FIRMS' INFLATION EXPECTATIONS: NEW EVIDENCE FROM FRANCE

Frédérique Savignac
Banque de France

Erwan Gautier
Banque de France

Yuriy Gorodnichenko
UC Berkeley and NBER

Olivier Coibion
UT Austin and NBER

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Abstract: Using a new survey of firms' inflation expectations in France, we provide novel evidence about the measurement and formation of inflation expectations on the part of firms. First, French firms report inflation expectations with a smaller, but still positive, bias than households and display less disagreement. Second, we characterize the extent and manner in which the wording of questions matters for the measurement of firms' inflation expectations. Third, we document whether and how the position of the respondent within the firm affects the provided responses. Fourth, because our survey measures firms' expectations about aggregate and firm-level wage growth along with their inflation expectations, we are able to show that expectations about wages are even more condensed than firms' inflation expectations and almost completely uncorrelated with them, indicating that firms perceive little link between price and wage inflation. Finally, an experimental treatment indicates that an exogenous change in firms' inflation expectations has no effect on their aggregate wage expectations.

JEL: E2, E3, E4

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1 Introduction

The role that firms' inflation expectations can play in macroeconomic dynamics has long been recognized. These expectations can affect firms' decisions along a variety of margins such as the prices they choose to charge (since future inflation determines the rate at which their relative price will fall) or how much to invest (via the perceived real interest rate). But measuring these expectations has presented many challenges and, as a result, there are very few high-quality surveys of firms' inflation expectations, especially in advanced economies. In this paper, we report results from a new survey of firms' inflation expectations in France.

This survey, implemented in five different waves in 2020 and 2021 using about nine hundred firms in total drawn from different sizes and sectors, has a number of distinguishing elements. First, different formulations of the question about expected inflation were used, allowing us to provide new evidence on how the phrasing of the question matters for the measurement of expectations. Second, the job of the respondent was recorded, allowing us to study how the position of the respondent within the firm relates to their reported inflation expectations. To the best of our knowledge, this is the first survey of firms that allows us to explicitly characterize the position of the respondent within the firm. Third, the survey measures not just inflation expectations but also what respondents expect about aggregate and firms' wages. We are therefore able to speak to the joint determination of firms' expectations about aggregate prices and wages. Fourth, 75% of firms are surveyed twice: a first time at the end of 2020 when inflation was close to 0 and again in May 2021 when inflation was significantly higher and concerns about inflation were more prominent, which also allows us to document how firms revise their inflation expectations when actual inflation is higher. More generally, because there are so few high-quality quantitative surveys of firms' inflation expectations available in advanced economies, our results provide a useful benchmark for future work on the inflation expectations of firms in advanced economies.

We emphasize several key results from our survey. First, the inflation expectations of firms in France were relatively low during the time of survey, close to 2% on average, but still higher than actual inflation over that period, which was running between 0 at the end of 2020 to about 1 percent over the first six months of 2021. Results are broadly similar across forecasting horizons, ranging from one-year ahead to two or five years ahead. Firms' inflation forecasts therefore display a positive bias, as documented in other settings but significantly smaller than the one found in household forecasts. Second, the dispersion in answers about inflation in France is lower than observed in comparable surveys in other advanced economies like New Zealand or the United States and is also lower than dispersion in inflation forecasts among French households. Firm inflation forecasts nonetheless reveal significant disagreement

about the evolution of the future aggregate price level. Third, firms in France disagree not just about future inflation but also about recent inflation, something that is readily observable. This indicates that inattention to macroeconomic conditions is pervasive among firms. Fourth, we find that when inflation is higher like in May 2021 when concerns about inflation were more prominent, the bias and the level of disagreement are more limited. Finally, and consistent with prior work, firms' perceptions about recent inflation are a very strong predictor of what they anticipate future inflation to be, indicating that imperfect information provides an important rationale in accounting for disagreement about the future. In a similar vein, we also document a positive link between firms' expectations about their own prices and their expectations about aggregate inflation.

The unique characteristics of this survey allow us to further address three questions that are central to the measurement of firms' inflation expectations. The first is how sensitive are responses to the formulation of the question. Some surveys of firms, for example, ask about "prices in general" while others ask more specifically about "inflation". Consistent with other evidence for firms, we find only limited sensitivity of reported expectations to whether questions refer to inflation or prices in general, in contrast to what is often found for households (de Bruin et al. 2012). Referring to "prices in general" in the formulation of questions leads to slightly higher average reported perceptions of recent inflation but has no statistically significant effect on reported expectations about future inflation relative to equivalent questions asking about inflation. We also do not find any difference in the dispersion of answers about expected inflation when referring to "prices in general" or "inflation".

In contrast, when questions about future inflation first include information about recent inflation rates, as done for example in the Bank of Italy's survey of firms, we find that this has very large effects on the reported expectations of firms. Consistent with evidence in Bartiloro et al. (2019) and Coibion, Gorodnichenko and Ropele (2020), when firms are provided with information about recent inflation, they move their reported forecasts of future inflation in the direction of the provided information, leading to a strong reduction in the dispersion of forecasts and a movement in the mean toward the provided signal. We also find that this information has a rather short-lived effect since firms receiving this information in December 2020 have similar inflation expectations as untreated firms by May 2021. The powerful effect of even simple information about recent inflation on reported expectations implies that questions about inflation expectations should not include additional information about recent inflation if they are meant to solicit firms' unbiased prior beliefs about future inflation.

We also use several different formulations to capture the long term inflation expectation of firms by varying the specific horizon used: 2 years, 3 to 5 years and 5 years. We find that firms provide highly

correlated answers for these different horizons but the response rate to the question declines quite drastically with the horizon of the formulation. The dispersion of answers is more limited and cannot be related to observed characteristics like for past inflation or for the one-year horizon answer.

The second question that we address is how/whether responses differ based on the respondent's position in the firm. To the best of our knowledge, this is the first survey of firms' inflation expectations which provides this information. In large firms, it is not clear that inflation expectations of CEOs are necessarily the most important, when for example pricing decisions are made at much lower levels of decision-making in the firm. Consistent with this, we do find significant differences in expectations of respondents depending on their job positions. CEOs and Financial Executives have, on average, significantly lower inflation expectations than those at lower levels within the firm or with positions unrelated to finance. We confirm this novel finding through a survey of French households in which we are able to separately identify managers and CEOs. These agents again display much lower inflation expectations than other respondents, and observable socio-demographic characteristics of CEOs (education, income,…) cannot fully explain why their expectations are so much lower: we identify that having a CEO position in a firm is associated with a lower inflation expectation of about 1 percentage point even after controlling for education, income or gender. We interpret this as providing novel evidence that inflation expectations can differ within the firm, and therefore that one should try to ascertain the expectations of individuals making specific decisions: e.g. price-setters, recruiters, etc.

Third, the survey includes questions not just about inflation expectations but also about aggregate and firm-level *wage* growth expectations. With wages being one of the main costs of production, expectations of wage growth should be closely tied to inflation expectations. In fact, we find only a weak link between the aggregate wage expectations of firms and their price expectations. Moreover, we find that revisions in expected wage growth are not related to revisions in aggregate inflation. Similarly, firms which receive information about recent inflation that leads to significant revision in their inflation expectations do not display any unusual revision in their wage expectations relative to untreated firms. This suggests that, at least in the minds of firms, the link between wages and prices is not a particularly strong one.

Jointly, these results build on a growing literature studying the formation and measurement of expectations, particularly for firms. This nascent body of work is exploring a widening range of firm-level surveys. In Italy, Banca d'Italia has been collecting inflation expectations of firms since 1999 (Bartiloro et al. 2019, Conflitti and Zizza 2021), while more recently, large quantitative representative surveys of firms have been set up in Uruguay (Frache and Lluberas 2019), Ukraine (Coibion and Gorodnichenko

2015), Japan (Kaihatsu and Shiraki 2016, Muto 2015). Much more limited surveys have also been studied in the U.S. (Bryant et al. 2015, Candia et al. 2020 and 2021), Britain (Boneva et al. 2020), Canada (Richards and Verstraete 2016), and Switzerland (Humziker et al. 2018) among others. But the latter surveys all have important shortcomings, such as non-representative samples, non-quantitative inflation expectations questions or questions that focus only on firm-specific outcomes, etc. The survey of French firms that we utilize is much closer to the former group in that it is based on a wide and representative selection of firms (by size and industry) and it provides quantitative expectations of aggregate inflation, unlike a different survey of French firms utilized in Andrade et al. (2022). Through this unique and novel of survey of firms in France, we are able to provide new insight on the measurement of these expectations as well as on the perceived determinants of inflation by firms.

Section 2 describes the survey and questions used. Section 3 presents results on sensitivity of answers to formulation of inflation questions. Section 4 discusses the role played by the position of the respondent within the firm. Section 5 turns to the link between wage and price expectations. Section 6 concludes.

2. Survey Description

The survey we use is a pilot set of questions on inflation expectations added to a pre-existing survey of French firms called *Enquete Mensuelle de Conjoncture* (Monthly Outlook Survey). The Monthly Outlook Surveys include about 8,000 firms from industry, services and construction. It has been conducted by local branches of Banque de France since the early 90s. It is a short survey with qualitative questions about firms' perceptions and expectations about their own activity, demand and prices during the month and over short horizons (within 3 months).[1] The interviews take place the last week of each month (most answers are collected over 2 or 3 days). This survey is mainly used for nowcasting GDP.[2] The pilot questions on inflation expectations were added in two specific regions in France, the Hauts-de-France (the northernmost region of France) and Provence-Alpes-Cote-d'Azur (a region in southeastern France bordering Italy and the Mediterranean), over five different monthly waves: 4 waves between September-December 2020 and 1 wave in May 2021.[3] Overall, the initial sample includes a little more than 1,000 firms of different sizes covering industry, services and construction (see Table A.1 in Appendix). This

[1] See for instance Harris et al. (2019) or Loupias and Sevestre (2013).
[2] See Barhoumi et al. (2012).
[3] France consists of 13 administrative regions: Hauts-de-France and Provence-Alpes-Cote-d'Azur are populated respectively by 6 and 5 million inhabitants (taken together 16% of French population) and each of their economies represents 7.2% of French GDP. .

sample was divided into four subsamples of similar composition in terms of regions, firms' size and sectors, so that in each wave of 2020, a new set of firms (of about 250 firms each) was interviewed. In May 2021, 75% of firms from the initial sample (overall about 750 firms) were randomly selected and were interviewed again using a similar set up.[4] In the end, 923 different firms answered the pilot survey across all waves.[5] The achieved sample composition is similar to the initial one (Table A.2 in appendix). The interviews were done in person by phone.

Inflation expectations were measured using several different questions across waves (see the Appendix for the complete list of questions asked over the different waves). In the first wave, firms were randomly assigned to one of two different formulations of the inflation questions. Both focused on "consumption prices" but the first group was asked to provide both qualitative and quantitative answers while the second group was only asked about quantitative values. Each group received questions about inflation over the previous twelve months, the next twelve month, and a two-year ahead annual inflation forecast. The version for perceived inflation over the last twelve months with both qualitative and quantitative questions was (translated from the French):

> *According to you, over the last 12 months, how have consumption prices in France evolved?*
>
> > *[Options: They have gone up a lot/gone up somewhat/they have been pretty stable/they have gone down somewhat/they have gone down a lot.]*
>
> *As a percentage, what do you think has been the change in consumption prices over the last 12 months?*

An equivalent question followed for inflation expectations over the next twelve months, both in qualitative and quantitative form. The second group was asked the exact same quantitative questions but without the qualitative questions asked first. Both groups were then asked to provide a quantitative forecast of inflation between September 2021 and September 2022, i.e. the annual inflation rate two years from the time of the survey.

