Spending Today or Spending Tomorrow? The Role of Inflation Expectations on Consumer Behaviour^{*}

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Abstract

This paper investigates whether Italian households' current expenditure and willingness to buy durables (cars) are related to their inflation expectations. In a high inflation regime, as in the early Nineties, consumers tend to have higher current than planned expenditure, suggesting the working of the inter-temporal substitution mechanism. Conversely, in a low inflation environment, as after the global financial crisis, higher expected inflation lowers households' purchasing power (income effect). We also find that inflation expectations affect expenditure through their effects on wealth.

Keywords: readiness to spend, intertemporal substitution effect, income effect. JEL Codes: D12, D84, E21, E31, E52.

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1 Introduction

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 households¹. Several channels are at work. First of all, on one hand if nominal interest rate are fixed, 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 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, due to precautionary motives, higher expected inflation may also be viewed as a sign of incertitude on the part of policymakers and hence reduce spending, signaling bad times ahead. Thus the consequences of higher inflation expectations are a priori ambiguous and deserve an empirical assessment.

Using data on inflation expectations and spending behavior at the household level 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 allow 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

 $^{^{1}}$ Grasso and Ropele (2018) find for Italy evidence of a positive and significant relationship between firms' inflation expectations and their propensity to invest.

expectations on consumption. On the one hand, Bachmann, Berg, and Sims (2015) using survey data from the Michigan Survey of Consumers find for 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 the 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.

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. Using the unexpected announcement of a future VAT increase in Germany as 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. (2018b) and D'Acunto et al. (2018a), relying on Nielsen homescan panel of US households and upon Finnish data, 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. 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 at shorter and longer time horizons 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 and in mid 2010s. 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, supporting the working of an intertemporal substitution mechanism. Conversely, in the most recent 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, but in the case of indebted households. We also 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.

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 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 are 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, sometimes even with the limitations of using categorical values for changes in consumption (Bachmann, Berg, and Sims (2015); Ichiue and Nishiguchi (2015)). A notable exception is Burke and Ozdagli (2013) who exploit panel high-frequency data for consumption with a high level of disaggregation.

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 values of inflation in the current juncture, 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%].

The distribution of inflation expectations in 1991^2 and 2016 is depicted in Figure 1; it is right-skewed in 1991 and the mode is between 0 and 1% in 2016 and between 5 and 6% in 1991. 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 mean (median) of inflation expectation is 7.01 (6.83) in 1991 and 0.94 (0.88) in 2016 (Table 1). Underlying data for inflation expectations are thus similar to those exploited by Burke and Ozdagli (2013), 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)). Interestingly, the correlation between the mean and the standard deviation was mildly positive in 1991, while its sign was inverted in 2016 (Figures 2 and 3): 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. Moreover, in a zero lower bound environment and given the inflation commitment, households expect more frequently a positive inflation, though the distribution is more concentrated (Figure 4). In periods of high inflation and without an explicit commitment, instead, inflation can assume a broader range of values, from being slightly positive to assuming two-digit values. More interestingly, this finding holds when we consider households interviewed both in 1991 and 2016 (Figure 5).

3 Methodology

As 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). In dealing with expenditure data, researchers often run an OLS regression of spending (or its logarithm)

 $^{^2\}mathrm{Descriptive}$ evidence for 1989 is broadly similar to that for 1991 and is not reported for the sake of brevity.

on the explanatory variables of interest (inflation expectations in our context) controlling for income and wealth. This approach requires that households formulate their inflation expectation at time t and use these expectations to decide whether spending at time tand t+1. However, the SHIW collects information on consumption (and its components) in the reference year, i.e. as for the 2016 wave households are asked in the first part of 2017 to report their expenditure in the previous year and their inflation expectations one-year ahead. Thus, inflation expectations as collected in 2017 cannot be used to explain consumption decisions as available in the 2016 wave, but arguably might be relevant for the decisions taken in 2017 and beyond.

For this reason we adopt the following empirical strategy.

