses in expected real wealth (i.e. inflation is a tax on asset holders) and thus might reduce

their consumption against the background of higher expected inflation. Results broken down by age tend to confirm the evidence found for the whole population, and thus are not shown. As for wealth, Table 10 shows that the response of planned durable expenditure to higher inflation is negative, but sometimes imprecisely estimated. The effect is driven by homeowners, who represent three quarters of the sample; for them, arguably the income effect is topped up with a wealth effect. As in Coibion et al. (2019), the negative result for the whole sample is by and large driven by non-financially constrained households.

Finally, higher expected inflation may lead to higher uncertainty and hence reduce consumption due to precautionary saving motives. Indeed in 2016 economic and policy uncertainty (Baker, Bloom, and Davis, 2016) rose among Italian households, hitting levels not far from those reached during the Sovereign Debt Crisis in 2012-13 (Figure 6).

The SHIW questionnaire includes a question on the amount of money that the household should put aside for unexpected events (e.g. health problems or other emergencies; see the Appendix A for the exact wording); this amount is divided by the household' actual saving, and the sample is split on the basis of this ratio (below and above 0.5). Table 9 (columns 3 and 4) shows that negative spending responses to higher inflation expectations come from households with high precautionary saving, supporting the view that this channel is at play.

6 Discussion and Conclusions

Inflation expectations are crucial in the conduct of monetary policy, also for their effects on aggregate consumption. The available literature provides conflicting evidence on the link between households' expected inflation and expenditure: this plausibly reflects countries' distinct institutional settings, as well as different macroeconomic contexts in which the spending decisions are taken.

In this paper we have investigated this nexus for Italy looking at high- and low-inflation regimes, exploiting household level data from the Banca d'Italia's SHIW. We find that an intertemporal substitution effect prevailed in the early Nineties, when current consumption tend to benefit, though modestly, from higher inflation. On the other hand, the income effect plays the lion's share in the late 2010s, as the readiness to buy durables (cars) reacts negatively.

Several explanations for these differences can be put forward.

First of all, as envisaged in the Maastricht Treaty (signed in February 1992 and entering into force on November 1993) a low value of HICP inflation was one of the convergence criteria EU members were required to comply with to adopt the euro. Since

then, and more forcefully in 1999, when Italy joined the euro area, the commitment to low inflation became firmer. Fears of reaching two-digit inflation levels disappeared; inflation was expected to remain low but close to 2%, creating an incentive to buy immediately rather than in the future. Conversely, in a low-inflation environment as in 2016, and against the background of the ECB's mandate of price stability, households may expect inflation to go up, switching this channel off.

Differences in the bargaining system may have also played a role. While in the early Nineties wages were still indexed to inflation, since 2009 social parts take as a reference three-year ahead forecasts of HICP (net of imported energy), but no automatism is in force. Thus, in recent years an increase in inflation is not necessarily compensated by wage increases, possibly involving a loss of purchasing power and plausibly causing the occurrence of an income effect.

All in all, our results are in line with the empirical evidence questioning the prominence of the intertemporal substitution effect in the standard representative agent models, and provide support to the growing literature considering heterogeneous agents. Nesting our micro evidence in a macro theoretical heterogenous agent framework is in our view a promising avenue for future research.