In the second (October) wave of the survey, two versions of inflation questions were again asked, but this time focusing on "consumption prices" versus "inflation." Specifically, one randomly

[4] The last quarter of firms will be interviewed during the last quarter of 2021 when the survey will be extended to all French regions using the same questionnaire.
[5] The sample of firms contacted is smaller than the total sample of firms. We were not able to contact by phone some firms because they were temporarily closed (holidays, Covid lockdown for some sectors like restaurants) or they responded to the monthly survey by email and not by phone like other firms.

selected group of firms was asked the same quantitative questions as in the first wave, while the second group was asked a new set of questions:

As a percentage, what do you think is the current inflation rate in France?

As a percentage, what do you think the inflation rate will be in France in one year?

As a percentage, what do you think the inflation rate will be in France in two years?[6]

This second group was also asked an additional question, formulated in the same way, asking about inflation in five years.

In the third wave (November), these two formulations of the inflation question were again used in a randomized fashion. In addition, two new questions about aggregate wage growth were introduced. Each question was worded in one of two ways, referring either to "base salaries" or just "salaries." Firms were randomly assigned to each wording choice. In both cases, the first question focused on recent wage growth while the second focused on expected wage growth. The phrasing was as follows:

We are now going to turn to average changes of (base) salaries in France, meaning (base) wages (excluding bonuses or benefits).

As a percentage, what do you think has been the change in the average (base) salaries in France over the last twelve months?

As a percentage, what do you think will be the change in the average (base) salaries in France over the next twelve months?

Hence, these questions provide us with both the aggregate price and wage expectations of firms, these two variables are arguably two important (and possibly related) nominal aggregate variables for firms' decisions.

In the fourth wave, all firms were asked quantitative questions for inflation rather than consumption prices as well as the same two wage questions (about salaries) as in the third wave. However, one randomly selected subset of firms was first provided with the most recent inflation rate:

In November 2020, the inflation rate in France was 0.2%.

while the rest of firms were not provided with this information. This provision of information regarding recent inflation mimics the survey of firms done by the Bank of Italy, in which most firms are provided with the most recent inflation data for Italy and the Euro area prior to being asked for their inflation

[6] The phrasing of questions was kept short because questions were asked by phone. In particular, compared with some other existing surveys administered by internet, we do not provide any further information more details on how inflation is defined (eg in Banca d'Italia survey, inflation is explicitly defined as the annual growth rate of the HICP index).

forecast. Note that for the group receiving the information about recent inflation in France, we do not ask what they think inflation has been either before or after the provision of this information.

In the fifth and final wave in May 2021, firms were asked four questions. The first two were quantitative questions on inflation (with no information) asked of all firms: perceived and expected inflation over the next 12 months (a phrasing similar as the one used in waves 2, 3 and 4). The third question asked about long term inflation expectation using three different horizons: 2 years, 3 to 5 years and 5 years. The three formulations were asked to three different subsets of firms (each of these subsets consists of about 250 randomly selected firms). Finally, the last question was common to all firms and asked about the expected growth of firms' base wages over the next 12 months.

Because these surveys are done by phone, the interviewer had some ability to gauge how easy it was for respondents to answer the questions. In particular, interviewers kept track of whether respondents were unwilling or unable to provide immediate answers to the questions. Many required some encouragement to provide precise quantitative answers, and interviewers recorded this hesitation. As a result, we can measure both the rate of non-response to questions (when respondents refused or were unable to provide an answer) as well as the share of respondents who showed difficulty in answering the question. On average, response rates for inflation questions were quite high but fell off at longer horizons (see Table A.3 in Appendix for detailed results on response rates by question). For example, an average perceived inflation rate was provided by 88% of respondents but only 66% provided a 5-year inflation forecast. Even though responses were provided in the vast majority of cases, interviewers noted that nearly 50% of respondents struggled to answer the questions about inflation. Difficulties were particularly pronounced at longer horizons, and more generally many respondents struggled to provide a precise answer to questions about aggregate inflation.

3. Aggregate Results of the Survey

We present aggregate results from the survey in Panel A of Table 1, pooling across question formulations and survey waves. To the best of our knowledge, these are the first quantitative measures of French firms' inflation expectations available and the only ones available for a Euro-area country other than Italy.

Several facts stand out with respect to French firms' forecasts. First, French firms were significantly *overestimating* the rate of inflation at the time: the average perceived inflation rate is equal to 1.8% and the median is equal to 1.3% while actual inflation was running between 0% at the end of 2020 and 1.4% in May 2021. Forward-looking expectations were close to these backward-looking perceptions, with the average one-year forecast at 2.2% and the average 5-year ahead forecast at 2.3%.

By contrast, firms' beliefs about wage growth were somewhat lower: the average perceived wage inflation was 0.9% while the average expected wage inflation was 1.3 %. At the time, average wage inflation was 1.6%, so firms seem to have been actually under-estimating the recent growth rate in base wages.[7]

Second, the degree to which firms overestimated inflation during this period was much less than for households. As shown in Panel B of Table 1, the inflation forecasts and perceived levels of inflation of French households over this same period were around 4 to 5%. This differs from some prior work which has found that firms' inflation forecasts were close in mean to those of households (Kumar et al. 2015). Using household data, we are able to investigate the source of this difference between firms' and households' inflation bias. When we restrict the household survey to answers given by managers only, we find that inflation perceptions and expectations are about 1.2 pp lower than the average household answer and they are even lower when we consider only the answers of CEOs (Table A4 in Appendix). The existing literature has already documented that more highly educated and higher income households tend to report lower inflation expectations (see e.g. Burke and Manz 2011). In section 5, we investigate these differences in more detail by using this information on the job of the respondent in both the firm and the household surveys; in particular we are able to test whether there is still a "manager" effect once we control for education and income.

Third, for price expectations and perceptions, medians are significantly lower than means, indicating the presence of a tail of higher expectations. To see this visually, Figure 1 plots the distribution of one-year ahead price and wage inflation expectations. In Panel A, we can see that there is indeed a right tail of higher inflation expectations and perceptions, particularly at rounding values like 5% and 10%, a feature previously documented and emphasized for households in Binder (2017). However, the distribution is fairly condensed overall. The cross-sectional standard deviation in inflation forecasts of firms is just 2.2%, as shown in Table 1, whereas households display a much higher degree of disagreement: the cross-sectional standard deviation in their forecasts is above 5%. This large dispersion contributes to explain the gap between the average answer of firms and the average answer of households. Overall, the median inflation answers of households (2 and 3%) are closer to our sample of firms' answers. For comparison, the distribution of firms' wage inflation expectations is even more condensed and more symmetric: almost everyone responds with a value ranging from 0% to 2%.

[7] There were large changes in labor composition during this time period due to the pandemic. Given the potential for different wage changes for job stayers and leavers, the measurement of wage growth during this period is particularly tenuous.

Fourth, we also find that firms' expectations and perceptions do respond to actual changes in observed inflation. To see this, Table 2 presents expectations of inflation for different waves of the survey. Comparing answers to the same questions in terms of phrasing, we find that the average perception of inflation in the 2020 waves was 1.1% whereas in 2021, the same firms perceive inflation to be close to 2%. This higher inflation perception is line with inflation numbers observed for the same dates: inflation was equal to 0% at the end of 2020 and 1.4% in May 2021. The bias is even lower in 2021 (about +0.5 pp) than in 2020 (about +1 pp). We observe a similar shift in the median of perceptions going from 1 to 1.5%. Overall, the distributions of perceived and expected inflation shifted to the right between 2020 and 2021 (Figure A5 in the Appendix).[8] Table A8 in the Appendix reports some results on the main determinants of firms' revisions in their expectations but very few of the observed characteristics of firms appear to have a significant effect on revisions. Finally, we test whether revisions for short- and long-run expectations are correlated. In particular, if inflation expectations are quite anchored, we might expect that revisions in long-run expectations will not be correlated with revisions in perceptions or short term expectations. We do find that revisions in long–run expectations are weakly correlated with revisions in inflation perceptions and that the correlation between revisions in 1-year and long run expectations is a little stronger but still rather small in magnitude (about 0.3 for the correlation coefficient) (see Figure A9 for scatter plots).

One last feature that is consistent with prior work is the strong correlation between perceptions over recent inflation and predictions about future inflation. We illustrate this correlation in Figure 2. Each panel is a scatter plot of firms' perceptions about inflation over the last twelve months against their expectation of inflation at each horizon (12-month ahead, two years ahead, and five years ahead). In each case, we can observe a strong positive correlation. Firms who think that inflation has recently been high tend to predict that inflation will continue to be high. Imperfect information on the part of firms is therefore an important source underlying their disagreement about the future.

4. How Phrasing of Questions Affects Reported Inflation Expectations

Does the phrasing of the inflation question matter for the responses provided by firms? Prior work has emphasized that question wording can be crucial when interviewing households (de Bruin et al. 2012) but much less important when firms are questioned (Kumar et al. 2015). Table 2 provides some

[8] In the Appendix, Table A7 and Figure A6 report statistics and full distribution of the revisions in firms' inflation expectations.

preliminary evidence in this spirit by showing both mean and median responses for each wave separately and for firms who received questions in terms of prices versus those who received questions in terms of inflation.

For a given question type, we see few changes across survey waves. For example, firms asked about consumption prices over the previous 12 months report an average perceived growth rate of 2.2% in September and 2.1% in November. However, there is a somewhat more pronounced difference in levels of expectations and perceptions looking *across* question types. For example, in October, the average perceived inflation measured in prices was 1.9% while it was only 0.9% when measured with inflation. Similar differences can be seen across forecasting horizons and waves, although the exact magnitudes vary. This suggests some role for the phrasing of questions.

To assess how question phrasing matters more systematically, we regress inflation perceptions and expectations on firm and interviewee characteristics (firm size, industry, job position of respondent) as well as indicators for the phrasing of the question received by the firm. The latter indicate whether respondents received the question in prices, the question about inflation without additional information, or whether they received the question about inflation with additional information. We include month fixed effects to control for the fact that some survey questions were asked in early waves (e.g. prices) while others were asked only in later waves (e.g. inflation), as well as region fixed effects.

The results are presented in Table 3. We find that receiving questions expressed in terms of "consumption prices" has little effect on responses relative to receiving questions phrased in terms of inflation. With forward-looking expectations, the coefficients on the price indicator are insignificantly different from zero and economically small. With perceptions, the effect is positive and significant: respondents report perceived inflation that is higher by about 0.8% when asked about consumption prices rather than inflation. But this effect on reported perceptions does not seem to carry through into reported forward-looking expectations.

Another small difference between the two wordings is on how easy it is for respondents to answer the question. Table 3 includes an equivalent regression in which the dependent variable is an indicator variable for whether the respondent had trouble answering the question. We see that when firms are asked about prices in general, they generally find it easier to provide an answer (-8 pp on

the probability to report difficulties to answer). Questions referring to inflation instead tend to cause more difficulties for some firms, although the effects do not seem very large. [9]

More striking and more robust is the effect of providing firms with information prior to asking them about their inflation expectations: we find that firms who received this information reported one-year and two-year ahead inflation expectations lower by about 70 basis points. The coefficient on five-year ahead expectations is also negative (-0.4) but is insignificantly different from zero. The sensitivity of reported forecasts to the provision of information about recent inflation is consistent with other evidence on how firms incorporate new information presented to them from Italy (Coibion, Gorodnichenko and Ropele 2020) and New Zealand (Coibion, Gorodnichenko and Kumar 2018).

