News consumption, political preferences, and accurate views on inflation

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Abstract

Using three waves of a customised survey among Dutch households, this paper studies the variation in people's views on inflation. Based on a range of panel regressions, we find that accurate perceptions of recent price changes are an important determinant of the accuracy of next-year inflation expectations. The realism of inflation perceptions is, in turn, related to the intensity of newspaper consumption and also affected by the broadness of a person's political preferences. However, more frequent newspaper usage does not necessarily reduce errors in inflation perceptions.

Keywords: inflation expectations, inflation perceptions, newspaper readership, political preferences, household survey data.
JEL classifications: D12, D83, D84, E31, E58.

1 Introduction

This paper contributes to the literature that studies how members of the general public formulate views on current and future developments in consumer prices. Since the early 1980s, researchers have documented a wide range of factors that influence a person's views on inflation. The combined notions that the effects of monetary policy operate, to a large extent, through expectations (Woodford, 2001), while the relevant actors are not necessarily only financial market participants but also households (Blinder et al., 2008), have further intensified the search for appropriate models of how people think about consumer prices.

A common finding is that views on inflation vary across socio-demographic cohorts. Jonung (1981), who analyses a cross-section of Swedish households, finds that sex and age are significantly related to inflation expectations. In particular, expected rates decline with age, which can be explained by different inflation experiences of cohorts over their lifetime. Recently, similar evidence is provided by Malmendier and Nagel (2016), who analyse over 50 years of data from the Reuters/Michigan Survey of Consumers and also find that differences in experiences strongly predict differences in expectations. The relevance of socio-demographic backgrounds has been affirmed in various studies, including Bryan and Venkatu (2001), Souleles (2004), Christensen et al. (2006), Blanchflower and MacCoille (2009), Bruine de Bruin et al. (2010), and Ehrmann et al. (2017). The list of relevant background factors is, by now, extensive and includes variables such as sex, age, income, and education.

The contribution of this paper lies in bringing together two strand of literature that have, to the best of our knowledge, so far progressed more or less separately. The first of these strands has investigated the role of media consumption in the formulation of inflation expectations. A second strand shows how political views, preferences, or ideologies may influence household decision-making.

Firstly, there has been recent work suggesting that media consumption affects inflation expectations. However, not all papers come to positive conclusions. For instance, in testing the ideas of Carroll (2003) on the epidemiology of inflation expectations, Pfajfar and Santoro (2013) conclude that hearing news on prices does not necessarily produce better forecasts. On the other hand, Lamla and Lein (2014) show that intensive news reporting improves the accuracy of inflation expectations, though only if the news is not framed negatively. In line with this, Dräger (2015) finds evidence that in Sweden, media effects have occurred particularly during times of increasing inflation. Lamla and Maag (2012) document that media coverage affects disagreement of consumers. In addition, the level of disagreement increases with heterogeneity of media coverage and declines in the amount of reports. Finally, Menz and Poppitz (2013) find that group-specific news consumption accounts for the fact that age, income, and job status are related to expectation gaps.

Closely related are a number of papers that suggest that central bank communication can improve households' knowledge. Dräger et al. (2016) use data from the Survey of Consumers by the University of Michigan and find that communication by the Federal Reserve can increase the extent to which people form expectations consistent with key economic concepts.[1] In a survey of German households, Hayo and Neuenkirch (2015) find a positive relationship between media usage and knowledge of monetary policy and specific knowledge about the European Central Bank (ECB). In a survey of Dutch households, Van der Cruijsen et al. (2015) show that more intensive use of media information improves respondents' understanding of the ECB. In turn, individuals with better knowledge are also more likely to formulate realistic inflation expectations. However, in their cross-sectional data, there is no empirical evidence

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[1] See also Carvalho and Nechio (2014) who, using data from the Michigan Survey, find that at least part of U.S. households are aware of the basic features of U.S. monetary policy.

that media consumption variables have a direct effect on the likelihood of formulating realistic expectations.

Secondly, there is evidence that the ideologies that people subscribe to are relevant in the broader context of household decision-making. For example, Blinder and Krueger (2004) find that in the United States, ideology is the most important determinant of people's opinions on major policy issues. Anwar et al. (2015), who use data from the Gothenburg District Court in Sweden, find that various types of convictions depend on whether jurors have either far-right or far-left political preferences. Gromet et al. (2013) find that more conservative individuals are less likely to buy a more expensive energy-efficient light-bulb as soon as it is labelled with an environmental message. As part of their analysis, Van der Cruijsen et al. (2015) also show that people who have thought about their ideological positions are more likely to have realistic inflation expectations.

In combining attention for news consumption and political preferences, our paper builds on the idea that people select those media sources that cater to their opinions. In Mullainathan and Shleifer (2005), a key assumption is that readers hold beliefs that they like to see confirmed. In an analysis of U.S. newspapers during the early 20th century, Gentzkow et al. (2014) find empirical confirmation that households prefer reading like-minded news. In a related contribution, Gentzkow and Shapiro (2006) show that firms will tend to distort information to make it conform to consumers' prior beliefs. Also, Gentzkow and Shapiro (2011) find that, although ideological segregation of online news consumption is low, it is higher than segregation for most offline news consumption.[2]

The analysis in this paper is based on three waves of a customised survey among Dutch households. The data that we collect includes information on perceptions of

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[2]As discussed in Appendix D, our dataset gives clear indications that newspaper readership indeed varies across political positions.

current-year inflation and expectations for next-year inflation. In addition, we collect information on the intensity of readership of eight (categories of) Dutch newspapers as well as data on political preferences. The data was collected via the CentERpanel, an internet-based panel which has been used to collect information regarding household finances of Dutch households since the early 1990s (Teppa and Vis, 1990). We focus on print media rather than on a broader set of media channels, such as television, internet, or radio. Firstly, there is prior evidence that newspapers are among the most relevant media channels in this context (Van der Cruijsen et al., 2015). Secondly, for newspapers, it is most likely that one can see ideological differences across individual sources. Lastly, some restraint in the number of questions is useful in minimising non-response.

Using a range of panel regression models, we then find that perceptions of recent price changes are an important determinant of next-year inflation expectations. Estimates show that around half of the errors in inflation perceptions feeds through in expectations errors. In turn, errors in perceptions are driven by the intensity of newspaper consumption and somewhat affected by the broadness of a person's political preferences. Our empirical analysis also confirms the relationship between views on inflation and a broader set of socio-demographic factors.