Figures and Tables

Figure 1: Timing of the Survey: Consumption and Inflation Expectations

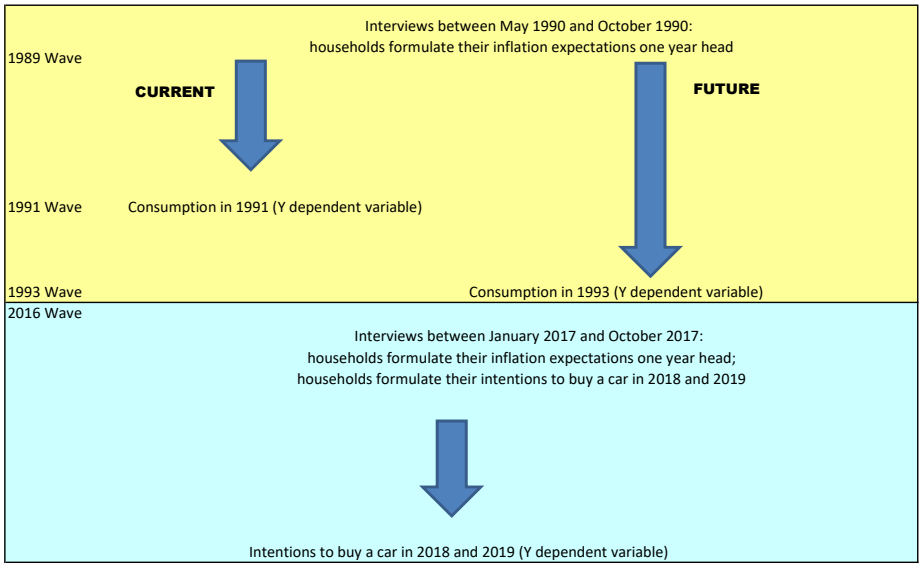
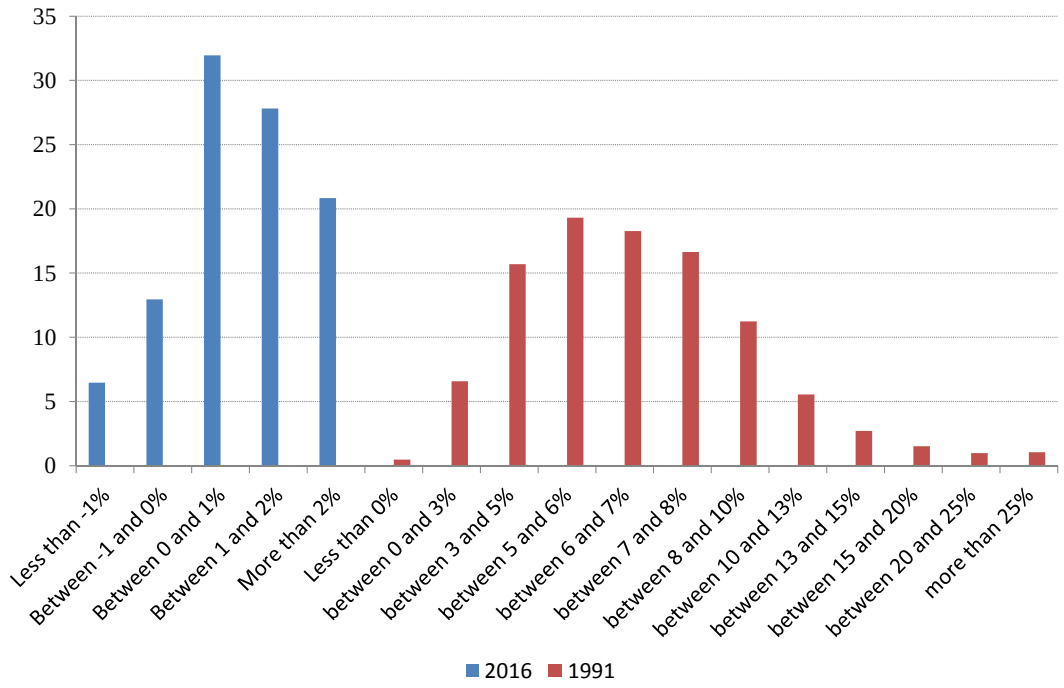
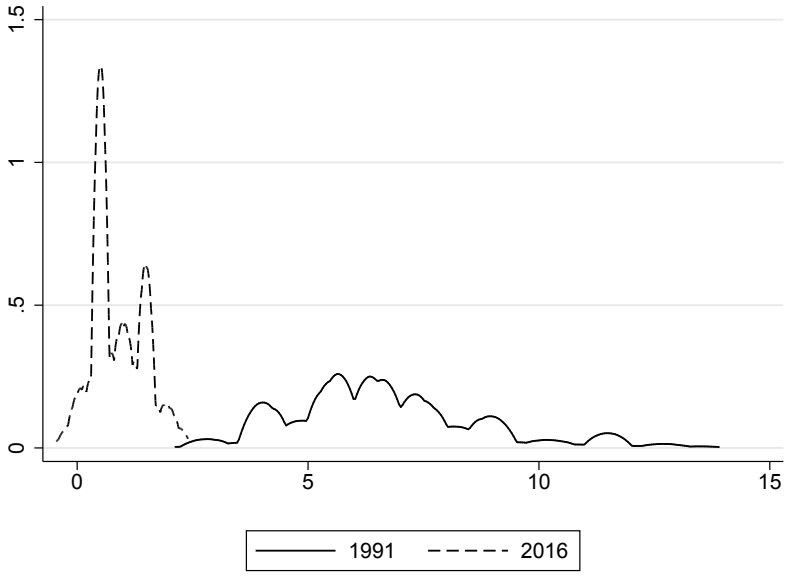


Figure 2: Average probability assigned to different inflation intervals



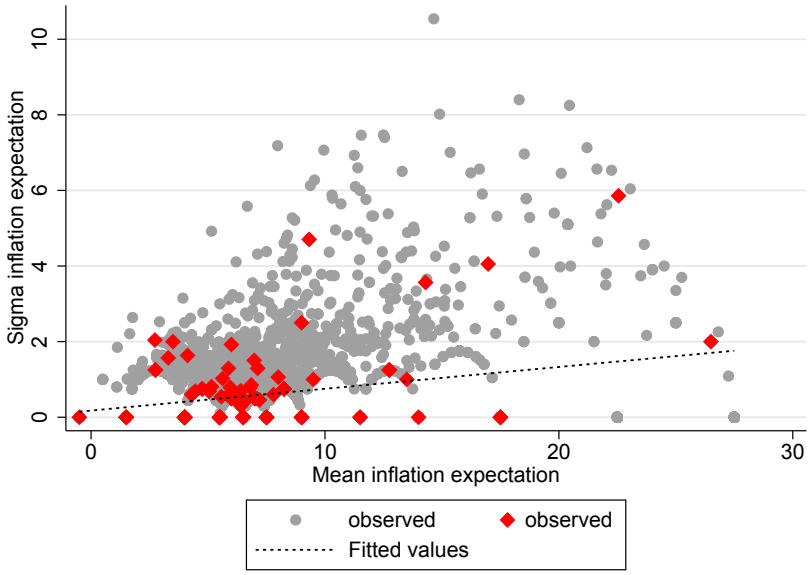
Notes: Own calculations from the SHIW. Sample weights included.