As for the period of high inflation (early Nineties) we exploit the panel component of the SHIW and estimate regressions at the household level using the 1991 and the 1993 waves for consumption and household characteristics but not for inflation expectations, which are taken respectively from the 1989 and the 1991 waves as formulated by the same household. We estimate both cross-section and fixed-effects estimates. For the cross-section specification we estimate the following equation:

$$C_{it} = \beta_0 + \beta_1 \pi^e_{i,t-1} + \beta_2 \sigma^e_{i,t-1} + \beta_3 X_{it} + \theta_t + \epsilon_{it}$$
(1)

where C_{it} is the expenditure of the household *i* at time *t* in either 1991 and 1993 (total and sub-components) and $\pi^{e}_{i,t-1}$ is the inflation expectation of household *i* formulated in the previous wave (1989 and 1991) and $\sigma^{e}_{i,t-1}$ is a measure of individual dispersion of these expectations; X_{it} is the deterministic component of expenditure that includes total income, net wealth and age, sex, education, number of components and geographical area. θ_t are year dummies and ϵ_{it} is the error component.

For the fixed-effect specification we estimate:

$$C_{it} = \beta_0 + \beta_1 \pi^e_{i,t-1} + \beta_2 \sigma^e_{i,t-1} + \beta_3 X_{it} + \theta_i + \epsilon_{it}$$
(2)

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

The complication of zero durable expenditure is addressed 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 wave of the SHIW available). These expectations can thus

be relevant only for future consumption decisions, namely for the readiness to spend in the period 2017-2019. In particular we estimate:

$$C_{it}^{e} = \beta_0 + \beta_1 \pi_{i,2016}^{e} + \beta_2 \sigma_{i,2016}^{e} + \beta_3 X_{i,2016} + \epsilon_{it}$$
(3)

where C_{it}^e is the expected probability of household *i* of purchasing a car in year *t*, with *t* equal to 2017, 2018 or 2019. These models are estimated through a linear probability model.

Our identification improves upon Bachmann, Berg, and Sims (2015) and Ichiue and Nishiguchi (2015) which rely on the variation in behavior 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).

4 What's behind inflation expectations?

As for the 1991 wave, 8,188 households were interviewed between May and October 1992 (except in August). Actual average inflation (according to Istat official releases) was 6.2% in 1990 and 1991 and declined to 5% in 1992 and to 4.5% in 1993. Average households' inflation expectations, as measured in the SHIW, was 7.0% in the 1991 wave. In Figure 6 we plot the average HICP and households' inflation expectations for the three waves (1989, 1991 and 2016): households' expectations anticipate fairly well the official HICP. The distribution of inflation expectations (Figure 1) is right skewed in 1991; more than 80% of the observations lie between 3 and 10%.

As for the 2016 wave, 7,421 households were interviewed between January and September 2017. The distribution of inflation expectations (Figure 1) is more concentrated with respect to 1991; more than 80% of households expected inflation in 2017 to be positive. The distribution of mean inflation expectations in 1991 is more widespread compared to 2016, because of the higher number of brackets (Figure 4). Despite this, σ_{π^e} is broadly the same (0.6) in both waves.

Figure 7 shows that the distribution of households' inflation expectations one-year ahead shifted to the right in the second part of 2017. In particular, among households interviewed in the third quarter the probability of HICP inflation being higher than 1% was 55%, against 48% in the first quarter. Additionally, households'inflation expectations (blue dashed line) are systematically lower than those from Consensus, but on average in the first and third quarters are in line with the latest official figures released (orange line), referred to the previous month but not provided in the questionnaire; the average official figure for the second quarter instead reflects the temporary acceleration of prices in April 2017 which did not affect households' projections. Additionally, a very low proportion of households replied expecting the low level of inflation in 2016 (-0.1%, that was provided in the questionnaire) to stay in 2017 as well. Household expectations surveyed in the SHIW anticipate fairly well the official data, while in Arioli et al. (2017) and Duca, Kenny, and Reuter (2018) consumers' expectations are systematically higher.³

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 recent 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

³It 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.