In a practical sense, our results suggest that monetary policy authorities could benefit from targeting their communication efforts towards inflation perceptions. Put simply, in guiding agents' expectations, it is of paramount importance that members of the general public get the starting-point right. Secondly, it also is important for monetary policy authorities to be aware that the media plays an important role in shaping households' views on inflation. In line with Pfajfar and Santoro (2013) and Van der Cruijsen et al. (2015), we find no broad-based evidence that greater usage of print media leads to a better understanding of developments in consumer price inflation. Although this finding might be interpreted negatively, it could also be argued that that central banks still have much to gain by further utilising the media channel more effectively.

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2 Research design and data

This paper uses detailed data gathered from three waves of a customised survey among Dutch households. These three waves were conducted in the month December of the calendar years 2014, 2015, and 2016. The data used in this paper covers information on inflation perceptions, inflation expectations, newspaper readership, and political preferences. We collected the data by submitting short questionnaires (shown in Appendix A) to the roughly 2,500 members of the CentERpanel. This panel is the basis for an often-used survey among the Dutch population, the DNB Household Survey (DHS). The DHS has information on both economic and psychological aspects of household decision-making for a representative sample of Dutch citizens of 16 years and older. The DHS history extends back to the early 1990s, and the DHS forms the basis for a wide range of papers on household finance, including Van Rooij et al. (2011) and Jansen et al. (2015).[3]

Table 1 gives summary statistics for the main covariates used in the empirical analysis. The table presents sample means for several variables in each of the three years. The variables are: sex, age (divided in four categories), education (a dummy for having obtained a university degree), a dummy for the presence of children in the household, a dummy denoting whether the respondent lives with a partner, a measure for the degree of urbanisation around the main residence (in three categories), a dummy for homeownership, a variable measuring gross income (in four categories), and a variable measuring a respondent's main occupation (in four categories). A comparison between the means for our samples and those of the full DHS waves show that our analysis uses, in particular, a higher proportion of males, from older age groups, who are well-

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[3]See also https://www.centerdata.nl/en/projects-by-centerdata/dnb-household-survey-dhs or Teppa and Vis (2012).

educated.[4]

To construct measures of inflation perceptions and expectations, we gave panel members two questions on consumer prices. The first question asked participants to indicate with what percentage consumer prices had approximately changed during the current calendar year. A second question asked for people's expectations regarding consumer price changes for the next calendar year. The question on perceptions gave respondents the option to select one out of eleven values, while there was also the possibility to say 'I do not know.' The question on expectations had eleven ranges to choose from, while adding an option 'This is difficult to estimate.' In both questions, the respondents could also choose negative values or ranges, as the surveys took place at a time when the possibility of negative inflation was widely discussed.[5]

On average, both perceptions and expectations are more or less in line with realisations for consumer price inflation. This finding is in line with Christensen et al. (2006) who showed that for the median respondent, perceptions of Dutch inflation were quite accurate. Figure 1 shows boxplots for perceptions (top panel) and expectations (bottom panel). In addition, the blue diamonds denote the realisations for inflation in respective calendar years. Here, and also in the regression analyses, we work with variables that transform the original answer categories into numeric values. The main purpose is to facilitate the interpretation. The transformation is implemented by making two assumptions. First, we restrict the top and bottom categories to −4.5%/+4.5% (for per-

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[4]All analyses rely on a complete-cases sample, where, in addition, data is available for at least two out of the three waves so that one can account for unobserved heterogeneity. See Appendix B for further details on the full DHS samples for 2014 - 2016.

[5]The DHS does not include information on inflation perceptions, and its standard question on inflation expectations does not allow respondents to report negative numbers. Nevertheless, appendix E shows our results generally hold when using the standard DHS variable on expectations ($pr0$).

ceptions) and −5%/+5% (for expectations). Second, in case of inflation expectations, we use the midpoint of the intervals.[6]

As shown in the top panel of Figure 1, between 2014 and 2016 inflation perceptions showed a downward trend, in line with realised inflation. Also, in each of the three years, the means (denoted by the grey circles) as well as the medians (denoted by the plus-signs) of inflation perceptions are in line with realised inflation. However, for each year, but in particular for 2016, there was a large degree of variation in perceptions. Also, inflation perceptions were generally higher than the actual levels of inflation. The bottom panel of Figure 1 suggests similar conclusions for inflation expectations.[7]

insert Figure 1 around here

To measure news consumption, the third question in our survey asked respondents to report how frequently they were informed about consumer prices via various print media outlets. Participants had the option of selecting one or more of the major Dutch newspapers (Algemeen Dagblad, NRC Handelsblad, De Telegraaf, Trouw, De Volkskrant), one magazine (Elsevier), free newspapers (such as Metro), and local or regional print media. We use the information on newspaper usage in two ways. In the end, we will present regressions that use eight variables measuring the frequency of usage of these newspapers on a scale from 1 (never) to 5 (very frequently). However, most of the initial analysis will focus on a single combined indicator of the intensity of newspaper usage. To this end, we use a variable that was introduced by Blinder and Krueger (2004) and which was also used in Van der Cruijsen et al. (2015). This variable (labelled *QH*) measures the intensity of newspaper usage by dividing the number of outlets which

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[6]The distributions for the original categories are shown in Appendix C.
[7]At this moment, the realisation for 2017 is not yet available.

are used either 'frequently' or 'very frequently' by the total number of outlets used. By construction, QH is bounded between zero and one, and a higher value indicates that a larger fraction of the available outlets are used intensively.

As may be expected, perhaps, only a small fraction of respondents have a high intensity of media usage. Panel A in Figure 2 shows the distribution of QH for the three survey waves. The grey solid lines show the distribution for 2014, while the long-dashed lines summarize data for 2015, and the dotted lines denote data for 2016. In all three years, less than 10% of the respondents use all available outlets (very) frequently. Most of the distribution is massed at the values 0 and 0.125, showing that, at best, only one outlet is used at least frequently. The distribution of QH in our data is similar to that in Blinder and Krueger (2004).[8]

insert Figure 2 around here

With a fourth and final question, we collected background information on the respondents' political preferences. As in Van der Cruijsen et al. (2015), we asked participants to indicate whether they would use one or more of five terms to describe their political preferences. These five terms can be grouped into two sub-groups. First, there is a ternary scale ranging from liberal to socialist, with Christian-democratic occupying a middle position. Secondly, there is a binary scale where people can indicate whether they consider themselves to be conservative or progressive. As with the media variables, we will use the answers in the form of five separate dummy variables in the regressions, but we also compute a measure of broadness of political views. This vari-

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[8]The value of 0.125 follows, of course, from the eight available print media outlets in this particular survey question. Blinder and Krueger (2004) also define a variable QL, measuring the fraction of outlets that are used 'never' or 'almost never'. In our sample, QH and QL exhibit a strong negative correlation, so that we do not use QL in the regressions.

able (labelled *QHp*) is computed similarly as QH. As such, it measures the fraction of political labels that a person would use to describe his or her political preferences.