Figure 3: Distribution of individual mean inflation expectations



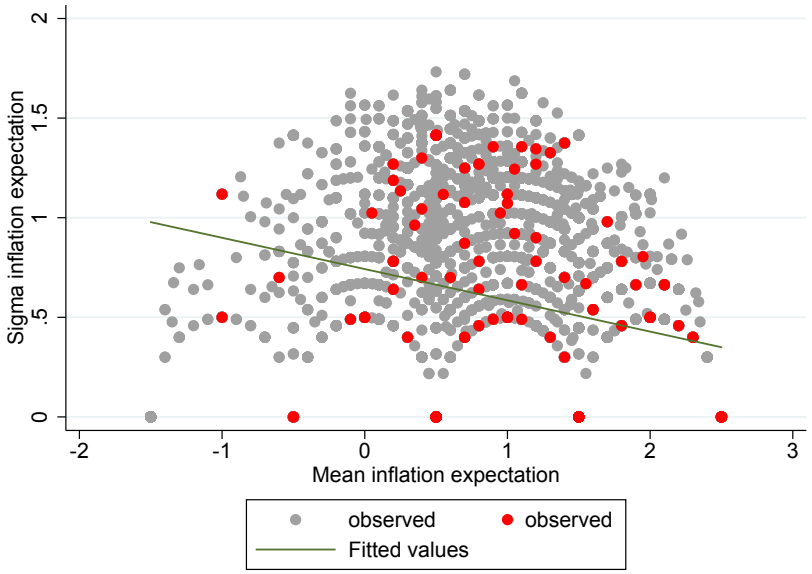
Notes: Our calculations excluding the top and bottom 5%. See Section 2 for the method of calculation.

Figure 4: Individual mean and dispersion of inflation expectations (year: 1991)



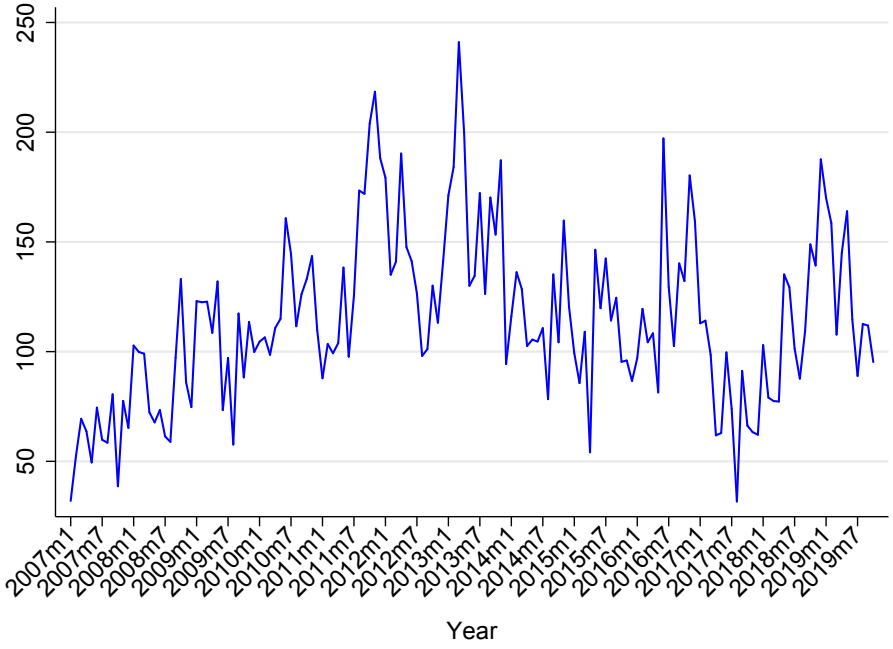
Notes: See Section 2 for the method of calculation. The estimated regression line is $y = 0.22 + 0.05x$ The coefficient on x is significant at 1% level. Red observations are households in the panel between 1991 and 2016 (112 households).

Figure 5: Individual mean and dispersion of inflation expectations (year: 2016)



Notes: See Section 2 for the method of calculation. The estimated regression line is $y = 0.74 - 0.17x$ The coefficient on x is significant at 1% level. Red observations are interviewed in both 1991 and 2016 (112 households).

Figure 6: Economic Policy Uncertainty



Notes: Economic Policy Uncertainty Index for Italy, based on Baker, Bloom, and Davis (2016).