The order of magnitude of the revision is also broadly consistent with prior evidence. With Bayesian updating, the revision in the firm's forecast should be equal to their Kalman gain times their forecast error (i.e. the difference between the signal and what they expected it to be). The provided signal about recent inflation is 0.2%, and untreated firms have an average perceived inflation of about 1.9%, so the difference is 1.7%. Since the effect on forecasts is 70 basis points on average, the implied Kalman gain is around 0.4 ($\approx$0.7/1.7). This value is very similar to estimates in Coibion, Gorodnichenko and Ropele (2020) or Coibion and Gorodnichenko (2015).

Jointly, these results largely confirm earlier evidence that whether firms are asked about consumption prices or inflation has only limited consequences for the forecasts they subsequently report. Formulations involving general prices may invoke consumer spending experiences more directly, leading to higher inflation perceptions (as in D'Acunto et al. 2021) but are easier for some respondents to answer, yielding a higher response rate. There is therefore a slight trade-off between the two approaches. More strikingly however, our results from French firms confirm earlier evidence that providing firms with information about recent inflation can lead to significant revisions in their reported forecasts. These firms place significant weight on the provided information, so treated firms (i.e. those provided with new information) can no longer be considered representative of the general population of firms.

Finally, we find that the effect of information is very short lived: all other things equal, firms provided with information on actual inflation at the end of 2020 revised strongly their 1-year inflation expectation by 0.8pp and long-term expectations by 1.5pp in May 2021 and thus, have similar inflation expectations in 2021 as other firms (see Table A.8 in Appendix).

[9] Similarly, we find that this formulation is associated with a higher response rate (about 2 percentage points for perceived and expected inflation over a one year horizon), however this effect is non-significant (see Table 5).

5. How the Job of the Respondent and Firm Characteristics Affect Inflation Expectations

5.1 Do respondents' characteristics matter?

A second unique characteristic of the survey is the fact that interviewers enquire about the position of the respondent. Table 4 summarizes the reported jobs held by survey respondents, both across all firms as well as broken down by firm size and industry. A little over 40 percent of respondents are CEOs for their firms, and a third are financial officers. These two roles therefore account for a significant majority of our respondents. Smaller firms more frequently have their CEO available for surveys while larger firms often delegate the survey to financial officers. Nonetheless, our sample also includes human resources officers, production managers, accountants, and other executives in the firm, accounting for about thirty percent of respondents across all firm sizes and industries. This therefore gives us an unprecedented ability to study the extent to which one's job position is related, if at all, to their inflation perceptions and expectations.

To do so, we use the same specifications as before in which we regress inflation perceptions or expectations at different horizons on firm characteristics (size, industry), wave fixed effects, and indicators for the type of question but now adding indicator variables identifying whether the respondent is a CEO, a Chief Financial Officer (CFO), or holds a different role in the company. As shown in Table 3, we find that respondents who are neither CEOs nor financial officers tend to have higher perceptions of recent inflation than others, in other words they were less well informed about how low inflation had been at the time in France. The effect is relatively large: someone who is neither a CEO nor financial officer believes inflation has been higher by almost one percentage point compared to CEOs. The same effect applies to one-year ahead inflation expectations: those holding "other" positions in the firm have inflation forecasts that are higher by about one percentage point. This is true even after controlling for firm characteristics, which can be important since the job of the respondent is not independent of the type of firm, as shown in Table 4. We also find that those who are neither CEOs nor financial officers are more likely to struggle with questions about recent inflation. They are about 15% more likely to have trouble answering the question than CEOs or financial officers.

We can similarly characterize whether those holding other positions are less likely to submit a response to expectations questions at all. To do so, we run logit regressions for whether a respondent provided an answer to a specific question or not on the same firm characteristics as before, time and region fixed effects, question type indicators, as well as job characteristics. We present results from

these regressions in Table 5. The table reveals a qualitatively similar finding: CEOs and financial officers are more likely to answer questions about inflation than those holding other positions, by about 10 percentage points.

The fact that CEOs and financial officers are more likely to respond to questions about inflation, and more likely to be informed about recent inflation, may seem natural but it need not imply that surveys of firms should focus on these specific individuals within the firms. Ultimately, we want to measure the expectations of those who are making decisions based on those expectations. For many firm decisions such as hiring, wage-setting, pricing, capital expenditures, etc., the responsible party is not the CEO or the financial officer. What our results indicate is that the expectations of different individuals within a firm are *not interchangeable*. If we want to measure the inflation expectations of price-setters within a firm, for example, it will be important to actually reach those price-setters rather than rely on the first executive that a firm provides to respond to the survey.

Using household data, we are also able to investigate further why firms' managers report lower inflation expectations and perceptions than other households. The existing literature has already documented that more educated and higher income individuals tend to report lower inflation expectations. Since managers are more likely to hold a higher degree of education and to be better paid than the average household, lower expectations of managers could potentially be the result of the combination of these demographic variables (see also Link et al. (2021) for further evidence on this type of comparison). To test whether we can identify a "manager" effect on inflation expectations (on top of the effect of education, income, age…), we use a parallel survey of French households: the CAMME survey conducted by INSEE within the harmonized European Commission framework (see Andrade et al. (2021) for detailed information on this survey). A helpful and unusual feature of this survey of French households is that several socio-economic characteristics on the respondent are collected. In particular, the job position of the respondent and the socio-economic category of the respondent are available on top of usual variables like education or income. We are therefore able to identify from this household survey respondents who are managers in their firms as well as the nature of the management position they hold (CEO/business manager, or team manager in a specific division of the firm). We can then compare the inflation expectations of CEOs from this household survey to other households, using their quantitative answers to questions on both the perceived evolution of prices over the past 12 months and their expectations about inflation over the next 12 months.[10]

[10] Our data set contains data from Jan. 2004 to June 2021.

Table 6 presents results from regressing either the perceived levels of inflation or the expected future levels of inflation of survey respondents on time fixed effects, a number of individual controls (including education, income, gender) as well as indicator variables for their position within the firm. Detailed information on the job position is reported since 2016 in the survey. Since managers and CEOs are a very small proportion of households surveyed, we run regressions on different time periods: 2016-2021 to get the maximum number of observations, the last 2 years to test the robustness over a recent period and exactly the same period as the firm survey for having the closest comparison (in this case, we have a smaller sample of CEO's comparable answers). Panel A indicates that those with any managerial role had lower levels of perceived and expected inflation by 0.6 to 1 percentage points on average (even after controlling for education or income). Panel C provides the most detailed breakdown and shows that those with progressively higher managerial roles had progressively smaller biases in their average perceptions and expectations. Similar results hold if we use a longer time sample (2016-2021), indicating that these results are not driven by the particular time period over which the firm survey was run. Hence, evidence from this alternative data source on the inflation expectations of individuals with different job positions confirms the results from the firm survey that the position of the respondent within the firm is not innocuous in terms of the resulting measure of expectations.

5.2 Do firms' characteristics matter?

Our results also indicate that the characteristics and the local environment of the firm matter for the reported inflation expectations: Table 3 documents some systematic heterogeneity across firms in inflation perceptions and expectations. For example, firms in the construction industry were more likely to report that inflation had been higher over the last twelve months than firms in other sectors. Firms in manufacturing tended to report lower inflation perceptions and expectations. This confirms evidence from previous work documenting that firms in different sectors often have systematically different inflation expectations (e.g. Coibion, Gorodnichenko and Kumar 2018). But consistent with the relatively low dispersion in reported forecasts documented in Figure 1, the disparities are not very large in an economic sense: average differences in inflation expectations across sectors do not exceed 100 basis points which is low relative to previous work.

More at odds with prior work is the effect of firm size: we find in Table 3 that firms of more than 50 employees tend to report lower inflation expectations than smaller firms. The effect is particularly strong for inflation perceptions but remains elevated and significant for one year ahead and two year ahead inflation expectations. Even for five year ahead expectations, the coefficient remains similar to those found in other specifications but precision is weaker making it statistically

insignificant. This result is in contrast to an earlier finding by Kumar et al. (2015) documenting that it is smaller firms in New Zealand that tend to be better informed about inflation relative to larger firms.

Finally, we match quantitative answers on aggregate inflation with qualitative answers from the same firms from the regular monthly business survey. In this monthly survey, firms are asked about the evolution of their own prices (over the past month and over the next month): firms report whether they believe their prices will increase, stay the same or decrease. We find that firms reporting a past or future price increase within their firm have higher inflation perception or expectations. The effect is about 0.4 pp and significant. This seems to confirm that firms use local information to extrapolate to the rest of the economy when they are asked to provide their aggregate perception about inflation. This result is in line with Andrade et al. (2022) who link qualitative aggregate expectations to firms' local conditions.

Jointly, we interpret these results as complementing an earlier body of work showing that firms are not interchangeable in their beliefs: whether firms anticipate higher or lower aggregate price growth is often tied to specific characteristics of the firm such as their industry (Coibion, Gorodnichenko and Kumar 2018), the number of competitors they face (Afrouzi 2019), or the number of products they produce (Yang 2020). We build on this by providing evidence from a new country –France– that confirms some patterns (construction is least informed about inflation) but challenges others (whether small or large firms are more informed about inflation). In addition, we provide new evidence on the role played by the respondent's position within the firm. Not only are firms not interchangeable in terms of their aggregate expectations, neither are different employees within the firm. Since ultimately we would like to measure the expectations of agents making specific decisions within firms, our results imply that future work should increasingly aim to identify the expectations of specific individuals within a firm depending on the margin of adjustment that one expects specific expectations to act upon.

6. How Firms Perceive Wage Growth and its Connection with Price Inflation

Wage growth is another nominal variable that firms may be more familiar with and we now compare how their expectations about wage growth compare with their aggregate inflation expectations. The questions on wages were asked during the last two waves in 2020 using phrasing about aggregate wages whereas in May 2021, the questions were on firms' wage growth expectations. Overall, they report perceived and expected aggregate wage growth of about 1% whereas actual aggregate base

wage growth is about 1.6% in France. We also document that the dispersion of answers is much lower than for inflation expectations: the standard deviation of answers is about 1.5% (vs 2.5% for inflation (Table 1)) (see also the full distribution Panel B in Figure 1). Overall, firms' managers perceive and expect that real wages are going to decrease at the different horizons tested by about 0.5pp on average.

What are the determinants of heterogeneity in wage growth expectations? In Table 7, we report the results of OLS regressions pooling all answers together. We find that firms' CEOs anticipate higher wage growth than CFOs (difference of 20 basis points). Interestingly, CFOs also perceive less inflation than other managers. Wage growth expectations are lower in services than in other sectors whereas the size of the firm does not seem to matter. These results are quite consistent across the different waves for the different phrasings of the question. If we calculate the real wage growth expectation as the difference between the nominal wage expectations and the inflation expectation, we find that firms in the manufacturing sector and larger firms expect a higher real wage growth than other firms and CEOs are more optimistic than other job positions within the firm on the wage purchasing power (Table A11 in Appendix).