In our samples, it turns out that respondents would usually use between one and three labels to describe their political views. This conclusion follows from the distribution of QHp in panel B of Figure 2. As with QH, the distribution of QHp is relatively stable over the three sample years, with 30% or more of the respondents using two labels to describe their views.

Turning to estimations, our empirical results are based on random-effects panel regressions.[9] Both in the case of perceptions and expectations, we model accuracy by computing absolute differences with realised inflation. To model the absolute error in inflation perceptions, we estimate:

$$|\pi_{it}^{p} - \pi_t| = \boldsymbol{x}_{it}'\boldsymbol{\beta} + \gamma_t + \alpha + u_i + \epsilon_{it} \tag{1}$$

where π^p denotes inflation perceptions, π_t is realised consumer price inflation according to Statistics Netherlands, i indexes individuals, t denotes time in calendar years, and γ_t denotes time fixed-effects. The vector $\boldsymbol{x}$ has the demographic covariates listed in Table 1, variables that capture newspaper usage, and variables that measure political preferences.[10] To model the absolute error in inflation expectations, we estimate a similar model to Equation (1), but add the absolute error in perceptions as an explanatory variable.

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[9]We obtain qualitatively comparable results when using a LSDV approach or a between estimator.

[10]In addition, the regressions use variables that measure the province where an individual lives as well as religious positions. Although not the focus of this paper, the religious positions could be important as these are historically related to both political positions and newspaper usage.

3   Baseline regression results

To begin with, the regression results confirm the broad relevance of socio-demographic factors. Table 2 shows parameter estimates for two panel regressions, where we only show results for a selected number of covariates. These regressions do not yet include the covariates capturing newspaper usage or political preferences. Column 1 has results for perceptions, while column 2 has results for expectations. Sex has a significant effect on expectations, as men have around 0.10 percentage points higher absolute expectation errors. There is no clear pattern regarding the respondent's age, while education is strongly associated with both lower inflation perceptions and expectations errors. For gross income, the level does not have a clear effect, though people who do not report their income have both significantly higher perception errors and lower expectation errors. Homeowners have around 0.23 percentage points lower perception errors, while their expectations are also slightly more accurate. Finally, individuals with children have more accurate inflation expectations.

insert Table 2 around here

Turning to our key findings, there appears to be no guarantee that more intense news consumption reduces errors in inflation perceptions. When we add a measure of intensity of newspaper usage (QH) to the regression models outlined above, the coefficient turns out to be significant, but with a positive sign (Table 3, column 1). The coefficient indicates that a switch from no usage to complete usage of all available newspapers would *increase* the absolute perception error by 0.19 percentage points. In contrast, and in line with Van der Cruijsen et al. (2015), having broader political views is associated with more accurate inflation perceptions, though the coefficient is only significant at the 10% level (Table 3, column 2). The conclusions hold when we include

both variables together in a panel regression (column 3).

insert Table 3 around here

The unhelpful effect of newspaper usage is mainly driven by the group with low newspaper usage. This conclusion follows from the regression in column 4 of Table 3, where we split the variable QH in three classes: those with QH equal to zero (the base category in the regression), those with QH higher than zero but at most 0.5, and those with QH higher than 0.5. In particular for the group with low intensity, the coefficient estimate is significantly different from zero and positive. An interesting question is to what extent particular newspapers may be the underlying reason for the effect of QH on perception errors. We will explore this issue further in the next section.

Turning to accuracy of expectations, a major determinant is the accuracy of perceptions. Table 4 shows four regression models that follow the structure of Table 3. In each of the four columns, the coefficient for perception errors is highly significant. The parameter estimates are between 0.50 and 0.55, showing that around half of the errors in inflation perceptions feeds through in expectations errors. Having controlled already for perceptions, both the intensity of news and broadness of preferences do not add significantly to the model, although the signs of the coefficients are generally in line with those of the regressions for perceptions.[11]

insert Table 4 around here

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[11]Excluding the perception error variable from the models does not change this conclusion.

4 Looking at individual papers and preferences

In a final set of analyses, we find that not all newspapers are necessarily helpful, while readership of some, in fact, seem to be unhelpful. Table 5 shows parameter estimates for regressions, where we add variables measuring the usage of individual newspapers and also include dummies denoting particular political preferences.[12] Column 1 uses perception errors as dependent variable, while column 2 focuses on expectation errors.

insert Table 5 around here

Most strikingly, for only three out of the eight print media outlets do we find (some) evidence that increased usage lead to lower errors. Of these three, the only strongly significant coefficient is for Newspaper C in the regression for perception errors (Table 5, column 1). Reading this newspaper more frequently can reduce absolute perception errors by a few basis points.

For most newspapers, we find no clear effects of readership on errors, while in a few cases, increased usage lead to less accurate views on inflation. Frequent readers of newspaper E would have higher expectation errors, while individuals who often read about inflation in regional print media would have less accurate inflation perceptions. Subscribing to a particular political view generally coincides with more accurate views on inflation. The coefficients for the political labels are generally negative, and most significantly so in case of the perception errors of conservatives and the expectation errors of progressives.

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[12]The focus here is not on singling out individual print outlets, which is why we re-label the newspapers rather than use their actual names.

5   Conclusions

Analysing three waves of a customised survey among Dutch households, we find that perceptions of recent consumer price changes are an important determinant of next-year inflation expectations. Based on a range of panel regression models, we conclude that around half of the errors in inflation perceptions feeds through in expectations errors. Errors in inflation perceptions are, in turn, driven by the intensity of newspaper consumption and somewhat affected by the broadness of a person's political preferences. Our empirical analysis also confirms the relationship between views on inflation and a broader set of socio-demographic factors.

Overall, the importance of these findings lies in the fact that monetary policy is, nowadays, increasingly focusing on the role of expectations via communication and transparency (Woodford, 2001; Blinder et al., 2008). Indeed, central banks have been using communication more actively in recent years, and expect that they will continue to do so (Blinder et al., 2017). There is also recent evidence that households' inflation expectations could be important in their spending decisions (Bachman et al., 2015). At the same time, two points made in this paper provide food for thought for policymakers.