Table 1: Descriptive statistics

		1991			2016		
		Obs.	Mean	Std. dev.	Obs	Mean	Std. dev.
Annual consumption	Total	8,188	23,606	13,254	7,421	22,118	14,620
(in €):	Food	8,188	8,375	4,109	7,421	6,299	3,961
	Non durables	8,188	8,636	6,210	7,421	9,022	8,483
	Durables	2,590	7,740	9,152	1,989	4,846	8,452
	Cars	1,140	11,898	9,143	527	11,839	10,889
	Other durables	1,859	3,417	5,471	1,657	1,777	3,786
	Rents	3,031	2,196	2,214	2,083	2,695	2,789
	Imputed Rents	4,867	5,617	4,364	5,338	6,683	4,648
Probability of buying	by 2017				5,326	7.4	20.6
a new car (over 100):	in 2018				5,326	9.9	21.7
	in 2019				5,326	16.3	27.8
Inflation expectations:	π^e	7,085	7.01	3.85	7,421	0.94	0.82
	σ_{π^e}	7,085	0.56	0.85	7,421	0.59	0.54
	median	7,085	6.83	3.85	7,421	0.88	0.90
	interquartile range	7,085	0.82	1.42	7,421	0.85	0.91
Age:	20-39	8,188	0.23	0.42	7,421	0.15	0.36
	40-49	8,188	0.19	0.40	7,421	0.21	0.40
	50-59	8,188	0.20	0.40	7,421	0.20	0.40
	60-69	8,188	0.20	0.40	7,421	0.18	0.38
	70+	8,188	0.19	0.39	7,421	0.26	0.44
Education:	None or primary	8,188	0.46	0.50	7,421	0.22	0.42
	Middle school	8,188	0.25	0.43	7,421	0.29	0.45
	High School	8,188	0.28	0.45	7,421	0.36	0.48
	College and beyond	8,188	0.00	0.04	7,421	0.13	0.34
Sex:	Male	8,188	0.79	0.41	7,421	0.53	0.50
	Female	8,188	0.21	0.41	7,421	0.47	0.50
Geographic area:	North	8,188	0.48	0.50	7,421	0.47	0.50
	Center	8,188	0.20	0.40	7,421	0.20	0.40
	South	8,188	0.32	0.47	7,421	0.32	0.47
	No. Components	8,188	2.96	1.38	7,421	2.36	1.31
Financial education:	Low				7,421	0.23	0.42
	High				7,421	0.28	0.45
Income and Wealth:	Total Income	8,188	35,380	22,886	7,421	30,715	23,278
	Net Wealth	8,188	175,200	240,787	7,421	206,421	343,903
Bought a car in 2016					7,421	0.1	0.3
Car: km covered/10,000					5,326	9.3	6.8
Car: year of purchase					5,326	8.4	5.2

Notes: Sample weights included. Low financial education is a dummy variable equal to one for households with low financial education (i.e. having replied in the wrong way to all three questions related to financial education). Consumption, income and wealth are at prices of 2016.

Table 2: Determinants of inflation expectations in low and high inflation times

	2016				1991	
	(1)	(2)	(3)	(4)	(5)	(6)
40-49	0.000659	0.00981	0.00206	0.00304	-0.0637	-0.0435
	[0.0326]	[0.0328]	[0.0326]	[0.0327]	[0.144]	[0.145]
50-59	-0.0171	0.00171	-0.0137	-0.00538	-0.262*	-0.213
	[0.0330]	[0.0337]	[0.0331]	[0.0332]	[0.148]	[0.151]
60-69	-0.0236	-2.61e-05	-0.0185	-0.00667	-0.428***	-0.397**
	[0.0339]	[0.0349]	[0.0340]	[0.0343]	[0.154]	[0.157]
70+	-0.0109	0.0187	-0.0102	0.0124	-0.512***	-0.499***
	[0.0351]	[0.0366]	[0.0351]	[0.0357]	[0.169]	[0.171]
Middle school	0.0349	0.0427	0.0428	0.0517*	0.113	0.134
	[0.0310]	[0.0311]	[0.0312]	[0.0313]	[0.125]	[0.126]
High School	-0.0343	-0.0143	-0.0183	0.00422	-0.0929	-0.00142
	[0.0309]	[0.0318]	[0.0318]	[0.0324]	[0.122]	[0.131]
College and beyond	-0.0521	-0.00779	-0.0301	0.0124	1.938*	2.169**
	[0.0377]	[0.0412]	[0.0390]	[0.0409]	[1.024]	[1.030]
Masculine	-0.00265	-0.00939	-0.00737	-0.0124	0.455***	0.432***
	[0.0194]	[0.0195]	[0.0195]	[0.0196]	[0.130]	[0.131]
Center	-0.0830***	-0.0854***	-0.0816***	-0.0819***	-0.822***	-0.833***
	[0.0251]	[0.0251]	[0.0251]	[0.0251]	[0.122]	[0.122]
South and Isles	0.0612***	0.0491**	0.0558**	0.0369	-0.120	-0.178
	[0.0220]	[0.0227]	[0.0221]	[0.0228]	[0.107]	[0.110]
No. Components	-0.0119	-0.00645	-0.0109	-0.0116	0.0357	0.0638
	[0.00792]	[0.00845]	[0.00794]	[0.00793]	[0.0421]	[0.0441]
Low financial educ.			0.0372	0.0327		
			[0.0252]	[0.0252]		
High financial educ.			-0.0266	-0.0191		
			[0.0230]	[0.0232]		
Difficult making ends meet				-0.0719**		
				[0.0343]		
Slightly difficult making ends meet				-0.0982***		
				[0.0303]		
Fairly easy making ends meet				-0.0923***		
				[0.0331]		
Easily making ends meet				-0.167***		
				[0.0450]		
Very easily making ends meet				-0.168**		
				[0.0691]		
Total Income		-6.51e-07				-6.01e-06**
		[5.91e-07]				[2.93e-06]
Net Wealth		-6.02e-08*				1.68e-07
		[3.51e-08]				[2.41e-07]
Constant	0.983***	0.977***	0.970***	1.037***	7.251***	7.323***
	[0.0441]	[0.0443]	[0.0457]	[0.0503]	[0.196]	[0.199]
Observations	7421	7421	7421	7421	7085	7085
R-squared	0.006	0.007	0.007	0.009	0.011	0.012