With wages representing the largest component of costs for most companies, one might expect firms to hold expectations of future aggregate price increases that are closely tied to their expectations of future aggregate wage increases. Because surveys do not generally measure firms' expectations of both aggregate prices and wages, determining the strength of this relationship has not previously been possible. This survey allows us to study the link between wage growth and inflation. To do so, we first consider the correlation between beliefs about aggregate wages and beliefs about aggregate prices. Panel A of Figure 3 plots a scatter of firms' perceptions about aggregate wage inflation over the last twelve months versus their perceptions of aggregate price inflation over the last twelve months. We can observe a weak positive correlation between the two. Panel B of Figure 3 plots an equivalent correlation for one-year ahead expectations of aggregate wage and price inflation. Again, there is at best only a weak positive correlation between the two. Firms that expect higher aggregate wage growth do not display a much higher expectation of price inflation than those who expect lower aggregate wage growth. Table 7 confirms that, even after conditioning on other factors, there is little correlation between price and wage expectations of firms. Even when there is a statistically significant relationship (column 4), the quantitative magnitude is very small. We also find that this positive correlation is found to be somewhat higher and more robust for CEOs, for smaller firms and in the sector of construction (Table A12 in Appendix). Overall, this suggests that firms, on average, do not view wage changes as a primary determinant of price inflation at the aggregate level.

What determines firms' expectations of future aggregate wage growth? We have already seen that forecasts of price inflation largely reflect firms' perceptions of recent inflation, so one might expect imperfect information about recent wage changes to play a similar role in accounting for expectations about future aggregate wage changes. Figure 4 therefore plots the correlation between firms' perceptions about recent aggregate wage growth versus their expectations about future aggregate wage growth. As with price inflation, we can observe a very strong positive correlation between perceptions about the past and expectations of future wages. Since past wage growth is in principle observable, this suggests that inattention on the part of firms to recent aggregate wage changes is a primary driver of their different beliefs about the future path of aggregate wages.

We estimate regressions to quantify these visual patterns and report results in Table 8. First, we confirm the strong relationship between perceptions of past values with expectations of future values for price inflation (column 1) and wage inflation (column 6). We also find that the persistence firms seem to assume for price and wage inflation is very similar, with an implied AR(1) of about 0.40 at the annual frequency. Consistent with Figure 4, there is very little correlation between the perceived recent wage and price inflation by firms (column 4). However, perceived wage inflation has predictive power for firms' expected inflation even after their perceived inflation level is taken into account (column 2), although the additional predictive power is quantitatively small, consistent with results in Table 7.

Finally, we can also test whether revisions in wage expectations are related to revisions in inflation expectations or perceptions. On average, firms revise their wage expectations by about 0.5 pp across year 2020 and year 2021, which is in line with the typical revision for inflation expectations. We also find that no specific observable characteristic of the firm can help to predict revisions of wage growth. In Figure A10, we plot the scatter of revisions in wage growth expectations and revisions in inflation perceptions and expectations. We do not find any significant relationship, suggesting that firms do not link revisions in inflation with revisions in wage growth expectations. Even when firms are provided with information on inflation, managers do not revise their expectations about wage growth (Table 7) even though their inflation expectations move sharply. This is consistent with our other evidence documenting only a weak link, if any, between firms' inflation expectations and their wage growth expectations.

Jointly, these results indicate that firms do not seem to view wages and prices as being tightly related. There is little correlation between their perceived levels of past wage and price inflation, and there is also little correlation between what they expect future price and wage inflation will be, despite

the fact that wage contracts are commonly indexed to inflation in France (see for instance Fougère et al. 2018).

7. Conclusion

The macroeconomic expectations of firms have long been thought to be an important determinant of economic conditions. The measurement of those expectations, on the other hand, is a much more recent phenomenon. We provide new evidence on how firms form their expectations of price and wage inflation using a new survey of firms' expectations in France. Our results contribute both to the practical design of such surveys (how to phrase questions, who to speak to) as well as more to broadly understanding what they imply about the expectations formation process. With the latter, for example, we document a strikingly weak correlation between the price and wage inflation expectations of firms, a feature difficult to reconcile with standard models given the large share of costs accounted for by labor.

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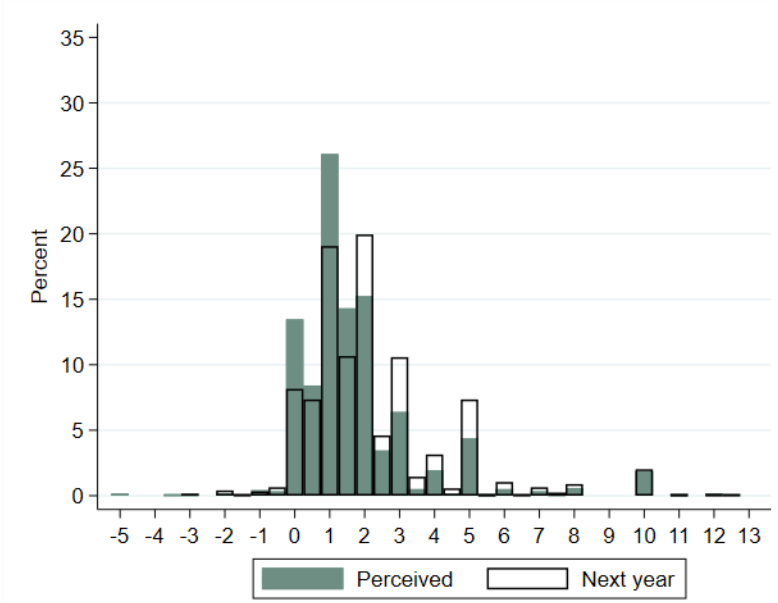
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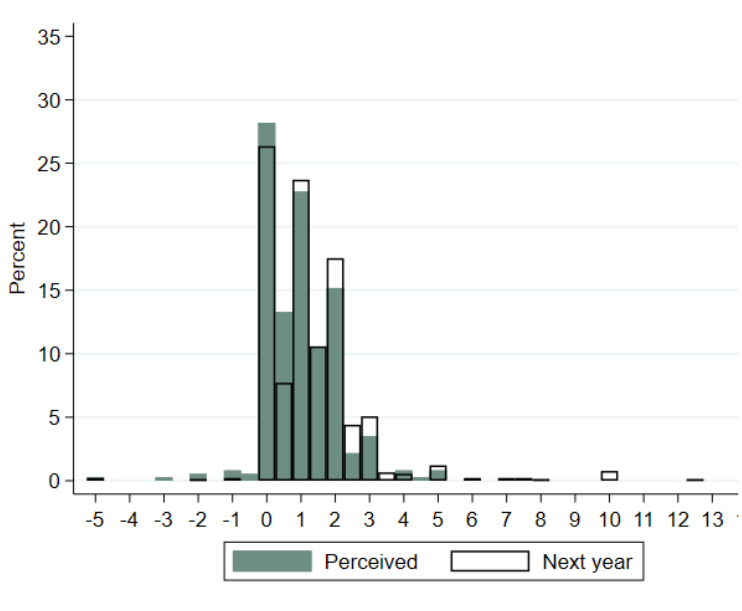
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Figure 1: Distributions of Perceived and Expected Wage and Price Inflation by Firms

Panel A: Price Inflation

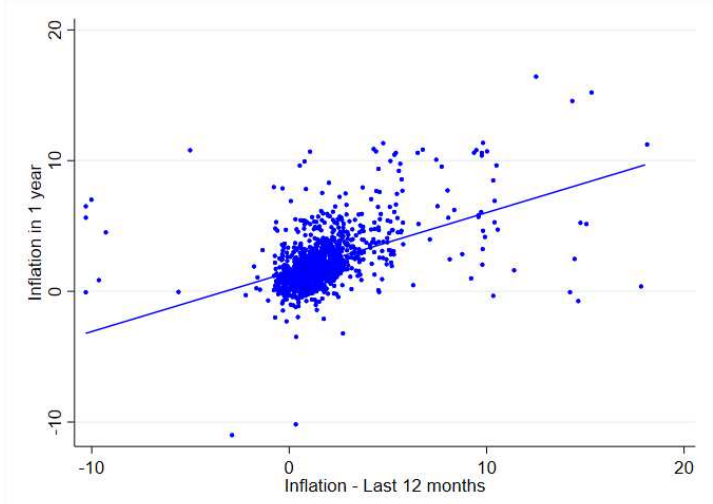


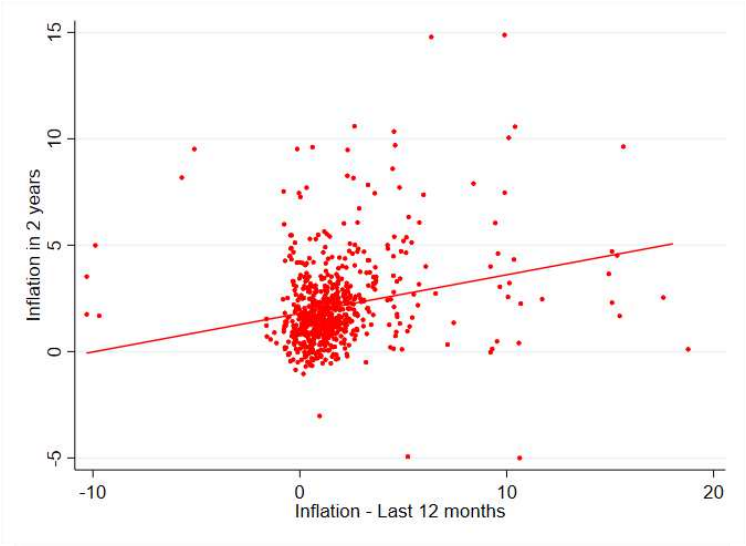
Panel B: Wage Inflation

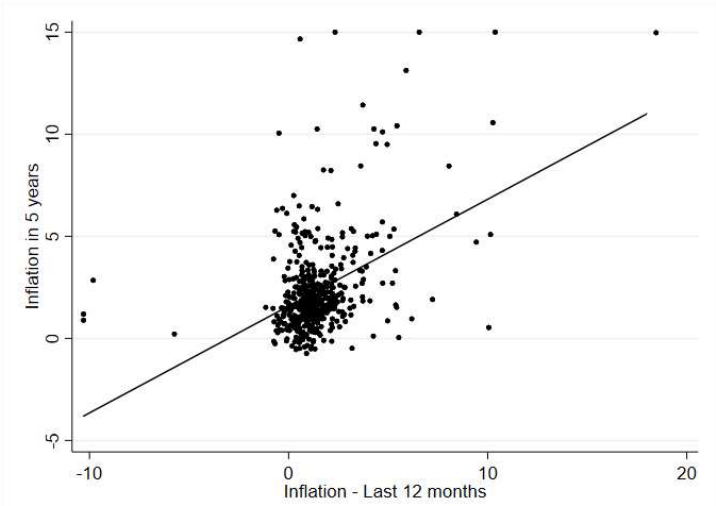


Notes: The figure plots the distribution of responses for perceived and expected one-year ahead inflation (Panel A) and wage inflation (Panel B) pooled across all available waves of the survey and questionnaire formulations.