Firstly, our results suggest that monetary policy authorities could benefit from targeting their communication efforts towards inflation perceptions. Put simply, in guiding agents' expectations, it is of paramount importance for the public to get the starting-point right. Although the role of perceptions has been known in the literature already since the early 1980s (Jonung, 1981), this factor has perhaps remained somewhat neglected in recent years.

Secondly, it is important for monetary policy authorities to be aware that the media plays an important role in shaping households' views on inflation. At the same time, we find that there is no guarantee that a higher intensity of media usage leads to more

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realistic views on inflation. More intensive readership, in some cases, even leads to an increase in errors regarding inflation perceptions or expectations. More importantly, there is no broad-based evidence that greater usage of print media leads to a better understanding of developments in consumer price inflation. These findings are in line with Pfajfar and Santoro (2013) and Van der Cruijsen et al. (2015). Although this outcome may be sobering on the one hand, it could also be argued that central banks can still gain further on this aspect by utilising the media channel more effectively.

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Figure 1: Perceptions, expectations, and realisations

Panel A: Perceptions

Panel B: Expectations
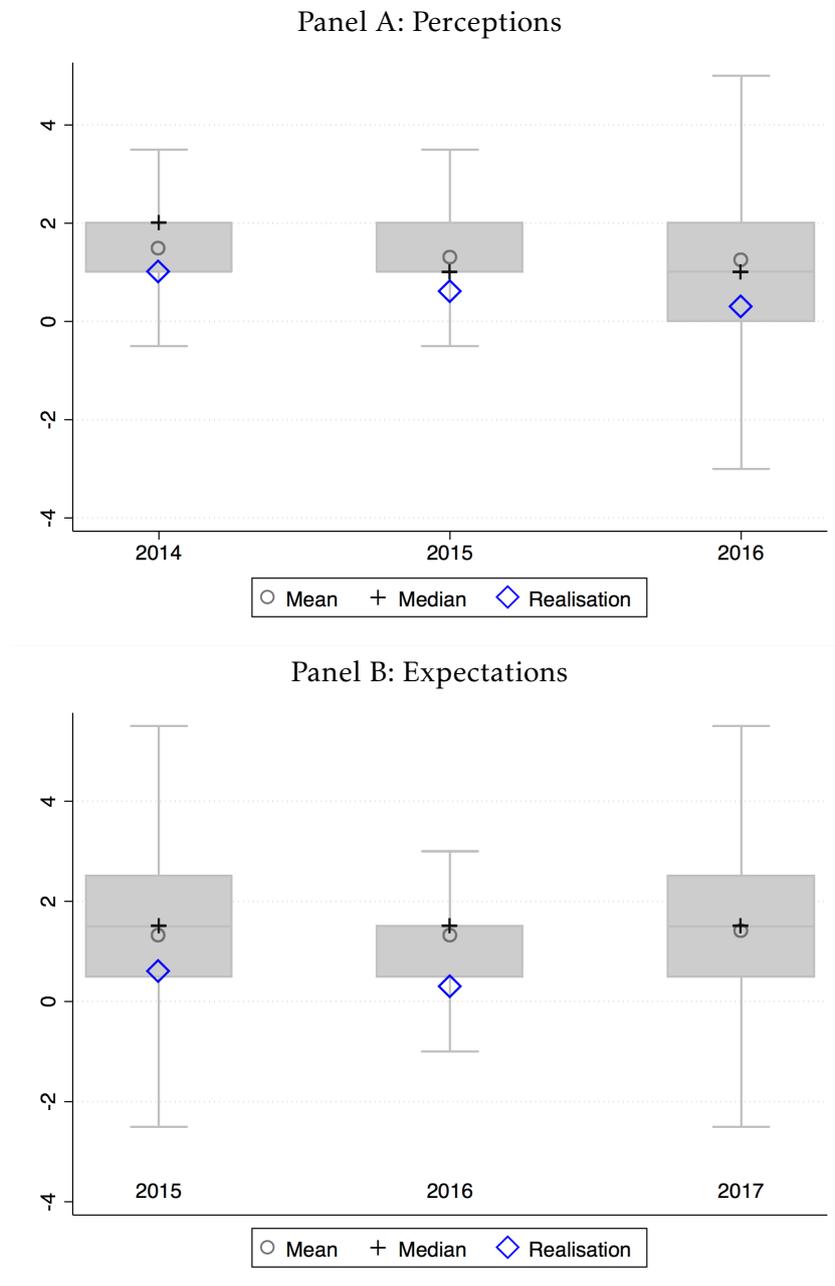
Notes: Boxplots for Dutch households' perceptions (panel A) and expectations (panel B) of consumer price changes. The blue diamonds denote the realisation of consumer price inflation according to Statistics Netherlands. Boxplots are based on three surveys among Dutch households via the CentERpanel. The surveys took place in December of 2014, 2015, and 2016. Perceptions were asked for current year inflation, while expectations referred to next-year inflation. The boxes cover the region between the 25th and the 75th percentile. At this moment, the realisation for 2017 is not yet available.