Notes: OLS estimates. Sample weights included. Omitted categories are 'Up to 39', 'Less than middle school', 'Female', 'North', 'Intermediate financial education', 'Very difficult making ends meet'. For the exact questions on household's assessment on how they make ends meet, see the Appendix A. Standard errors in brackets. $^{***}p < 0.01,^{**}p < 0.05,^{*}p < 0.1$.

Table 3: Effect of inflation expectations on consumption in high inflation times

	a.Current Consumption				
	Total	Non durables	Durables	*of which*	
				Cars	Oth. Dur.
	(1)	(2)	(3)	(4)	(5)
π^e	79.66**	17.90	89.46	27.59	34.53
	[37.91]	[14.11]	[61.69]	[96.35]	[34.76]
σ_{π^e}	234.3	195.2***	-227.5	130.4	-96.85
	[164.4]	[61.19]	[267.7]	[469.5]	[141.6]
y	0.255***	0.0958***	0.0685***	0.0919***	0.0276***
	[0.00818]	[0.00305]	[0.0118]	[0.0189]	[0.00624]
w	0.00130**	-0.00104***	0.00215**	0.00244*	0.000663
	[0.000569]	[0.000212]	[0.000907]	[0.00142]	[0.000493]
Const.	6743***	1515***	8284***	14734***	2786***
	[929.3]	[345.9]	[1523]	[2411]	[852.3]
Obs	4540	4537	1549	669	1120
R^2	0.531	0.522	0.113	0.155	0.075
	b. Future Consumption				
π^e	34.56	29.90	-28.64	-194.9	57.04
	[47.87]	[19.25]	[72.17]	[127.9]	[43.73]
σ_{π^e}	-18.35	-81.77	347.5	458.8	333.5*
	[208.2]	[83.72]	[299.8]	[535.1]	[176.3]
y	0.242***	0.102***	0.0207	0.0144	0.00716
	[0.00948]	[0.00381]	[0.0135]	[0.0227]	[0.00830]
w	0.00247***	-0.000288	0.00399***	0.00791***	0.00209***
	[0.000546]	[0.000219]	[0.000998]	[0.00169]	[0.000616]
Const.	8563***	1511**	12031***	20245***	3697***
	[1605]	[645.6]	[2062]	[3211]	[1231]
Obs	3017	3015	1056	437	800
R^2	0.502	0.507	0.091	0.174	0.070
demo	YES	YES	YES	YES	YES
year	YES	YES	YES	YES	YES

Notes: Panel a). OLS estimates for current consumption in 1991 and 1993 with inflation expectations elicited in May-October 1990 and 1992, respectively. Panel b). OLS estimates for future consumption in 1993 and 1995 with inflation expectations elicited in May-October 1990 and 1992, respectively. Sample weights included. Demographics include: gender, age, education, number of components, geographical area. Standard errors in brackets. $^{***}p < 0.01,^{**}p < 0.05,^{*}p < 0.1$.

Table 4: Effect of inflation expectations on the probability of buying durables in high inflation times

a.Current Consumption			
	Durables	Cars	Other Durables
	(1)	(2)	(3)
π^e	0.00239	0.00303*	-0.00166
	[0.00288]	[0.00179]	[0.00274]
σ_{π^e}	-0.0115	-0.012	0.00412
	[0.0120]	[0.00760]	[0.0106]
Obs.	4540	4540	4540
Obs. prob	0.334	0.145	0.239
b. Future Consumption			
π^e	-0.00192	-9.99e-05	-0.00148
	[0.00312]	[0.00208]	[0.00296]
σ_{π^e}	0.00552	0.000649	0.00227
	[0.0129]	[0.00854]	[0.0118]
Obs.	3017	3017	3017
Obs. prob	0.345	0.149	0.264
demo	YES	YES	YES
Y and W	YES	YES	YES
year	YES	YES	YES

Notes: Panel a). Probit estimates (marginal effects) for current consumption in 1991 and 1993 with inflation expectations elicited in May-October 1990 and 1992, respectively. Panel b). Probit estimates (marginal effects) for future consumption in 1993 and 1995 with inflation expectations elicited in May-October 1990 and 1992, respectively. Sample weights included. Demographics include: gender, age, education, number of components, geographical area. Standard errors in brackets. $^{***}p < 0.01,^{**}\ p < 0.05,^{*}\ p < 0.1$.