Figure 2: Correlation of Perceived Inflation with Expectations of Future Inflation



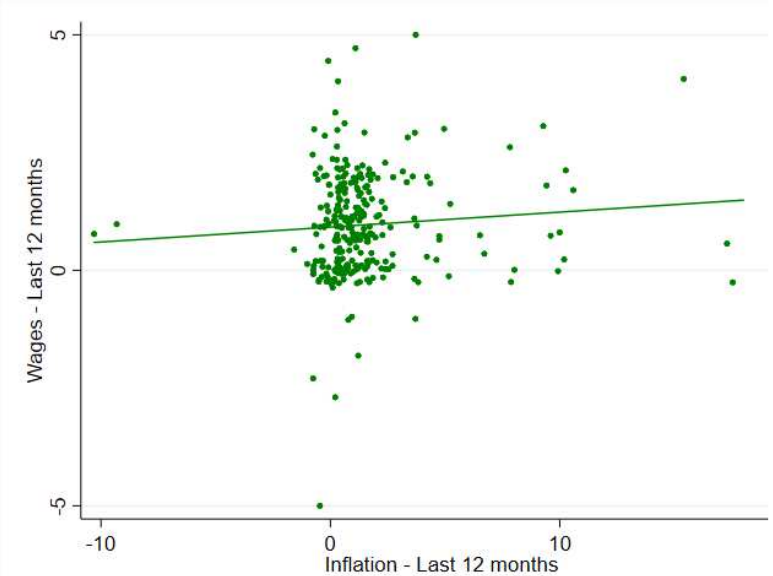




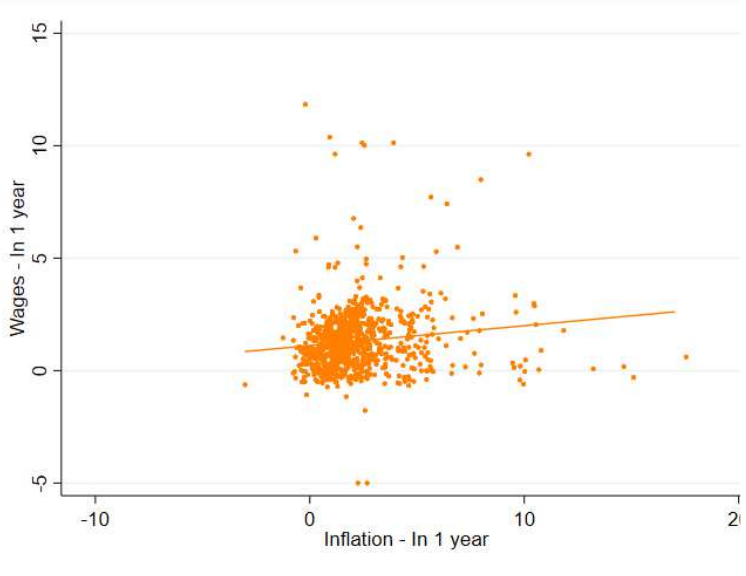
Notes: The figure plots firms' perceptions of inflation over the last 12 months against their expectations of inflation over the next twelve months (panel A), two years ahead (panel B) and 5 years ahead (panel C).

Figure 3: Correlations of Aggregate Price and Wage Perceptions and Expectations

Panel A: Correlation of Price and Wage Perceptions

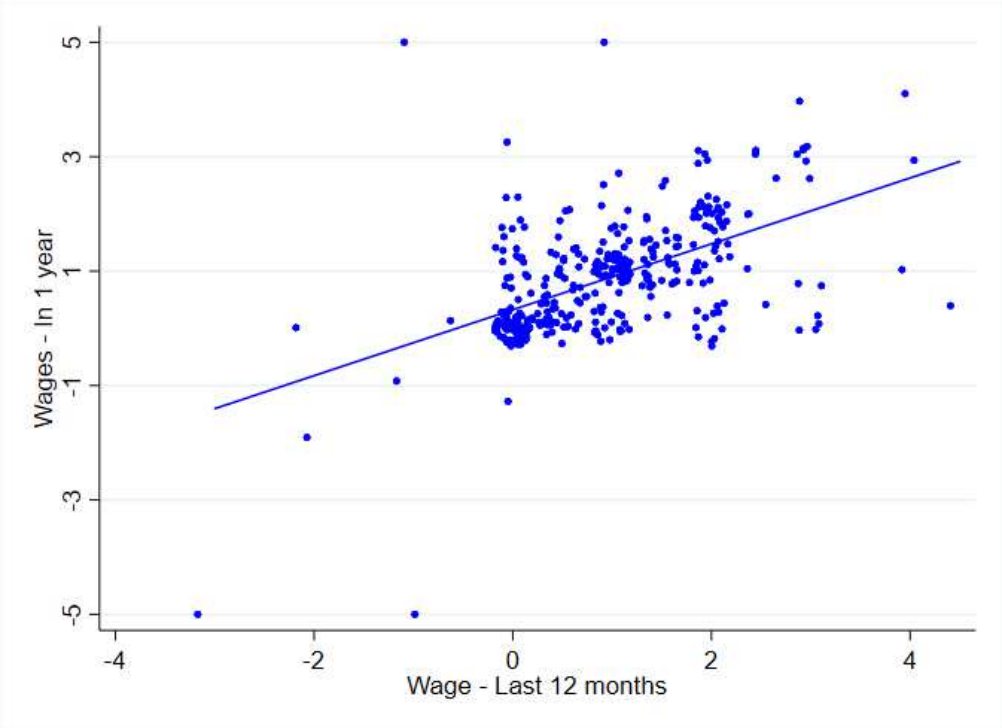


Panel B: Correlation and Price and Wage Expectations



Notes: The figure plots firm level perceptions (panel A) and expectations (Panel B) for wage growth and aggregate inflation. For wage growth expectations, we have put together expectations about aggregate and firm-level wage expectations (waves 3, 4 (end 2020) and 5 (mid 2021)) of the survey whereas for wage growth perceptions, we use answers from waves 3 and 4 (only aggregate wage expectations collected in end 2020).

Figure 4: Perceived and Expected Aggregate Wage Inflation



Notes: The figure plots firms' perceptions of aggregate wage growth over the last twelve months versus their expectations for aggregate wage growth over the next twelve months. We here use answers collected during waves 3 and 4 (end 2020) of the survey.

Table 1: Average Expectations from the Survey of French Firms

	Prices / Inflation				Wages			
	Average	Median	Std.	N	Average	Median	Std.	N
PANEL A								
Previous 12 months***	1.8	1.3	2.4	1,196	0.9	1.0	1.4	370
Next 12 months*	2.2	2.0	2.2	1,242	1.3	1.0	1.5	908
Two years ahead*	2.1	1.5	2.0	801				
3 to 5 years ahead****	2.5	2.0	2.3	150				
Five years ahead**	2.3	2.0	2.3	392				
PANEL B								
All households								
Previous 12 months	5.0	3.0	5.5	8,673				
Next 12 months	3.9	2.0	5.2	8,065				

Notes: The table presents statistics pooled across all five waves. Panel A reports (non-weighted) statistics using individual answers to the Banque de France pilot survey on inflation expectations collected over the five monthly waves of the survey, * indicates data was pooled across all five waves of the survey and all formulations of the questions, ** indicates only second, third, fourth and fifth waves were available and using the "inflation" formulation of question, *** uses all waves but omits those in the group that received information about recent inflation. **** uses only the fifth wave answers. Wage expectations are only available for third, fourth and fifth waves and for expected wage growth, we put together expectations about aggregate and firm-level wages (fifth wave). Panel B reports (non-weighted) statistics using households' answers to an Insee survey (CAMME survey) conducted for the European Commission, we report results using two quantitative answers on the perceived evolution of prices in general over the last 12 months and about the expected evolution of prices in general over the next 12 months.

Table 2: Inflation Expectations by Wave and Questionnaire

	"Price" Questions			"Inflation" Questions		
	Past	1-yr ahead	2-yr ahead	Past	1-yr ahead	2-yr ahead
Average						
September 2020	2.20	2.18	2.09	-	-	-
October 2020	1.90	1.91	2.26	0.87	1.83	1.83
November 2020	2.12	2.44	2.22	1.48	1.90	2.09
December 2020	-	-	-	0.87	1.58	1.93
May 2021				1.92	2.67	2.42
Median						
September 2020	1.5	1.5	1.5	-	-	-
October 2020	1.2	1.7	2.0	1.0	1.0	1.2
November 2020	1.0	2.0	2.0	1.0	1.0	1.0
December 2020	-	-	-	1.0	1.4	1.8
May 2021	-	-	-	1.5	2.0	2.0

Notes: The table reports average and median inflation perceptions and expectations for different horizons across different waves depending on whether questions were formulated in terms of "consumption price" or whether they were formulated in terms of "inflation." We drop answers where firms were provided with information on past inflation (dec 2020 – 4th wave of the survey).

Table 3: Effect of Question Wording and Firm Characteristics on Inflation Expectations

	Reported Inflation Expectation				Difficulty Responding
	Last year	One year ahead	Two year ahead	Five year ahead	
Sector					
Construction	0.434** (0.213)	0.457** (0.222)	0.013 (0.257)	0.722* (0.434)	-0,074* (0.042)
Manufacturing	-0.222 (0.182)	-0.292* (0.154)	-0.396** (0.166)	-0.127 (0.235)	-0.067** (0.031)
Services	Ref	Ref	Ref	Ref	Ref
Size					
>50 employees	-0.670*** (0.180)	-0.638*** (0.148)	-0.565*** (0.162)	-0.428 (0.267)	-0.044 (0.029)
≤50 employees	Ref	Ref	Ref	Ref	Ref
Position					
CEO	Ref	Ref	Ref	Ref	Ref
CFO	0.369** (0.169)	0.323** (0.149)	0.226 (0.180)	-0.131 (0.272)	0.006 (0.032)
Other	0.718*** (0.257)	0.654*** (0.206)	0.502** (0.217)	0.312 (0.352)	0.132*** (0.037)
Question used					
Price	0.798*** (0.289)	0.304 (0.263)	0.235 (0.241)	-	-0.082* (0.046)
Inflation without info.	Ref	Ref	Ref	Ref	Ref
Inflation with info.	-	-0.733*** (0.183)	-0.659*** (0.279)	-0.419 (0.275)	0.019 (0.074)
Wave					
Sep 2020	0.584 (0.443)	0.372 (0.358)	-0.002 (0.330)	-	0.117 (0.078)
Oct 2020	0.050 (0.342)	0.087 (0.283)	0.021 (0.258)	-0.123 (0.353)	0.132** (0.067)
Nov 2020	0.475 (0.337)	0.408 (0.258)	0.125 (0.293)	0.176 (0.453)	0.132** (0.066)
Dec 2020	Ref	Ref	Ref	Ref	Ref
May 2021	0.893*** (0.244)	0.991*** (0.170)	0.458** (0.209)	0.212 (0.256)	0.020 (0.056)
Firms' own prices					
Decrease	-0.208 (0.406)	-0.419 (0.308)	0.415 (0.579)	0.593 (0.413)	0.058 (0.065)
Stable	Ref	Ref	Ref	Ref	Ref
Increase	0.417* (0.236)	0.438** (0.197)	0.113 (0.255)	0.107 (0.244)	0.006 (0.043)
R2	0.066	0.095	0.062	0.044	-
# observations	1,196	1,242	801	542	1,445

Notes: We report results of OLS regressions where the endogenous variable is the quantitative answer on inflation/price reported by firms' managers (columns 1 to 4), the last column reports marginal effects of a Probit model where the endogenous variable is a dummy variable equal to 1 if a manager reports some difficulty answering to the questionnaire (0 otherwise). All regressions also include region fixed effects. Statistical significance is indicated by *** for 1% ; ** 5% ; and * for 10%.