Figure 2: Newspaper usage and political preferences

Panel A: Intensity of newspaper usage

Panel B: Broadness of political preferences
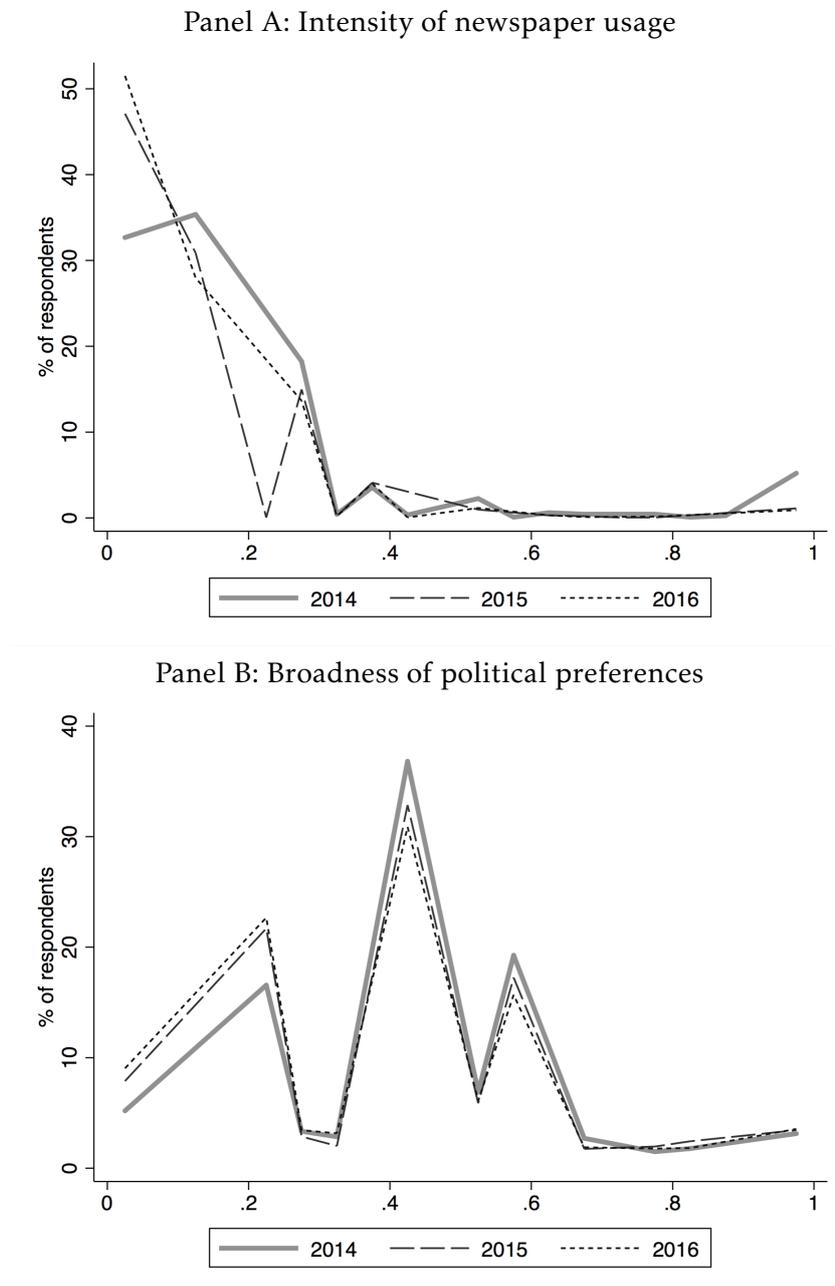
Notes: Distribution of survey replies regarding the intensity of newspaper usage (QH, in panel A) and broadness of political preferences (QHp, in panel B). QH is computed as in Blinder and Krueger (2004) and denotes the fraction of newspapers that are read either frequently or very frequently. QHp is defined as the fraction of political labels that a person would use to describe his or her views. The grey solid lines show the distribution for 2014, while the long-dashed lines summarize data for 2015, and the dotted lines denote data for 2016.

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Table 1: Descriptive statistics for control variables

	(1) 2014	(2) 2015	(3) 2016
Male	0.54	0.53	0.54
Age: 16 - 34	0.10	0.09	0.08
Age: 35 - 49	0.24	0.24	0.24
Age: 50 - 64	0.31	0.30	0.30
Age: 65+	0.35	0.37	0.38
University degree	0.15	0.13	0.13
Has children	0.31	0.33	0.33
Lives with partner	0.75	0.78	0.78
Urban: (Very) low	0.39	0.41	0.41
Urban: Moderate	0.20	0.22	0.21
Urban: (Very) high	0.41	0.38	0.38
Homeowner	0.76	0.77	0.78
Income: 0 - 30K	0.37	0.39	0.36
Income: 30 - 50K	0.26	0.25	0.24
Income: over 50K	0.14	0.12	0.14
Income: NA	0.23	0.23	0.26
Worker	0.46	0.45	0.45
Self-employed	0.05	0.05	0.05
Retired	0.31	0.32	0.33
Other occupation	0.19	0.18	0.18
Observations	1555	2098	2010

Notes: Summary statistics for a range of control variables from three waves of a survey among Dutch households. Numbers represent fractions of the sample per category. Variables include sex, age, education, a dummy for children, a dummy for living with a partner, degree of urbanisation, homeownership, income, and main occupation. Other occupations denotes people looking for a job, students, housemakers, and volunteer workers.

Table 2: Accuracy of Views on Inflation: Role of Control Variables

	(1) Perceptions	(2) Expectations
Male	-0.04	0.10***
	(0.04)	(0.03)
Age: 16 - 34	0.01	-0.08
	(0.07)	(0.06)
Age: 50 - 64	0.00	0.02
	(0.05)	(0.04)
Age: 65+	0.03	-0.09
	(0.07)	(0.06)
University degree	-0.24***	-0.08**
	(0.04)	(0.04)
Income: 0 - 30K	0.05	-0.07*
	(0.04)	(0.04)
Income: over 50K	-0.02	-0.06
	(0.04)	(0.04)
Income: NA	0.09**	-0.08**
	(0.05)	(0.04)
Homeowner	-0.23***	-0.07*
	(0.05)	(0.04)
Has children	-0.03	-0.09**
	(0.05)	(0.04)
R2 overall	0.05	0.34
No. clusters	1631	1533
Observations	4972	3077

Notes: Coefficients and standard errors (in parentheses, clustered per household) for random-effects panel regressions. The dependent variable in column 1 measures the absolute difference between inflation perceptions and realisations for the years 2014–2016. The dependent variable in column 2 measures the absolute difference between inflation expectations and realisations for the years 2015 and 2016. Only selected coefficients are shown; regressions include all covariates listed in Table 1 as well as dummies for provinces and dummies for religious positions. */**/*** denotes significance at the 10%/5%/1% level.

Table 3: Accuracy of Inflation Perceptions

	(1) News	(2) Political	(3) Combined	(4) Groups
Intensity of newspaper usage	0.19**		0.21**	
	(0.08)		(0.08)	
Broadness of political views		-0.13*	-0.13*	
		(0.07)	(0.07)	
Intensity: low				0.09***
				(0.03)
Intensity: high				0.09
				(0.09)
Broadness: low				-0.09
				(0.07)
Broadness: high				-0.09
				(0.07)
R2 overall	0.05	0.04	0.05	0.05
No. clusters	1614	1560	1541	1541
Observations	4571	4541	4190	4190

Notes: See also notes for Table 2. Column 1 uses a explanatory variable that measures the fraction of newspapers that are read 'frequently' or 'very frequently'. Column 2 uses a variable that measures the fraction of political preferences an individual would use to describe his or her views. Column 4 uses the variables from columns 1 and 2 and splits these in different groups based on size. These regressions also include all covariates listed in Table 1 as well as dummies for provinces and dummies for religious positions. */**/*** denotes significance at the 10%/5%/1% level.