multivariate setting (Table 2), while in 1991 expected inflations decrease with age, confirming the univariate evidence. Education and sex 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 making 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 it does not seem that the level of financial literacy can 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 will 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 (food, non durables, durables, rents and imputed rents) 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 shows pooled ordinary least squares estimates for consumption in 1991 and 1993, regressed against expected inflation as collected in the previous year (i.e. in the 1989 and 1991 waves of the Survey, respectively) as well as on the households' characteristics. Consumption, income and wealth are included 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 positive but not significant. Evidence on the role of inflation uncertainty is mixed: when significant, the impact is positive (e.g. non durables). Income and wealth have plausible coefficients in terms of sign and magnitude. Positive wealth effects emerge for durables.

The fact that we find an effect for total consumption and not for its sub-categories 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 shows indeed a positive and mildly significant effect of expected inflation on car purchases: inflation expectations higher by one percentage point translates 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.

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 case. 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) and 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 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. One could alternatively check 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). We thus propose two sample splits, by age of the household head and by wealth.

As for age we consider 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 5, 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 5, bottom panel).

As for wealth we can exploit its very comprehensive definition collected in the SHIW, including both real and financial assets, as well as debts. In particular we obtain different estimates according to the homeownership status - homeowners versus renters - and contrasting high- and low-financial activity households (using 2,000 euros as a threshold, corresponding to the 33rd percentile of the distribution of financial activity). We also introduce a dummy accounting for the indebtness status (equal to 1 when debt is above 7,500 euros, which corresponds to the 90th percentile of the distribution of debt), and its interaction with expected inflation. Table 6 (column 1) shows that the positive impact of inflation expectations on total annual consumption is equal to 73 euros if the household is not indebted, but jumps to more than 300 euros for those indebted. This is in line with the theory, that predicts that gains for debtors in terms of expected wealth due to high expected inflation translate into higher expenditure. The breakdown by homeownership status reveals that the effect of total consumption is not statistically different in the two categories (Table 6, columns 2-4). Households less endowed with financial activity show a higher and significant effect (86 euros), which would be consistent with inflation as acting as a tax on asset holders (Table 6, columns 5-6); for less affluent households we detect that also non-durable goods respond to inflation expectations (73 euros). As for the probability of purchasing durables, we still find a significant and positive effect for

cars but wealth status does not alter the estimates.⁴

Further we exploit the panel component of the SHIW to obtain estimates with fixed effects. As shown in Table 7, the impact of expected inflation on consumption is positive in all cases (but food) but never significant. We then focus on durables and find a very strong impact (around 1,300 euros) for indebted households and for homeowners with debt (around 1,200 euros).

5.2 Low inflation regime

Ideally we would have liked to estimate the response of consumption to inflation expectations exploiting the panel component of the SHIW, i.e. households who were interviewed by Banca d'Italia both in 1991 and 2016. A quarter of a century is a long period and unfortunately we remain with a very small sample, including 112 households only. Moreover, we lack inflation expectations to relate to actual consumption in 2016, as those collected in the 2016 wave are asked in 2017 with reference to the next 12 months.

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 2017-2019, collected in the 2016 wave. Since the field of the Survey was conducted in 2017 between January and September, one can hold the reply for 2017 as a proxy of actual consumption.⁵

We employ linear probability models 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 1-3) we find that the impact of inflation expectations on the reported intention to buy a car in 2018 and in 2019 is significantly negative, while is negative but non-significant in 2017: expected inflation higher by one percentage point is associated with a lower probability of purchase by about 1.2 and 1.6 points respectively in 2018 and 2019, which compares with average probabilities by 10 and 16 per cent respectively. Financial education in principle might have its own explanatory power on consumption behavior 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 per cent.

⁴Estimates obtained using median and interquartile range are very similar and not reported for the sake of brevity (available upon request).

⁵Our outcome has a different definition in the two periods. In the early Nineties it is actual spending, while for the period 2017-19 only readiness to spend is available, that is an hypothetical measure. Replicating the analysis on actual consumption in low inflation times with the next wave of the SHIW is for sure in our research agenda.