Table 5: Effect of inflation expectations in high inflation times (fixed effects)

	a.Current Consumption		
	Total	Non durables	Durables
π^e	54.572	-1.577	104.157
	[113.374]	[45.214]	[231.504]
Obs.	4540	4537	1549
R^2	0.054	0.057	0.125
	b. Future Consumption		
π^e	-150.674	-36.735	-173.000
	[125.137]	[51.570]	[318.818]
Obs.	3017	3015	1056
R^2	0.049	0.025	0.030

Notes: Panel a). Panel fixed-effects estimates for current consumption in 1991 and 1993 with inflation expectations elicited in May-October 1990 and 1992, respectively. Panel b). Panel fixed-effects estimates for future consumption in 1993 and 1995 with inflation expectations elicited in May-October 1990 and 1992, respectively. Weights refer to the latest year in which the household is included in the sample. Number of components included. Standard errors in brackets. $^{***}p < 0.01,^{**}\, p < 0.05,^{*}\, p < 0.1$.

Table 6: Effect of inflation expectations on current consumption in high inflation times by age

	Total			Non durables			Durables			Cars			Other durables.		
	< 50	[50-69]	70+	< 50	[50-69]	70+	< 50	[50-69]	70+	< 50	[50-69]	70+	< 50	[50-69]	70+
π^e	184.6***	22.69	27.78	30.51	3.738	20.28	234.1***	-80.73	-35.33	203.4	-136.3	-350.9	65.63	8.471	10.25
	[64.74]	[59.72]	[49.97]	[22.27]	[23.96]	[21.25]	[89.75]	[91.99]	[127.0]	[129.6]	[152.8]	[383.6]	[50.80]	[53.86]	[53.62]
Obs.	1938	1948	654	1937	1946	654	813	614	122	377	266	26	579	437	104
R^2	0.392	0.586	0.697	0.396	0.552	0.655	0.147	0.081	0.119	0.229	0.128	0.646	0.096	0.074	0.220
	Probability of buying														
							Durables			Cars			Other durables		
π^e							0.006	0.005	-0.011*	0.007**	0.001	-0.000	0.000	0.000	-0.011**
							[0.004]	[0.005]	[0.006]	[0.003]	[0.003]	[0.002]	[0.004]	[0.005]	[0.005]
Obs.							1938	1946	653	1938	1946	653	1938	1946	653
Obs. Prob.							0.408	0.320	0.172	0.195	0.135	0.0320	0.281	0.231	0.146

Notes: Estimates for current consumption in 1991 and 1993 with inflation expectations elicited in May-October 1990 and 1992, respectively. OLS estimates in the top panel; probit estimates (marginal effects) in the bottom panel. Sample weights included. Demographics included are: gender, age, education, number of components, geographical area. Year dummies, total income and net wealth are included. Standard errors in brackets. $^{***}p < 0.01, ^{**}p < 0.05, ^{*}p < 0.1$.

Table 7: Effect of inflation expectations on current consumption in high inflation times by wealth

	All	home.	renters	liquid <3 non-dur	liquid >=3 non-dur	fin. act. <median	fin. act. >=median	fin. act. low	fin. act. high
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
					Total				
π^e	79.66**	80.46	74.36	44.35	94.32*	50.01	135.0*	85.64**	75.57
	[37.91]	[51.10]	[53.03]	[48.58]	[51.14]	[34.96]	[73.71]	[39.71]	[53.26]
Obs.	4540	2957	1583	1306	3234	2329	2211	1201	3339
R^2	0.531	0.538	0.483	0.603	0.509	0.574	0.444	0.548	0.493
					Non durables				
π^e	17.90	13.89	13.30	31.74	6.477	34.93**	-2.580	37.33**	5.917
	[14.11]	[19.14]	[19.93]	[20.50]	[18.36]	[14.06]	[26.50]	[16.71]	[19.45]
Obs.	4537	2955	1582	1303	3234	2327	2210	1200	3337
R^2	0.522	0.517	0.534	0.563	0.520	0.521	0.465	0.502	0.499
					Probability of buying durables				
π^e	0.002	0.002	0.005	0.003	0.002	0.003	0.003	0.004	0.001
	[0.003]	[0.004]	[0.004]	[0.005]	[0.003]	[0.004]	[0.004]	[0.004]	[0.004]
Obs.	4540	2957	1583	1306	3234	2329	2211	1200	3339
Obs. Prob.	0.334	0.349	0.305	0.270	0.359	0.265	0.404	0.235	0.368
					Probability of buying cars				
π^e	0.003*	0.004	0.003	0.002	0.004*	0.001	0.007**	0.002	0.003
	[0.002]	[0.002]	[0.003]	[0.002]	[0.002]	[0.002]	[0.003]	[0.002]	[0.002]
Obs.	4540	2957	1578	1306	3234	2326	2211	1200	3339
Obs. Prob.	0.145	0.142	0.150	0.110	0.157	0.117	0.172	0.0899	0.163
					Probability of buying other durables				
π^e	-0.002	-0.001	-0.001	0.001	-0.004	0.001	-0.006	0.002	-0.005
	[0.003]	[0.004]	[0.004]	[0.004]	[0.003]	[0.003]	[0.004]	[0.004]	[0.003]
Obs.	4540	2949	1583	1306	3234	2329	2211	1200	3339
Obs. Prob.	0.239	0.255	0.206	0.200	0.253	0.179	0.299	0.176	0.260