Table 4: Jobs of Respondents across Firms

	Total	≤50 employees	>50 employees	Construction	Manufacturing	Services
CEO	43.1	59.6	28.0	62.9	32.1	49.6
Administrative/Financial Officer (CFO)	30.4	17.5	42.3	17.2	39.3	24.4
Accounting Director	5.0	2.5	5.2	4.3	5.1	2.4
General Management	7.3	4.8	11.6	6.0	12.3	4.5
Production Supervisor	4.8	5.4	4.2	1.7	4.4	6.1
Human Resources Director	0.5	0.2	0.8	0,0	0.9	0.3
Other (marketing directors, sales executive…)	6.6	7.5	5.8	5.2	4.0	10.1
No job title provided	2.3	2.5	2.1	2.6	1.9	2.7
# Observations	923	441	482	116	430	377

Notes: We report here statistics on the position of the respondent within the firm. We report non-weighted statistics for all firms, by size and by broad sector.

Table 5: Determinants of Non-Response to Questions about Inflation Expectations

	Inflation Expectation			
Horizon	Last year	One year ahead	Two year ahead	Five year ahead
Sector				
Construction	0.028	0.069**	0.075*	0.018
	(0.027)	(0.027)	(0.040)	(0.054)
Manufacturing	0.030	0.067***	0.081***	0.062
	(0.020)	(0.022)	(0.031)	(0.039)
Services	Ref	Ref	Ref	Ref
Size				
>50 employees	0.093***	0.094***	0.063**	0.051
	(0.020)	(0.021)	(0.030)	(0.038)
≤50 employees	Ref	Ref	Ref	-0.082*
				(0.046)
Position				
CEO	Ref	Ref	Ref	Ref
CFO	-0.047**	-0.025	-0.029	0.043
	(0.020)	(0.020)	(0.030)	(0.040)
Other	-0.120***	-0.130***	-0.102***	-0.054
	(0.029)	(0.029)	(0.039)	(0.048)
Question used				
Price	-0.022	-0.018	0.008	-
	(0.034)	(0.037)	(0.039)	
Inflation without info.	Ref	Ref	Ref	Ref
Inflation with info.	-	0.016	0.056	-0.022
		(0.051)	(0.055)	(0.072)
# observations	1,353	1,445	1,019	807

Notes: The table presents marginal effects from logit regressions of indicator variables for firms having supplied an answer to a question. The regression includes date (wave) and region fixed effects. Statistical significance is indicated by *** for 1% ; ** 5% ; and * for 10%.

Table 6: Inflation perceptions and expectations of CEOs and firm managers in household survey

	Full period 2016m5-2021m06		Last 2 years 2019m6-2021m06		Recent period 2020m9-2021m06	
	Perception	Expectation	Perception	Expectation	Perception	Expectation
All managers (chief officers, all executive managers…)	-0.626***	-0.629***	-0.804***	-0.916***	-1.032***	-1.074 ***
	(0.078)	(0.071)	(0.121)	(0.115)	(0.210)	(0.196)
#Obs	50,529	47,988	21,010	19,568	8,287	7,703
R2	0.07	0.05	0.07	0.04	0.07	0.04
General Director, Deputy General Director	-0.683***	-0.537***	-0.951***	-0.524**	-0.139	0.322
	(0.174)	(0.140)	(0.300)	(0.259)	(0.514)	(0.502)
Other managers	-0.641***	-0.460***	-0.786***	-0.548***	-0.873***	-0.561***
	(0.072)	(0.068)	(0.118)	(0.117)	(0.196)	(0.196)
Other categories of workers	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
#Obs	33,592	31,592	14,051	13,138	5,465	5,102
R2	0.08	0.05	0.07	0.04	0.08	0.04
Skilled manual labor	-0.005	-0.052	0.126	0.024	0.711*	0.515
	(0.139)	(0.128)	(0.238)	(0.218)	(0.415)	(0.376)
Small retail business manager	-0.529***	-0.440***	-0.694***	-0.501***	-0.388	0.141
	(0.108)	(0.101)	(0.169)	(0.165)	(0.282)	(0.278)
CEO (firms with more than 10 employees)	-1.087 ***	-0.728***	-1.550***	-1.591***	-2.141***	-1.750***
	(0.266)	(0.243)	(0.371)	(0.303)	(0.592)	(0.380)
Executive managers (administrative, engineers…)	-0.839***	-0.611***	-1.061***	-0.790***	-1.299***	-0.838***
	(0.063)	(0.059)	(0.103)	(0.101)	(0.168)	(0.165)
Non-manager categories	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
R2	0.08	0.05	0.07	0.04	0.07	0.04
# observations	52,153	49,570	21,691	20,209	8,575	7,977

Notes: The table reports results of OLS regressions using quantitative answers to the French Household Survey (CAMME –Insee) on the general evolution of prices over the last 12 months (perception) and over the next 12 months (expectations). All answers larger than 20% in absolute values have been removed from the sample. The survey documents several variables for the job position/ status of the respondent, they do not fully overlap and we report results corresponding to these different qualitative variables (see also Table A4 in the Appendix for further details). All regressions include controls for education, income, gender, age, region, size of the city, time. Statistical significance is indicated by *** for 1% ; ** 5% ; and * for 10%.

Table 7: Determinants of Wage Growth Perceptions and Expectations

	Aggregate wage		Firms' wages	All wages
	Last year	One year ahead	One year Ahead	One year ahead
Firms' Aggregate Inflation Expectations	0.017 (0.030)	0.043 (0.30)	0.053 (0.036)	0.049** (0.025)
Sector				
Construction	0.289 (0.238)	0.046 (0.185)	0.462** (0.218)	0.302** (0.153)
Manufacturing	0.249 (0.160)	0.220* (0.129)	0.291** (0.129)	0.258*** (0.092)
Services	Ref	Ref	Ref	Ref
Size				
>50 employees	0.040 (0.157)	0.057 (0.125)	-0.098 (0.130)	-0.081 (0.093)
≤50 employees	Ref	Ref	Ref	Ref
Position				
CEO	Ref	Ref	Ref	Ref
CFO	-0.130 (0.152)	-0.054 (0.122)	-0.305** (0.124)	-0.195** (0.088)
Other	0.143 (0.199)	0.065 (0.150)	-0.108 (0.166)	-0.038 (0.118)
Question used				
Price	-0.125 (0.149)	-0.258* (0.147)	-	-0.274* (0.146)
Inflation without info.	Ref	Ref	-	Ref
Inflation with info.	-	0.048 (0.134)	-	0.054 (0.133)
Wave				
Nov 2020	0.160 (0.144)	0.260* (0.149)		0.270* (0.146)
Dec 2020	Ref	Ref		Ref
May 2021	-	-		0.585*** (0.108)
R2	0.033	0.043	0.043	0.087
# observations	268	343	475	818

Notes: We report results of OLS regressions where the endogenous variable is the quantitative answer on aggregate wage expectations (perceived – column 1 and expected column 2), on expected firm's wage growth (column 3) and taking answers on aggregate and firms' wage growth together (columns 4). All regressions also include region fixed effects. Statistical significance is indicated by *** for 1% ; ** 5% ; and * for 10%.

Table 8: Persistence of Price and Wage Inflation Expectations

	Price Inflation				Wage Inflation			
Horizon	1-yr	1-yr	2-yr	5-yr	Past	1-yr	1-yr	1-yr
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Price Inflation								
Past	0.455***	0.381***	0.007		0.043		0.012	
	(0.065)	(0.110)	(0.044)		(0.031)		(0.020)	
1-yr ahead			0.460***	0.101				0.080**
			(0.061)	(0.102)				(0.034)
2-yr ahead				0.778***				
				(0.081)				
Wage Inflation								
Past		-0.22*				0.402**	0.397**	
		(0.117)				(0.161)	(0.181)	
R2	0.24	0.24	0.27	0.46	0.01	0.22	0.22	0.01
# observations	1,131	263	703	263	273	359	264	829

Notes: The table reports results from regressing expectations of price or wage expectations at different horizons on perceptions or shorter-horizon expectations of price and/or wage inflation. The last column reports results taking together answers on aggregate and firm-level expected wage growth. Statistical significance is indicated by *** for 1% ; ** 5% ; and * for 10%.

Appendices

Appendix – Detailed Questionnaire.

Wave 1 - September 2020

Phrasing A1

Q1 According to you, over the last 12 months, how have consumption prices in France evolved? [Options: They have gone up a lot/gone up somewhat/they have been pretty stable/they have gone down somewhat/they have gone down a lot.]

Q2. As a percentage, what do you think has been the change in consumption prices over the last 12 months? (ie between Sep 2019 and Sep 2020)

Q3. According to you, over the next 12 months, how will consumption prices in France evolve? [Options: They will go up a lot/go up somewhat/they will be pretty stable/they will go down somewhat/ they will go down a lot.]

Q4. As a percentage, what do you think will be the change in consumption prices over the next 12 months? (ie between Sep 2020 and Sep 2021)

Q5. As a percentage, what do you think will be the change in consumption prices between Sep 2021 and Sep. 2022?

Phrasing A2

Q1. As a percentage, what do you think has been the change in consumption prices over the last 12 months? (ie between Sep 2019 and Sep 2020)

Q2. As a percentage, what do you think will be the change in consumption prices over the next 12 months? (ie between Sep 2020 and Sep 2021)

Q3. As a percentage, what do you think will be the change in consumption prices between Sep 2021 and Sep. 2022?

Wave 2 - October 2020

Phrasing A2

Q1. As a percentage, what do you think has been the change in consumption prices over the last 12 months? (ie between Oct. 2019 and Oct. 2020)

Q2. As a percentage, what do you think will be the change in consumption prices over the next 12 months? (ie between Oct. 2020 and Oct. 2021)

Q3. As a percentage, what do you think will be the change in consumption prices between Oct. 2021 and Oct. 2022?

Phrasing B

Q1. As a percentage, what do you think is the current inflation rate in France?

Q2. As a percentage, what do you think the inflation rate will be in France in one year?

Q3. As a percentage, what do you think the inflation rate will be in France in two years?

Q4. As a percentage, what do you think the inflation rate will be in France in five years?

Wave 3 - November 2020

Phrasing A2

Q1. As a percentage, what do you think has been the change in consumption prices over the last 12 months? (ie between Nov. 2019 and Nov. 2020)

Q2. As a percentage, what do you think will be the change in consumption prices over the next 12 months? (ie between Nov. 2020 and Nov. 2021)

Q3. As a percentage, what do you think will be the change in consumption prices between Nov. 2021 and Nov. 2022?

We are now going to turn to average changes of (base) salaries in France, meaning (base) wages (excluding bonuses or benefits).

Q4. As a percentage, what do you think has been the change in the average (base) salaries in France over the last twelve months?

Q5. As a percentage, what do you think will be the change in the average (base) salaries in France over the next twelve months?

Phrasing B

Q1. As a percentage, what do you think is the current inflation rate in France?

Q2. As a percentage, what do you think the inflation rate will be in France in one year?

Q3. As a percentage, what do you think the inflation rate will be in France in two years?

Q4. As a percentage, what do you think the inflation rate will be in France in five years?

We are now going to turn to average changes of wages in France.

Q5. As a percentage, what do you think has been the change in the average wages in France over the last twelve months?

Q6. As a percentage, what do you think will be the change in the average wages in France over the next twelve months?

Wave 4 - December 2020

Phrasing B

Q1. As a percentage, what do you think is the current inflation rate in France?