A second specification includes a dummy accounting for having bought a car in 2016 (Table 8 columns 4-6), which as foreseeable affects negatively the probability of buying a new car in the subsequent years: the effect ranges from -4 to -2 percentage points, quite intuitively decreasing (in absolute value) and losing 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 7-9). The coefficients have the expected sign: an additional year in car's age raises the probability of purchase by 0.4-0.5 points, depending on the horizon considered; additional 10,000 km covered by the owned car raise the probability by the same amount. The impact of inflation expectations is negative but mildly significant only for 2019 (when the estimate is equal to -1.2 points); the inclusion of car's attributes tend to crowd out the importance of inflation expectations as a factor influencing expenditure decisions. 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 all estimates uncertainty on price developments appears to have no effect on consumption choices. Impacts estimated employing the median and the interquartile range are qualitatively similar but have a smaller magnitude.

5.2.1 The role of liquidity constraints and wealth

We have shown that intentions of purchasing a car respond negatively (or are nonresponsive) 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.

A second channel refers to households with positive net wealth, who experience losses in expected real wealth and thus might reduce their consumption against the background of higher expected inflation. Finally, higher expected inflation may lead to higher uncertainty and hence reduce consumption due to precautionary saving. Though we will not be able to fully assess the role of the different channels at play, we can gain some insights from the split of the sample according to age and wealth/homeownership status, as illustrated for the high-inflation regime.

Results broken down by age tend to confirm the evidence found for the whole popu-

lation. As for wealth, Table 9 shows differentiated results for 2017 and for 2018-19. In 2017 we previously said that the coefficient was negative but not significant. The negative sign indeed comes from homeowners, and in particular for those with no mortgage (-1.1 points), while for indebted households the impact is positive and significant, by 1.4 points. These effects compare with an average probability of purchasing a car by 16 per cent. In 2018 and 2019 instead the response of durable expenditure to higher inflation is negative for both indebted and non-indebted households. Thus, for indebted homeowners we find that the intertemporal substitution effect is at work.

Results do not differ dramatically according to different endowments in terms of financial activity.

6 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, but in the case of indebted households.

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, 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 heterogeneous agent framework is in our view a promising avenue for future research.

Figures and Tables



Figure 1: Frequency distribution of inflation expectations

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



Figure 2: Mean and dispersion of inflation expectations (year: 1991)

Notes: 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 3: Mean and dispersion of inflation expectations (year: 2016)



Notes: 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).





Notes: Our calculations excluding the top and bottom 5%.

Figure 5: Distribution of mean inflation expectations (households in the panel)



Notes: 112 households interviewed in both 1991 and 2016. Our calculations excluding the top and bottom 5%.



Figure 6: Inflation and inflation expectations.

Notes: Istat, and our calculations from the SHIW. SHIW data indicate the year to which expectations refer to.



Figure 7: HICP and Inflation Expectations from Consensus and from SHIW

Notes: Istat, Consensus and our calculations from the SHIW.

			1991			2016	
	Variable	Obs.	Mean	Std. dev.	Obs	Mean	Std. dev.
Annual Consumption	Total	8,188	23,606	$13,\!254$	7,421	22,118	14,620
(in Euro):	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
	π^e (median)	7,085	6.83	3.85	7,421	0.88	0.90
	iqr75 (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

Table 1: Descriptive statistics

Notes: Sample weights included. Low/high financial education is a dummy variable equal to one for households with low financial education (i.e. having replied in the wrong/correct way to all three questions related to financial education). iqr75 is the interquartile range (75-25). Consumption, income and wealth are at prices of 2016.

		20	16		1	.991
	(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	[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	[0.00102]	[0.00040]	0.0372	0.0327	[0.0421]	[0.0441]
			[0.0252]	[0.0252]		
High financial aduc			0.0252]	0.0202]		
Ingli illancial educ.			-0.0200	[0 0232]		
Difficult molting and most			[0.0230]	[0.0232]		
Difficult making ends meet				-0.0719		
Cliphthe different and in a sector of				[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

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

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. ***p < 0.01,** p < 0.05,* p < 0.1.