Notes: Estimates for current consumption in 1991 and 1993 with inflation expectations elicited in May-October 1990 and 1992, respectively. OLS estimates in the top panel; probit estimates (marginal effects) in the bottom panel. Sample weights included. Demographics included are: gender, age, education, number of components, geographical area. Year dummies, total income and net wealth are included. Columns (4) and (5) include households not having/having enough liquid assets to cover three months of non-durable good spending; columns (6) and (7) includes households with low/high financial activity (using about 6,800 euros as a threshold, equal to the median of the distribution of financial wealth); columns (8) and (9) include low/high financial activity households (using 2,000 euros as a threshold, corresponding to the 25th percentile). Liquid assets include deposits and bonds. Standard errors in brackets. $^{***}p < 0.01,^{**}p < 0.05,^{*}p < 0.1$.

Table 8: Effect of inflation expectations on the probability of buying cars in low inflation

	in 2018	in 2019	in 2018	in 2019	in 2018	in 2019
	(1)	(2)	(3)	(4)	(5)	(6)
			MEAN			
π^e	-1.158***	-1.624***	-1.158***	-1.624***	-0.803**	-1.200**
	[0.379]	[0.487]	[0.379]	[0.487]	[0.372]	[0.481]
σ_{π^e}	0.543	0.148	0.531	0.141	0.927*	0.634
	[0.572]	[0.735]	[0.571]	[0.735]	[0.561]	[0.725]
fin low	0.810	-2.343**	0.746	-2.385**	0.792	-2.317**
	[0.844]	[1.085]	[0.843]	[1.085]	[0.826]	[1.068]
Car: km					0.383***	0.492***
					[0.0515]	[0.0666]
Car: year					0.506***	0.485***
					[0.0699]	[0.0903]
Bought car			-3.284***	-2.148*		
			[0.966]	[1.243]		
Constant	1.618	12.48***	1.749	12.57***	-6.368***	3.634
	[2.226]	[2.861]	[2.224]	[2.861]	[2.238]	[2.892]
Observations	5326	5326	5326	5326	5326	5326
R-squared	0.038	0.032	0.040	0.033	0.080	0.065
demo	YES	YES	YES	YES	YES	YES
Y and W	YES	YES	YES	YES	YES	YES
Mean dep. var.	9.934	16.27	9.934	16.27	9.934	16.27

Notes: Linear fractional model. Sample weights included. Demographics include: gender, age, education, number of components, geographical area. *Fin low* is a dummy variable equal to one for households with low financial education (i.e. having replied in the wrong way to the three questions related to financial education). *Bought car* is a dummy variable equal to one if the household bought a car in 2016. Standard errors in brackets. $^{***}p < 0.01,^{**}\, p < 0.05,^{*}\, p < 0.1$.

Table 9: Income and precautionary saving effects on the probability of buying cars in low inflation times

	$(W/P)^e$ will not increase	$(W/P)^e$ will increase	high precautionary S	low precautionary S
		2018		
π^e	-0.939**	-0.304	-1.152**	-0.382
	[0.398]	[1.532]	[0.538]	[0.513]
Car: km	0.407***	0.00253	0.422***	0.333***
	[0.0555]	[0.195]	[0.0762]	[0.0688]
Car: year	0.532***	0.900***	0.627***	0.432***
	[0.0746]	[0.289]	[0.104]	[0.0936]
R^2	0.086	0.180	0.087	0.082
Mean dep. var	9.991	10.23	10.62	9.174
		2019		
π^e	-1.467***	0.681	-1.305*	-0.902
	[0.505]	[2.301]	[0.668]	[0.700]
Car: km	0.529***	-0.0522	0.529***	0.440***
	[0.0704]	[0.293]	[0.0946]	[0.0938]
Car: year	0.493***	1.123**	0.467***	0.546***
	[0.0946]	[0.435]	[0.129]	[0.128]
Mean dep. var	0.067	0.261	0.074	0.073
R^2	15.78	23.02	16.50	16.04
Obs.	4657	338	2898	2406

Notes: Linear fractional model. Sample weights included. Demographics include: gender, age, education, number of components, geographical area. Total income and net wealth are included. $(W/P)^e$ *will not (will) increase* includes all the households declaring that in 2017 their income will increase less than or in line with (more than) prices. *High (low) precautionary S* includes households whose precautionary saving is higher (lower) than half as much their saving in the year. Standard errors in brackets. $^{***}p < 0.01,^{**}p < 0.05,^{*}p < 0.1$.