Q2. As a percentage, what do you think the inflation rate will be in France in one year?

Q3. As a percentage, what do you think the inflation rate will be in France in two years?

Q4. As a percentage, what do you think the inflation rate will be in France in five years?

We are now going to turn to average changes of base wages in France.

Q5. As a percentage, what do you think has been the change in the average (base) salaries in France over the last twelve months?

Q6. As a percentage, what do you think will be the change in the average (base) salaries in France over the next twelve months?

Phrasing C

In November 2020, the inflation rate in France was 0.2%.

Q1. As a percentage, what do you think the inflation rate will be in France in one year?

Q2. As a percentage, what do you think the inflation rate will be in France in two years?

Q3. As a percentage, what do you think the inflation rate will be in France in five years?

We are now going to turn to average changes of base wages in France.

Q4. As a percentage, what do you think has been the change in the average (base) salaries in France over the last twelve months?

Q5. As a percentage, what do you think will be the change in the average (base) salaries in France over the next twelve months?

Wave 5 - May 2021

Phrasing D

Q1. As a percentage, what do you think is the current inflation rate in France?

Q2. As a percentage, what do you think the inflation rate will be in France in one year?

Q3. As a percentage, what do you think the inflation rate will be in France in two years? ***or*** *3 to 5 years ?* ***or*** *5 years?*

We are now going to turn to average changes of base wages in your firm.

Q4. As a percentage, what do you think will be the change in the average (base) salaries in your firm over the next twelve months?

Table A1. Initial sample composition (number of firms)

	All				Region: Hauts de France				Region: PACA			
	Construction	Industry	Services	**Total**	Construction	Industry	Services	**Total**	Construction	Industry	Services	**Total**
0 to 20 workers	34	22	160	**216**	10	10	75	**95**	24	12	85	**121**
21 to 50 workers	45	112	128	**285**	25	65	75	**165**	20	47	53	**120**
51 to 100 workers	19	67	67	**153**	9	48	32	**89**	10	19	35	**64**
101 to 200 workers	13	98	51	**162**	7	78	23	**108**	6	20	28	**54**
More than 201 workers	18	179	43	**240**	11	139	20	**170**	7	40	23	**70**
Total	**129**	**478**	**449**	**1056**	**62**	**340**	**225**	**627**	**67**	**138**	**224**	**429**

Note : The four monthly samples in 2020 were defined in each region by drawing one fourth of all firms, using a stratification by size and broad sector (industry, construction, services). In 2021, three quarters of all firms we drawn from the total sample in each region, using a stratification by size and broad sector.

Table A2. Sample composition of firms responding to the survey (number of firms)

	All				Region: Hauts de France				Region: PACA			
	Construction	Industry	Services	**Total**	Construction	Industry	Services	**Total**	Construction	Industry	Services	**Total**
0 to 20 workers	31	18	137	**186**	8	8	65	**81**	23	10	72	**105**
21 to 50 workers	42	100	111	**253**	23	61	67	**151**	19	39	44	**102**
51 to 100 workers	17	61	53	**131**	8	45	23	**76**	9	16	30	**55**
101 to 200 workers	12	89	41	**142**	6	71	17	**94**	6	18	24	**48**
More than 201 workers	14	162	35	**211**	8	129	17	**154**	6	33	18	**57**
Total	**116**	**430**	**377**	**923**	**53**	**314**	**189**	**556**	**63**	**116**	**188**	**367**

Note: The four monthly samples in 2020 were defined in each region by drawing one fourth of all firms, using a stratification by size and broad sector (industry, construction, services). In 2021, three quarters of all firms we drawn from the total sample in each region, using a stratification by size and broad sector.

Table A3. Response rate to the different questions

Response rate (%)	All - prices	Prices in general	Inflation		All - wages	Aggregate wages		Firms' wages
Information on past inflation	-	No	No	Yes		No	Yes	
Previous 12 months	88.4	87.3	88.9		94.4	94.3	94.6	-
Next 12 months	86.0	86.1	85.4	90.2	89.4	96.7	93.5	87.0
Two years ahead	78.6	76.4	79.5	84.8	-	-	-	-
5 years ahead	65.9	-	65.8	66.3	-	-	-	-
N	1,445	440	913	92	1,016	300	392	624

Note : Response rates are calculated as the ratio of the number of firms answering to the question over the number of firms contacted and that have accepted to answer to questions. N is the total number of firms surveyed for each type of survey phrasing.

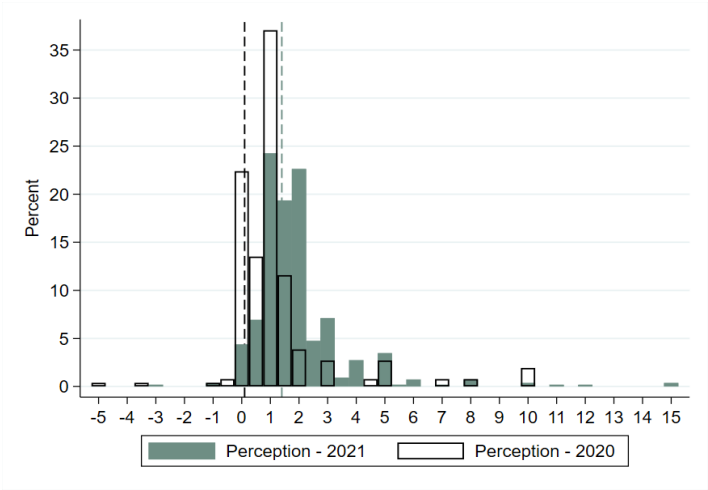
Table A4: Inflation Expectations of Managers (Firms vs Households surveys)

	Average	Median	Std.	N
PANEL A : BdF Firm survey				
Previous 12 months	1.8	1.3	2.4	1,196
Next 12 months	2.2	2.0	2.2	1,242
PANEL B: EC household survey				
All households				
Previous 12 months	5.0	3.0	5.5	8,673
Next 12 months	3.9	2.0	5.2	8,065
All managers (chief officers, all executive managers…)				
Previous 12 months	3.7	2.0	4.5	540
Next 12 months	2.7	1.5	4.1	550
CEO (firms with more than 10 employees)				
Previous 12 months	2.5	2.0	4.0	40
Next 12 months	1.9	1.0	2.6	37
Executive managers (administrative, engineers…)				
Previous 12 months	3.6	2.0	4.1	1,315
Next 12 months	3.0	2.0	4.2	1,270

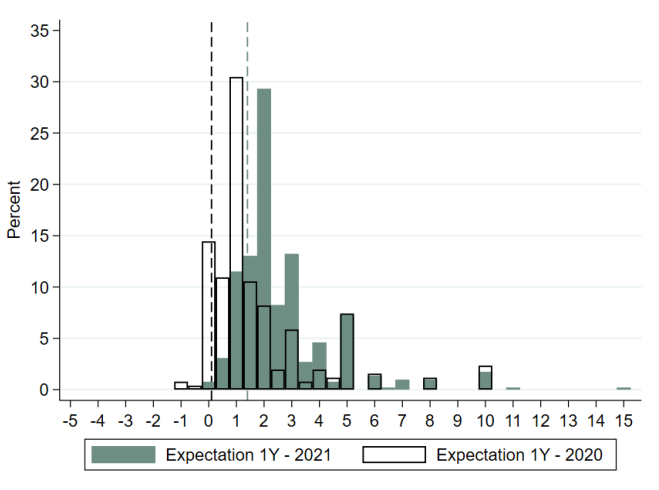
Notes: The table reports unweighted statistics using quantitative answers from the firms survey (Panel A) on perceived inflation (all waves, all formulations except the one using past information on inflation) and on expected inflation over a one-year horizon. Panel B reports unweighted statistics on inflation perceptions and expectations over a one-year horizon for households using the French Household Survey (CAMME –Insee). All answers larger than 20% in absolute values have been removed from the sample. The survey documents several variables for the job position/ status of the respondent, they do not fully overlap and we report results corresponding to these different qualitative variables. We use household data for the period 2020m09 to 2021m06 to cover a similar period as the one covered by the pilot firm survey.

Figure A5: Distributions of Perceived and Expected Price Inflation by Firms – Year 2020 vs Year 2021

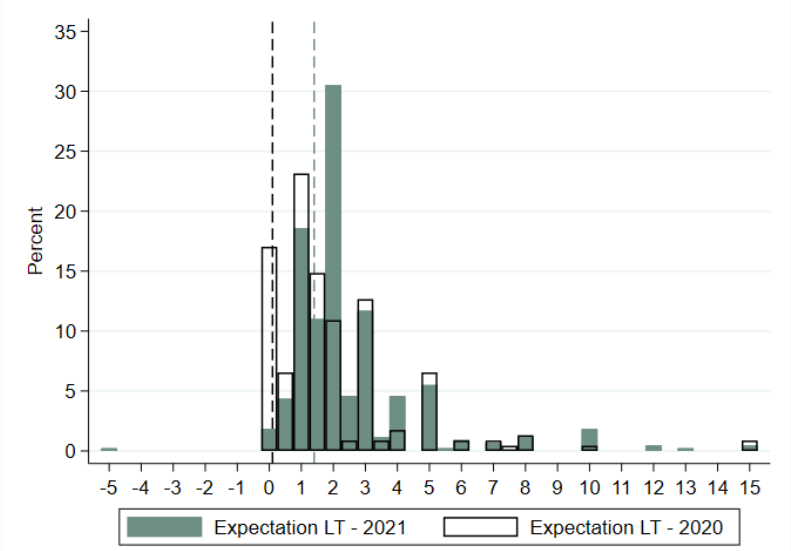
Panel A: Past inflation



Panel B: 1-year expectations



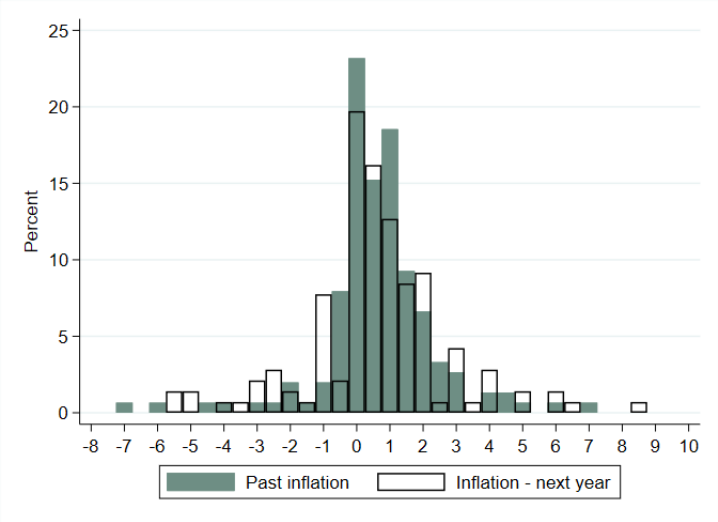
Panel C Long term expectations



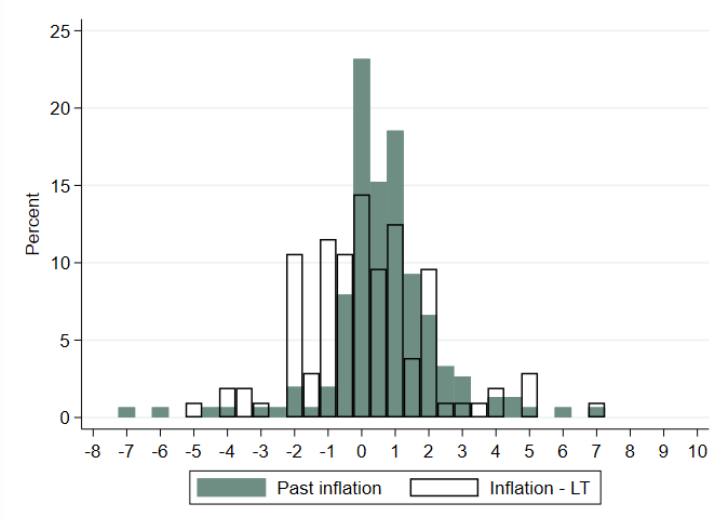
Notes: The figure plots the distributions of responses on perceived inflation (Panel A) collected in year 2020 (white histograms, waves 1 to 4) and in year 2021 (green histogram, wave 5), on expected one-year ahead inflation (Panel B) and long-term inflation (Panel C) for which we have used 2-year inflation expectation in 2020 and for the year 2021 we pooled answers to the different horizons (2-year, 3 t o5 years and 5 year horizon). In all graphs, we use answers to the question formulated in terms of inflation (without information). Dotted lines report actual HICP inflation rates for the years considered (2020: 0.1% and 2021 1.4%).