	Total	food	non dur.	durables	of u	which	rents	imputed rents
					cars	oth. dur.	-	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
π^e	79.66**	10.12	20.67	89.46	27.59	34.53	14.22	21.14
	[37.91]	[13.86]	[20.48]	[61.69]	[96.35]	[34.76]	[15.50]	[19.81]
σ_{π^e}	234.3	47.07	280.4^{***}	-227.5	130.4	-96.85	78.6	160.4^{*}
	[164.4]	[60.10]	[88.81]	[267.7]	[469.5]	[141.6]	[63.37]	[85.24]
У	0.255^{***}	0.0571^{***}	0.111^{***}	0.0685^{***}	0.0919^{***}	0.0276^{***}	0.00361	0.0506^{***}
	[0.00818]	[0.00299]	[0.00442]	[0.0118]	[0.0189]	[0.00624]	[0.00374]	[0.00388]
W	0.00130**	-0.00102***	-0.000872***	0.00215^{**}	0.00244^{*}	0.000663	0.000182	0.00172^{***}
	[0.000569]	[0.000208]	[0.000307]	[0.000907]	[0.00142]	[0.000493]	[0.000375]	[0.000257]
Const.	6743***	1170***	2613***	8284***	14734***	2786***	1142***	1896***
	[929.3]	[339.7]	[502.0]	[1523]	[2411]	[852.3]	[351.4]	[512.5]
	15.10	1500	4505	1540	0.00	1100	1.400	2000
Obs.	4540	4538	4537	1549	669	1120	1492	2909
R^2	0.531	0.401	0.36	0.113	0.155	0.075	0.099	0.329
demo	YES	YES	YES	YES	YES	YES	YES	YES
year	YES	YES	YES	YES	YES	YES	YES	YES

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

Notes: OLS estimates for 1991 and 1993. Sample weights included. Demographics include: sex, age, education, number of components, geographical area. ***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								

	durables	cars	other durables
		0010	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
demo	YES	YES	YES
Y and W	YES	YES	YES
year	YES	YES	YES
01 1	0.334	0.145	0.220

Notes: Probit estimates for 1991 and 1993; marginal effects. Sample weights included. Demographics include: sex, age, education, number of components, geographical area. ***p < 0.01, **p < 0.05, *p < 0.1.

		Total			Food			Von dur.			Dur.			Cars		U	Other Du	r.
	< 50	[50-69]	+02	< 50	[50-69]	+02	< 50	[50-69]	+02	< 50	[50-69]	+04	< 50	[50-69]	+02	< 50	[50-69]	+07
Total																		
π^e	184.6^{***}	22.69	27.78	-5,047	6,289	40.40^{*}	57.15^{*}	0.765	-5,952	234.1^{***}	-80.73	-35.33	203.4	-136.3	-350.9	65.63	8,471	10.25
	[64.74]	[59.72]	[49.97]	[20.84]	[24.36]	[23.57]	[32.97]	[34.26]	[31.63]	[89.75]	[91.99]	[127.0]	[129.6]	[152.8]	[383.6]	[50.80]	[53.86]	[53.62]
Obs.	1938	1948	654	1937	1947	654	1937	1946	654	813	614	122	377	266	26	579	437	104
R^2	0.392	0.586	0.697	0.276	0.417	0.528	0.291	0.38	0.425	0.147	0.081	0.119	0.229	0.128	0.646	0.096	0.074	0.22
									robabili	ty of buyi	ng							
											Dur.			Cars			Other Du	Ŀ.
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.										1,938	1,946	653	1938	1946	653	1938	1946	653
Obs. Prc	ъb.									0.408	0.32	0.172	0.195	0.135	0.032	0.281	0.231	0.146
Notes: (included a	DLS estimate are: sex, age	es in the 2, educat	top pan ion, nun	el; prob ıber of ε	it estima	ates (mε nts, geo	arginal e graphice	ffects) in al area.	ı the bo Year du	ttom pan mmies, to	el. Sam _l otal inco	ole weigt me and	nts incluc net wealt	ded. 199. th are in	1 and 19 Icluded.	993. De: *** $p <$	mograph $0.01,^{**}p$	ics
$0.05,^* p <$	0.1.																	