Table 10: Effect of inflation expectations on the probability of buying cars in low inflation times by wealth

	All	home.	renters	liquid <3 non-dur	liquid >=3 non-dur	fin. act. <median	fin. act. >=median	fin. act. low	fin. act. high
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
					2018				
π^e	-0.803**	-1.040**	-0.0916	-0.329	-1.048**	-0.0875	-1.441***	-0.876	-0.643
	[0.372]	[0.435]	[0.712]	[0.558]	[0.491]	[0.518]	[0.526]	[0.595]	[0.450]
Car: km	0.383***	0.352***	0.416***	0.140*	0.602***	0.170**	0.595***	-0.0388	0.598***
	[0.0515]	[0.0601]	[0.0991]	[0.0729]	[0.0710]	[0.0682]	[0.0763]	[0.0736]	[0.0654]
Car: year	0.506***	0.647***	0.152	0.472***	0.506***	0.449***	0.568***	0.393***	0.550***
	[0.0699]	[0.0821]	[0.135]	[0.105]	[0.0930]	[0.0986]	[0.0993]	[0.107]	[0.0866]
R^2	0.080	0.087	0.096	0.082	0.100	0.062	0.107	0.072	0.102
Mean dep. var	9.934	10.42	8.604	8.899	10.55	8.464	11.08	7.316	10.75
					2019				
π^e	-1.200**	-1.485***	0.00181	-0.708	-1.639***	-1.017	-1.407**	-1.061	-1.212**
	[0.481]	[0.549]	[0.981]	[0.760]	[0.620]	[0.698]	[0.663]	[0.884]	[0.568]
Car: km	0.492***	0.608***	0.0831	0.287***	0.669***	0.227**	0.749***	0.0262	0.704***
	[0.0666]	[0.0759]	[0.136]	[0.0992]	[0.0897]	[0.0919]	[0.0961]	[0.109]	[0.0825]
Car: year	0.485***	0.459***	0.489***	0.528***	0.470***	0.539***	0.462***	0.558***	0.481***
	[0.0903]	[0.104]	[0.186]	[0.143]	[0.118]	[0.133]	[0.125]	[0.159]	[0.109]
R^2	0.066	0.079	0.087	0.080	0.072	0.060	0.086	0.066	0.079
Mean dep. var	16.27	16.38	15.96	15.21	16.90	14.53	17.63	13.39	17.17
Obs.	5326	4063	1263	1926	3400	2250	3076	1264	4062

Notes: Linear fractional model. Sample weights included. Demographics include: gender, age, education, number of components, geographical area. Total income and net wealth are included. Column (4) includes households not having enough liquid assets to cover three months of non-durable good spending; column (6) includes households with low financial activity (using 6,000 euros as a threshold, equal to the median of the distribution of financial wealth); column (8) includes low financial activity households (using 2,000 euros as a threshold, corresponding to the 33rd percentile). Liquid assets include deposits and bonds. Standard errors in brackets. $^{***}p < 0.01,^{**}p < 0.05,^{*}p < 0.1$.

A Appendix: Additional Survey questions used

Financial Education

Lowly financially educated households are those whose head replied wrongly to all the three questions on financial education:

1. Suppose you put 100 euros into a *no fee, tax free* savings account with a guaranteed interest rate of 2% per year. You don't make any further payments into this account and you don't withdraw any money. How much would be in the account at the end of 5 years, once the interest payment is made?

    - Less than 102 euros
    - Exactly 102 euros
    - More than 102 euros
    - Don't know
    - No answer

2. Suppose you put 1,000 euros into a *no fee, tax free* savings account with a guaranteed interest rate of 1% per year. Suppose furthermore inflation stays at 2 per cent. In one year's time will you be able to buy the same amount of goods that you could buy by spending today 1,000 euros?

    - Yes
    - No, less than I could buy today
    - No, more than I could buy today
    - Don't know
    - No answer

3. In your opinion, the purchase of shares of one company usually provides a safer return than buying shares of a wide range of companies through a mutual fund?

    - True
    - False
    - Don't know
    - No answer

General Economic Conditions

Is your household income sufficient to see you through to the end of the month... ?

- with great difficulty
- with difficulty
- with some difficulty
- fairly easily
- easily
- very easily

Real Income Expectations

This year, in 2017, do you expect your household's total income to rise more than prices, less than prices, or about the same as prices ?

Precautionary Saving

Approximately, how much should your household put aside for unexpected events, e.g. health problems or other emergencies?

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