Table 4: Accuracy of Inflation Expectations

	(1) News	(2) Political	(3) Combined	(4) Groups
Accuracy of inflation perceptions	0.55***	0.50***	0.53***	0.52***
	(0.02)	(0.02)	(0.02)	(0.02)
Intensity of newspaper usage	0.05		0.01	
	(0.08)		(0.08)	
Broadness of political views		-0.03	-0.01	
		(0.07)	(0.07)	
Intensity: low				0.02
				(0.03)
Intensity: high				0.06
				(0.08)
Broadness: low				-0.07
				(0.06)
Broadness: high				-0.05
				(0.07)
R2 overall	0.36	0.32	0.33	0.33
No. clusters	1482	1460	1405	1405
Observations	2720	2846	2528	2528

Notes: The dependent variables measure the absolute difference between inflation expectations and realisations for 2015 and 2016. For explanatory variables, see also notes to Table 3. In addition, the explanatory variable in the first row denotes the accuracy of an individual's inflation perceptions. These regressions also include all covariates listed in Table 1 as well as dummies for provinces and dummies for religious positions. */**/*** denotes significance at the 10%/5%/1% level.

Table 5: Accuracy: Individual papers and political views

	(1) Perceptions	(2) Expectations
Newspaper_A	0.02	0.02
	(0.02)	(0.02)
Newspaper_B	0.02	0.01
	(0.03)	(0.02)
Newspaper_C	-0.06***	-0.00
	(0.02)	(0.02)
Newspaper_D	-0.02	-0.04*
	(0.03)	(0.02)
Newspaper_E	0.03	0.05***
	(0.02)	(0.02)
Newspaper_F	0.02	-0.03*
	(0.02)	(0.02)
Newspaper_G	0.01	-0.01
	(0.02)	(0.02)
Newspaper_Regional	0.04***	-0.01
	(0.01)	(0.01)
Liberal	-0.04	0.00
	(0.04)	(0.04)
Socialist	-0.05	0.06*
	(0.04)	(0.04)
Christian-democr.	-0.07	-0.05
	(0.04)	(0.04)
Conservative	-0.10**	-0.04
	(0.05)	(0.05)
Progressive	-0.05	-0.08**
	(0.04)	(0.04)
R2 overall	0.06	0.34
No. clusters	1341	1159
Observations	3073	1863

Notes: See also notes to Table 2. The first set of explanatory variables measure frequency of usage of eight (categories) of Dutch newspapers, on a scale from 1 (never) to 5 (very frequently). The second set of explanatory variables has five dummies denoting whether a person would use a particular label to describe his or her political preferences. These regressions also include all covariates listed in Table 1 as well as dummies for provinces and dummies for religious positions. */**/*** denotes significance at the 10%/5%/1% level.

A Survey questions

We report the four relevant questions from the three questionnaires, which were submitted to the roughly 2,500 members of the CentERpanel in December 2014, December 2015, and December 2016. In 2014, these four questions were part of a longer questionnaire (available upon request). The response rates to the three surveys were, respectively, 70.2%, 89.1%, and 92.5%.

With what percentage have Dutch consumer prices approximately changed in 2014 (2015/2016) compared to 2013 (2014/2015)?

- Prices declined by more than 4%.
- Prices declined by 4%.
- Prices declined by 3%.
- Prices declined by 2%.
- Prices declined by 1%.
- Prices remained unchanged.
- Prices increased by 1%.
- Prices increased by 2%.
- Prices increased by 3%.
- Prices increased by 4%.
- Prices increased by more than 4%.
- Do not know

With what percentage will Dutch consumer prices approximately change in 2015 (2016/2017) compared to 2014 (2015/2016)?

- Prices will decline by more than 4%.
- Prices will decline by between 3 and 4%.
- Prices will decline by between 2 and 3%.
- Prices will decline by between 1 and 2%.
- Prices will decline by between 0 and 1%.
- Prices will remain more or less unchanged.
- Prices will increase by between 0 and 1%.
- Prices will increase by between 1 and 2%.
- Prices will increase by between 2 and 3%.
- Prices will increase by between 3 and 4%.
- Prices will increase by more than 4%.
- This is difficult to estimate

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How often did you read about Dutch consumer prices in these newspapers or magazines in 2014 (2015/2016)?

- Algemeen Dagblad
- Elsevier
- Free newspaper (e.g. Metro)
- NRC Handelsblad
- Regional or local newspaper
- De Telegraaf
- Trouw
- De Volkskrant

1. Never
2. Almost never
3. Sometimes
4. Frequently
5. Very frequently
6. Do not know

Would you use one of the following terms to describe your political preferences? (it is possible to give more than one answer)

- Liberal
- Socialist
- Christian-Democratic
- Conservative
- Progressive

1. No
2. Yes
3. Do not know

B Summary statistics for DHS waves 2014–2016

Table A1 presents summary statistics for demographic variables in the DNB Household Survey waves between 2014 and 2016. These means for the full DHS data set can be compared against the means for the samples used in this paper, which are listed in Table 1. Such a comparison shows that the samples in this paper have, in particular, an overrepresentation of males, from older age categories, who are well educated.

Table A1: Summary statistics for full DHS samples

	(1) 2014	(2) 2015	(3) 2016
Male	0.49	0.49	0.49
Age: 16 - 34	0.18	0.15	0.20
Age: 35 - 49	0.24	0.22	0.20
Age: 50 - 64	0.18	0.21	0.19
Age: 65+	0.18	0.23	0.22
University degree	0.11	0.09	0.11
Has children	0.58	0.55	0.54
Lives with partner	0.85	0.85	0.84
Urban: (Very) low	0.41	0.42	0.41
Urban: Moderate	0.20	0.22	0.21
Urban: (Very) high	0.39	0.36	0.38
Income: 0 - 30K	0.18	0.22	0.19
Income: 30 - 50K	0.13	0.13	0.13
Income: over 50K	0.07	0.07	0.07
Income: NA	0.62	0.59	0.61
Worker	0.41	0.38	0.40
Self-employed	0.04	0.04	0.04
Retired	0.15	0.19	0.18
Other occupation	0.28	0.29	0.27

Notes: Based on 2014–2016 waves of DNB Household Survey. Other occupations denotes people looking for a job, students, housemakers, and volunteer workers.