	All	homeowners	homeowners	renters	high financial activity	low financial activity
	(1)	(2)	(3)	(4)	(5)	(6)
				Т	otal	
π^e	72.75*	80.46	88.62*	74.36	75.57	85.64**
	[39.12]	[51.10]	[53.56]	[53.03]	[53.26]	[39.71]
indebted	2347**		3305***			
	[989.6]		[1198]			
$\pi^{e*indebted}$	233.7*		61.26			
	[129.4]	0057	[158.1]	1500	2220	1001
Obs. D^2	4540	2957	2957	1583	3339	1201
R-	0.541	0.538	0.547	0.483	0.493	0.548
			(Other no	n durables	
π^e	28.48	8.585	20.29	24.17	-10.02	72.62***
	[21.29]	[27.77]	[29.23]	[29.04]	[28.68]	[22.93]
indebted	1529***		1842^{***}			
	[538.5]		[653.8]			
π^{e*} indebted	-45.22		-52.86			
	[70.39]		[86.27]			
Obs.	4537	2955	2955	1582	3337	1200
<i>R</i> ²	0.364	0.351	0.357	0.384	0.33	0.322
			Probal	oility of	buying durables	
π^e	0.004	0.002	0.005	0.005	0.001	0.004
	[0.003]	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]
indebted	0.182^{**}		0.221^{**}			
	[0.079]		[0.093]			
π^{e*} indebted	-0.011		-0.017*			
	[0.009]		[0.011]			
Obs.	4540	2957	2957	1583	3339	1200
Obs. Prob.	0.334	0.349	0.349	0.305	0.368	0.235
			Prob	oability o	of buying cars	
π^e	0.003*	0.004	0.005**	0.003	0.003	0.002
	[0.002]	[0.002]	[0.002]	[0.003]	[0.002]	[0.002]
indebted	0.061		0.115			
	[0.057]		[0.076]			
π^{e*} indebted	0.00		-0.005			
	[0.005]		[0.007]			
Obs.	4540	2957	2957	1578	3339	1200
Obs. Prob.	0.145	0.142	0.142	0.15	0.163	0.0899
			Probabili	ty of buy	ying other durables	
π^e	0.00	0.00	0.00	0.00	-0.01	0.00
	[0.003]	[0.004]	[0.004]	[0.004]	[0.003]	[0.004]
indebted	0.144*		0.173*			
	[0.081]		[0.100]			
π^{e*} indebted	-0.01		-0.02			
	[0.008]	20.40	[0.011]	1500	2220	1000
Obs.	4540	2949	2949	1583	3339	1200
ODS. Prod.	0.24	0.26	0.26	0.21	0.26	0.18

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

Notes: OLS estimates in the top panel; probit estimates (marginal effects) in the bottom panel. Sample weights included. 1991 and 1993. Demographics included are: sex, age, education, number of components, geographical area. Year dummies, total income and net wealth are included. Indebted is a dummy equal to 1 if household debt is above 7,500 euros, which corresponds to the 90th percentile of the distribution of debt. Low financial activity households are those with a value of financial activities lower than 2,000 euros, which corresponds to the 33rd percentile of the distribution of financial activity. ***p < 0.01,** p < 0.05,* p < 0.1.

	Total	Total	food	non dur.	durables	durables	cars	other dur.
π^e	121.747	92.841	-1.148	21.07	256.29	28.845	109.542	220.969
	[115.853]	[120.431]	[37.776]	[60.524]	[224.250]	[237.167]	[471.933]	[175.537]
indebted		851.291				-4,301.03		
		[2,729.984]				[4,553.322]		
$\pi^e * \text{indebted}$		363.632				1,261.294**		
		[340.000]				[556.041]		
Obs.	4540	4540	4538	4537	1549	1549	669	1120
R^2	0.095	0.109	0.038	0.049	0.079	0.154	0.122	0.237
			Effe	ect of π^e on du	rables			
	homeown.	homeown.	renters	high fin. act.	low fin act.			
π^e	414.241	168.164	191.83	204.839	$1,\!181.76$			
	[265.360]	[285.182]	[418.435]	[265.888]	[725.592]			
indebted		-2,237.17						
		$[5,\!220.791]$						
$\pi^e * \mathrm{indebted}$		$1,\!178.099*$						
		[617.670]						
Obs.	1043	1043	506	1257	292			
R^2	0.085	0.195	0.231	0.079	0.759			

Table 7: Effect of inflation expectations in high inflation times (fixed effects)

Notes: Panel fixed-effects estimates for 1991 and 1993. Number of components included. Indebted is a dummy equal to 1 if household debt is above 7,500 euros, which corresponds to the 90th percentile of the distribution of debt. Low financial activity households are those with a value of financial activities lower than 2,000 euros, which corresponds to the 33rd percentile of the distribution of financial activity. ***p < 0.01,** p < 0.05,* p < 0.1.

	by 2017	in 2018	in 2019	by 2017	in 2018	in 2019	by 2017	in 2018	in 2019
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
				MI	EAN				
π^e	-0.736	-1.158**	-1.624**	-0.737	-1.158**	-1.624**	-0.389	-0.803	-1.200*
	[0.580]	[0.504]	[0.676]	[0.578]	[0.504]	[0.675]	[0.577]	[0.497]	[0.668]
σ_{π^e}	-0.146	0.543	0.148	-0.160	0.531	0.141	0.257	0.927	0.634
	[0.841]	[0.805]	[0.997]	[0.839]	[0.803]	[0.998]	[0.847]	[0.808]	[1.011]
fin low	0.229	0.810	-2.343*	0.155	0.746	-2.385*	0.258	0.792	-2.317*
	[0.940]	[1.174]	[1.281]	[0.939]	[1.169]	[1.276]	[0.920]	[1.171]	[1.287]
Car: km							0.409^{***}	0.383^{***}	0.492^{***}
							[0.0796]	[0.0856]	[0.0988]
Car: year							0.378^{***}	0.506^{***}	0.485^{***}
							[0.0912]	[0.102]	[0.119]
Bought car				-3.772^{***}	-3.284^{***}	-2.148			
				[1.308]	[1.270]	[1.858]			
Constant	1.174	1.618	12.48^{**}	1.324	1.749	12.57^{**}	-5.972^{**}	-6.368**	3.634
	[2.891]	[2.678]	[4.912]	[2.883]	[2.693]	[4.924]	[2.924]	[2.683]	[5.073]
				ME	DIAN				
π^e	-0.497	-0.960**	-1.201**	-0.488	-0.952**	-1.196**	-0.264	-0.722	-0.917
	[0.523]	[0.457]	[0.610]	[0.522]	[0.456]	[0.609]	[0.517]	[0.449]	[0.601]
$iqr75_{\pi^e}$	0.168	0.401	0.0457	0.140	0.377	0.0302	0.394	0.618	0.318
	[0.471]	[0.478]	[0.587]	[0.470]	[0.477]	[0.589]	[0.473]	[0.478]	[0.595]
fin low	0.187	0.782	-2.366*	0.116	0.720	-2.407*	0.223	0.770	-2.334*
	[0.938]	[1.166]	[1.283]	[0.937]	[1.162]	[1.278]	[0.917]	[1.162]	[1.287]
Car: km							0.413***	0.385***	0.495***
							[0.0795]	[0.0850]	[0.0987]
Car: year							0.376***	0.506***	0.485***
							[0.0910]	[0.102]	[0.119]
Bought car				-3.745***	-3.233**	-2.109			
				[1.311]	[1.270]	[1.862]			
Constant	0.720	1.342	11.96**	0.867	1.469	12.05**	-6.265**	-6.481**	3.308
	[2.846]	[2.677]	[4.877]	[2.838]	[2.692]	[4.890]	[2.878]	[2.681]	[5.025]
Observations	5,326	5,326	5,326	5,326	5,326	5,326	5,326	5,326	5,326
R-squared	0.034	0.038	0.033	0.038	0.040	0.033	0.073	0.080	0.066
demo	YES	YES	YES	YES	YES	YES	YES	YES	YES
Y and W	YES	YES	YES	YES	YES	YES	YES	YES	YES
Mean dep. var.	7.402	9.934	16.27	7.402	9.934	16.27	7.402	9.934	16.27
p		0.001			0.001			0.001	

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

Notes: Linear probability model. Sample weights included. Demographics include: sex, 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. ***p < 0.01,** p < 0.05,* p < 0.1.