C Histograms for inflation perceptions and expectations

Figure A1 shows the distribution of inflation perceptions and expectations for the three waves. In the regression analyses, to facilitate the interpretation, we work with variables that transform the answer categories into numeric values. This is done by making two assumptions. First, we restrict the top and bottom categories to $-4.5\%/+4.5\%$ (for perceptions) and $-5\%/+5\%$ (for expectations). Second, in case of inflation expectations, we use the midpoint of the intervals.

Figure A1: Inflation perceptions and expectations
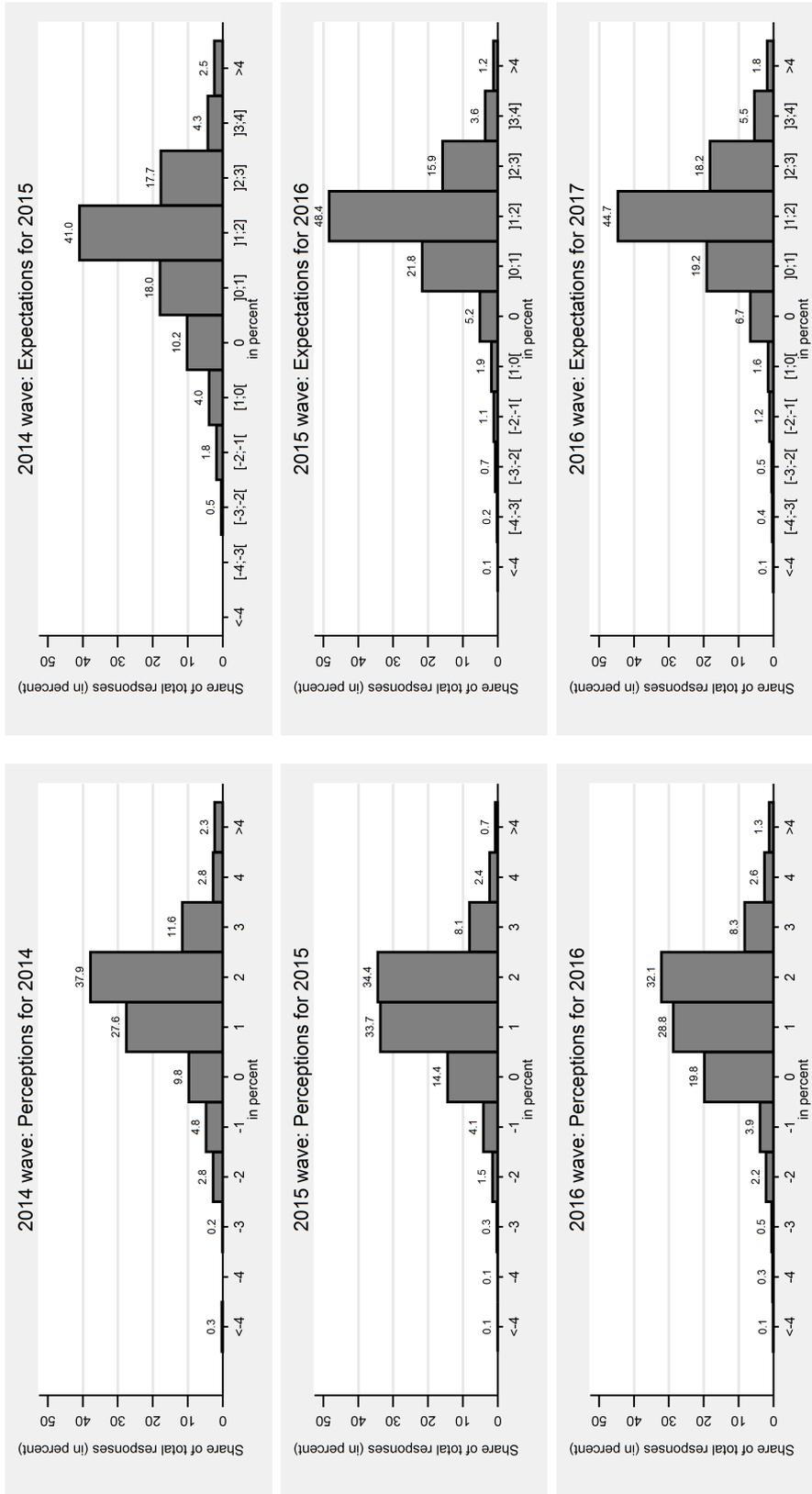
Notes: Histograms for households' perceptions of current-year price changes (left column) and next-year price changes (right column). Data was obtained via three customised surveys to Dutch households conducted in December 2014/2015/2016. The question on perceptions was '*With what percentage have Dutch consumer prices approximately changed in 2014 (2015/2016) compared to 2013 (2014/2015)?*' The question on expectations was '*With what percentage will Dutch consumer prices approximately change in 2015 (2016/2017) compared to 2014 (2015/2016)?*'.

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D   Newspaper readership and political preferences

This section studies the relationship between readership of eight (categories of) Dutch newspapers and political preferences. In terms of priors, it is interesting to note that the NRC Handelsblad uses the motto *'Lux et Libertas'*, while the AD (founded in 1946) was originally closely affiliated to the NRC. In the case of Elsevier, its editorial approach was historically close to both liberal and catholic political ideas, although the magazine characterises its current approach as 'Edge without ideology.' Trouw was founded during World War II by a group of orthodox-protestants, while De Volkskrant (founded in 1919) has its roots in the Catholic labour movement. De Telegraaf was founded in the late 19th century. In the 1960s and 1970s, it often took strong positions against socialist and progressive views. It has always been one of the most-read newspapers in The Netherlands. Currently, there are two main free newspapers (Metro and Spits), which are most readily available to users of public transport in urban areas.

Turning to regression results, there are clear indications that newspaper readership varies across political positions. Table A2 shows coefficients for eight random-effects panel regressions, where the dependent variables measure the intensity of newspaper readership on a five-point scale. As explanatory variables, we employ the five ideology labels and time dummies for the calendar years 2015 and 2016. Therefore, the base category is an individual in 2014 who would not use any of the five political labels to describe his or her views.

insert Table A2 around here

Firstly, individuals who relate to liberal positions are, in particular, more informed via De Telegraaf, but also the AD, Elsevier, or NRC (row 1). Secondly, respondents who use the label 'socialist' have a lower usage Elsevier or De Telegraaf and are more

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intensively informed via regional or free newspapers (row 2). Respondents who would use the term 'Christian-democratic' use, in particular, more often Trouw to be informed and less so De Volkskrant (row 3). Fourthly, people who recognise themselves in the conservative label are more likely to be informed via Elsevier, regional newspapers, or De Telegraaf (row 4). Finally, respondents with progressive positions are more active readers of De Volkskrant, NRC, and Trouw (row 5).