	All	homeown.	homeown.	renters	high financial activity	low financial activity
				20	17	
π^e	-0.61	-0.519	-1.086**	0.0632	-0.392	-0.0202
	[0.394]	[0.421]	[0.478]	[0.660]	[0.440]	[0.511]
Car: km	0.407^{***}	0.361^{***}	0.352***	0.522^{***}	0.566^{***}	0.0635
	[0.0493]	[0.0581]	[0.0581]	[0.0918]	[0.0640]	[0.0632]
Car: year	0.380^{***}	0.483^{***}	0.488^{***}	0.0882	0.432^{***}	0.255^{***}
	[0.0669]	[0.0793]	[0.0793]	[0.125]	[0.0847]	[0.0918]
indebted	-0.325		-0.675			
	[1.101]		[1.218]			
π^{e*} indebted	1.212		2.586^{***}			
	[0.890]		[0.983]			
Mean dep. var	7.402	7.917	7.917	5.999	8.241	4.715
R^2	0.074	0.075	0.078	0.097	0.084	0.068
				20	18	
π^e	-0.383	-1.040**	-0.603	-0.0916	-0.643	-0.876
	[0.411]	[0.435]	[0.495]	[0.712]	[0.450]	[0.595]
Car: km	0.384^{***}	0.352***	0.354^{***}	0.416^{***}	0.598^{***}	-0.0388
	[0.0515]	[0.0601]	[0.0602]	[0.0991]	[0.0654]	[0.0736]
Car: year	0.507^{***}	0.647^{***}	0.646^{***}	0.152	0.550^{***}	0.393^{***}
	[0.0699]	[0.0821]	[0.0821]	[0.135]	[0.0866]	[0.107]
indebted	1.729		1.723			
	[1.151]		[1.261]			
π^{e*} indebted	-2.229**		-1.887*			
	[0.930]		[1.018]			
Mean dep. var	9.934	10.42	10.42	8.604	10.75	7.316
R^2	0.081	0.087	0.088	0.096	0.102	0.072
				20	19	
π^e	-0.919*	-1.485***	-1.227**	0.00181	-1.212**	-1.061
	[0.532]	[0.549]	[0.624]	[0.981]	[0.568]	[0.884]
Car: km	0.497***	0.608***	0.614***	0.0831	0.704^{***}	0.0262
	[0.0666]	[0.0759]	[0.0760]	[0.136]	[0.0825]	[0.109]
Car: year	0.478^{***}	0.459^{***}	0.455^{***}	0.489***	0.481^{***}	0.558^{***}
	[0.0904]	[0.104]	[0.104]	[0.186]	[0.109]	[0.159]
indebted	-0.582		-0.338			
	[1.487]		[1.591]			
π^{e*} indebted	-1.598		-1.24			
	[1.202]		[1.285]			
Mean dep. var	16.27	16.38	16.38	15.96	17.17	13.39
R^2	0.066	0.079	0.079	0.087	0.079	0.066

Table 9: Effect of inflation expectations on the probability of buying cars in low inflation times by wealth

Notes: Linear probability model. Sample weights included. Demographics include: sex, age, education, number of components, geographical area. Total income and net wealth are included. Indebted is a dummy variable equal to one for the 10% of the households with debt (average is 7,500 euros). Low financial activity is a dummy variable equal to one for the 33% of the households with a value of financial activities lower than 2,000 euros. ***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
- $\bullet\,$ with some difficulty
- fairly easily
- \bullet easily
- $\bullet\,$ very easily

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