Table A2: Readership of newspapers and political preferences

	(1) AD	(2) Elsevier	(3) Free Paper	(4) NRC	(5) Regional	(6) Telegraaf	(7) Trouw	(8) Volkskrant
Liberal	0.10**	0.13***	0.05	0.19***	0.03	0.24***	-0.04	0.03
	(0.04)	(0.03)	(0.04)	(0.04)	(0.05)	(0.04)	(0.03)	(0.04)
Socialist	-0.02	-0.07***	0.15***	0.04	0.15***	-0.15***	0.02	0.20***
	(0.04)	(0.03)	(0.04)	(0.04)	(0.06)	(0.04)	(0.03)	(0.04)
Christian-democr.	0.06	0.06*	-0.00	-0.05	0.33***	0.05	0.09**	-0.18***
	(0.04)	(0.03)	(0.04)	(0.04)	(0.06)	(0.05)	(0.04)	(0.04)
Conservative	0.08*	0.09**	0.07	0.01	0.13**	0.11**	0.02	-0.03
	(0.05)	(0.04)	(0.05)	(0.05)	(0.07)	(0.05)	(0.03)	(0.04)
Progressive	0.01	-0.01	0.07*	0.22***	0.03	-0.06	0.13***	0.35***
	(0.04)	(0.03)	(0.04)	(0.04)	(0.06)	(0.04)	(0.03)	(0.04)
R2 overall	0.01	0.04	0.01	0.06	0.02	0.06	0.03	0.11
No. clusters	1459	1452	1455	1454	1474	1463	1450	1465
Observations	3503	3454	3490	3482	3588	3545	3455	3510

Notes: Coefficients and standard errors (in parentheses, clustered at the household level) for eight random-effects linear panel regressions. The dependent variable measures, on a five-point scale, the intensity of readership of eight (categories of) Dutch newspapers. The explanatory variables are five binary dummies that measure whether an individual would use a particular term to describe his or her political preferences. The regressions also include year dummies for 2015 and 2016. The base category denotes readership in 2014 by someone who would not use one of the five terms to describe his or her political views. */**/*** denotes significance at the 10%/5%/1% level.

E Results using standard expectations variable from DHS

The regular DNB Household Survey data does not include information on inflation perceptions, and the standard DHS question on inflation expectations does not allow respondents to report negative numbers. For these two reasons, this paper decided to work with a customised questionnaire. Nevertheless, it is interesting to compare the results in Tables 4 and 5 with regressions that rely on the standard DHS variable on inflation expectations. This variable ($pr0$) measures on a ten-point scale that ranges from 1% to 10% the replies to the question: *'What is the most likely (consumer) prices increase over the next twelve months, do you think?'*

Table A3 presents five random-effects panel regression models. The dependent variable measures the accuracy of the $pr0$ for the calender years 2015 and 2016. Of course, a direct comparison with Tables 4 and 5 is not possible, as there is no information on accuracy of perceptions available. Nevertheless, the findings from the baseline regressions are broadly confirmed.

In particular, there is no clear evidence that more intensive readership of newspapers leads to more accurate inflation expectations. Although the coefficients on the *QH* variable are negative, these are not significantly different from zero. Concerning socio-demographic backgrounds, education and homeownership turn out to be relevant factors. Finally, in this set of regressions, there is strong evidence that broadness of political views leads to more accurate expectations.

insert Table A3 around here

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Table A3: Regression results using *pr0* variable from DNB Household Survey

	(1) QH	(2) QHp	(3) Combined	(4) Groups	(5) Individual
Intensity of newspaper usage	-0.05 (0.14)		-0.07 (0.14)		
Broadness of political views		-0.27** (0.13)	-0.33** (0.13)		
Intensity: low				0.04 (0.05)	
Intensity: high				-0.05 (0.14)	
Broadness: low				-0.31** (0.13)	
Broadness: high				-0.34** (0.14)	
Newspaper_A					0.01 (0.03)
Newspaper_B					-0.00 (0.03)
Newspaper_C					-0.01 (0.03)
Newspaper_D					-0.09** (0.04)
Newspaper_E					0.10*** (0.03)
Newspaper_F					0.01 (0.03)
Newspaper_G					-0.04 (0.03)
Newspaper_Regional					0.01 (0.02)
Liberal					-0.13** (0.06)
Socialist					0.08 (0.07)
Christian-democr.					0.05 (0.08)
Conservative					-0.13 (0.09)
Progressive					-0.16** (0.07)
University degree	-0.42*** (0.07)	-0.33*** (0.07)	-0.36*** (0.07)	-0.35*** (0.07)	-0.27*** (0.08)
Income: 0 - 30K	0.20*** (0.07)	0.18*** (0.07)	0.18** (0.07)	0.17** (0.07)	0.19** (0.08)
Income: over 50K	-0.10 (0.07)	-0.11 (0.07)	-0.07 (0.07)	-0.07 (0.07)	0.02 (0.08)
Income: NA	0.39*** (0.11)	0.36*** (0.11)	0.36*** (0.11)	0.35*** (0.11)	0.42*** (0.13)
Homeowner	-0.24*** (0.09)	-0.23*** (0.09)	-0.23** (0.09)	-0.23** (0.09)	-0.22** (0.11)
Has children	-0.00 (0.08)	-0.01 (0.07)	0.03 (0.08)	0.03 (0.08)	0.06 (0.09)
R2 overall	0.05	0.05	0.06	0.06	0.09
No. clusters	1463	1413	1366	1366	1122
Observations	2746	2813	2484	2484	1821

Notes: Selected coefficients and standard errors (in parentheses, clustered at the household level) for random-effects panel regressions. The dependent variable measures the accuracy of inflation expectations using the standard question from the DHS. This variable (*pr0*) measures on a ten-point scale that ranges from 1% to 10% the replies to the question: *'What is the most likely (consumer) prices increase over the next twelve months, do you think?'* */**/*** denotes significance at the 10%/5%/1% level.

Previous DNB Working Papers in 2017