Figure A6: Distributions of Revisions in Perceived and Expected Wage and Price Inflation by Firms

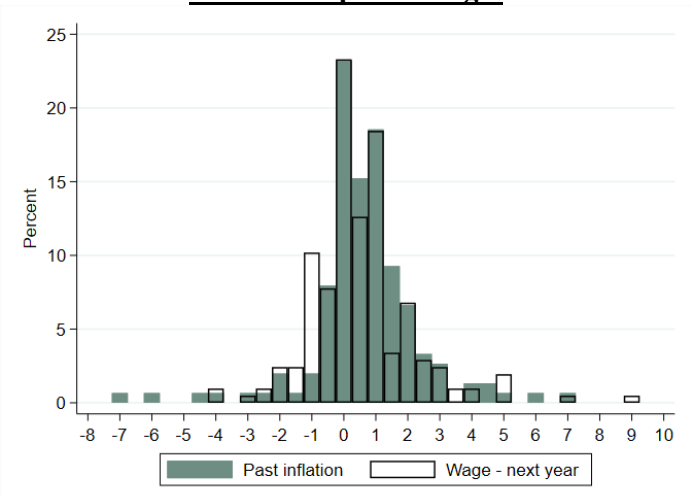
Panel A: Past inflation vs 1-year expectations



Panel B: Long term expectations



Panel C: Expected wages



Notes: For each firm answering twice to the questionnaire (ie in one of the waves in 2020 and in 2021), we have calculated revision as the difference between the answer provided in 2021 and the answer provided in 2020. The figure plots the distributions of revisions on perceived inflation and 1-year inflation expectations (Panel A) (using only revisions calculated using the formulation in terms of inflation for answers in 2020), perceived and long-term inflation (Panel B) where long term inflation refers to the pooling of answers 2-year, 3 to 5-year and 5-year horizons, perceived inflation and wage growth one-year expectation (Panel C) where the revisions are calculated using answers on aggregate wage growth in 2020 and firms' expected wage growth in 2021.

Appendix Table A7: Distribution of Revisions in Perceptions and Expectations

	Average	Median	SD	N
All wordings				
Inflation – last 12 months	0.2	0.4	2.7	385
Inflation – 1 year horizon	0.8	0.8	2.6	420
Inflation - Long-term expectations	0.3	0.3	2.5	204
Wages – 1 year horizon	0.5	0.5	1.6	206
Inflation wording				
Inflation – last 12 months	0.6	0.5	1.7	151
Inflation – 1 year horizon	0.6	0.5	2.1	142
Inflation - Long-term expectations	0.2	0.0	2.0	104
Wages – 1 year horizon	0.6	0.4	1.9	93

Notes: For each firm answering twice to the questionnaire (ie in one of the waves in 2020 and in 2021), we have calculated revision as the difference between the answer provided in 2021 and the answer provided in 2020. The Table reports statistics on the distribution of revisions. Top panel reports results using all formulations of questions for inflation (general prices or inflation) where the bottom panel restricts the sample of revisions to answers using only the inflation formulation (without information) for both years. Long term inflation refers to the pooling of answers 2-year, 3 to 5-year and 5-year horizons. For wage growth, the revisions are calculated using answers on aggregate wage growth in 2020 and firms' expected wage growth in 2021.

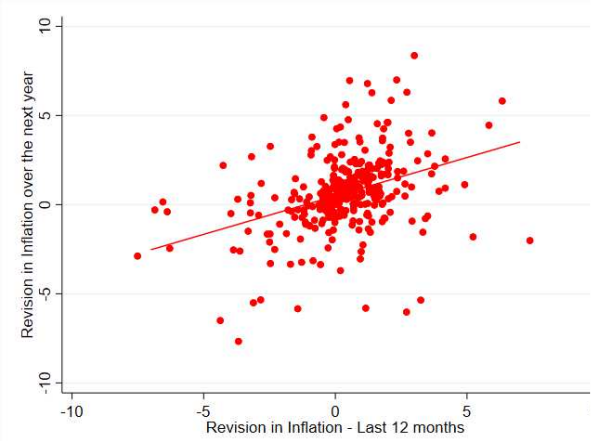
Table A8: Determinants of Revisions between 2020 and 2021

	Last year	Inflation one year ahead	Long term	Wages one year ahead
Sector				
Construction	-0.201	0.688*	0.054	0.610
	(0.300)	(0.353)	(0.455)	(0.491)
Manufacturing	-0.009	0.060	0.558	0.109
	(0.261)	(0.266)	(0.355)	(0.283)
Services	Ref	Ref	Ref	Ref
Size				
>50 employees	-0.162	-0.078	-0.392	0.167
	(0.262)	(0.246)	(0.347)	(0.252)
≤50 employees	Ref	Ref	Ref	Ref
Position				
CEO	Ref	Ref	Ref	Ref
CFO	-0.372	-0.214	0.765**	0.141
	(0.255)	(0.249)	(0.367)	(0.265)
Other	0.032	-0.147	0.800*	-0.305
	(0.263)	(0.300)	(0.415)	(0.259)
Question used				
Price	-0.439	0.040	-0.179	-0.025
	(0.276)	(0.316)	(0.473)	(0.272)
Inflation without info.	Ref	Ref	Ref	Ref
Inflation with info.	-	0.767**	1.406***	-0.626
		(0.321)	(0.363)	(0.416)
Firms' own prices				
Decrease	0.335	0.196	-0.379	
	(0.574)	(0.535)	(0.551)	
Stable	Ref	Ref	Ref	
Increase	0.420	0.374	0.140	
	(0.264)	(0.276)	(0.362)	
R2	0.039	0.057	0.119	0.094
# observations	373	412	200	206

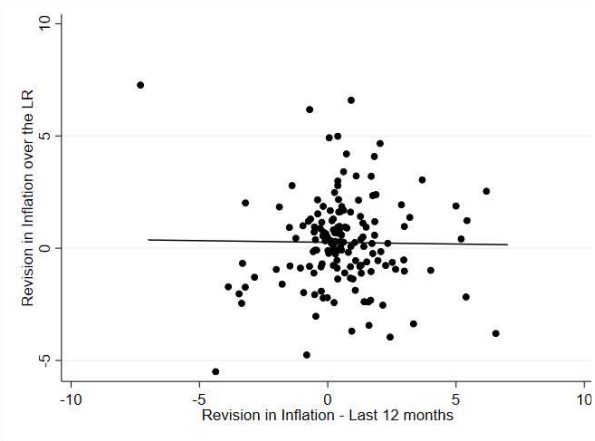
Notes: The table reports OLS results where the endogeneous variable is the revision of firm's perception or expectations. For each firm answering twice to the questionnaire (ie in one of the waves in 2020 and in 2021), we have calculated revision as the difference between the answer provided in 2021 and the answer provided in 2020. Long term inflation refers to the pooling of answers 2-year, 3 to 5-year and 5-year horizons. For wage growth, the revisions are calculated using answers on aggregate wage growth in 2020 and firms' expected wage growth in 2021. Statistical significance is indicated by *** for 1% ; ** 5% ; and * for 10%.

Figure A9: Correlation of Revisions in Perceived Inflation and Revisions in Expectations of Future Inflation

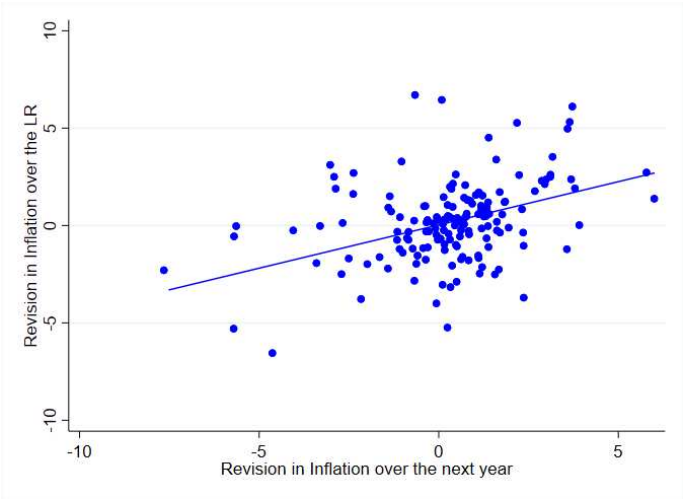
Panel A Revision over the next year vs over the last year



Panel B Revision over the long run vs over the last year



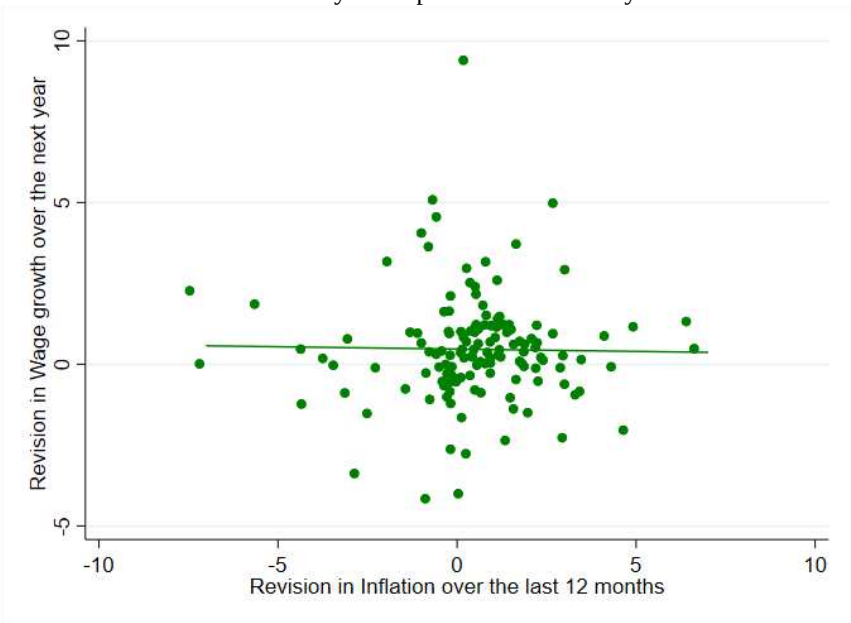
Panel B Revision over the long run vs over the next year



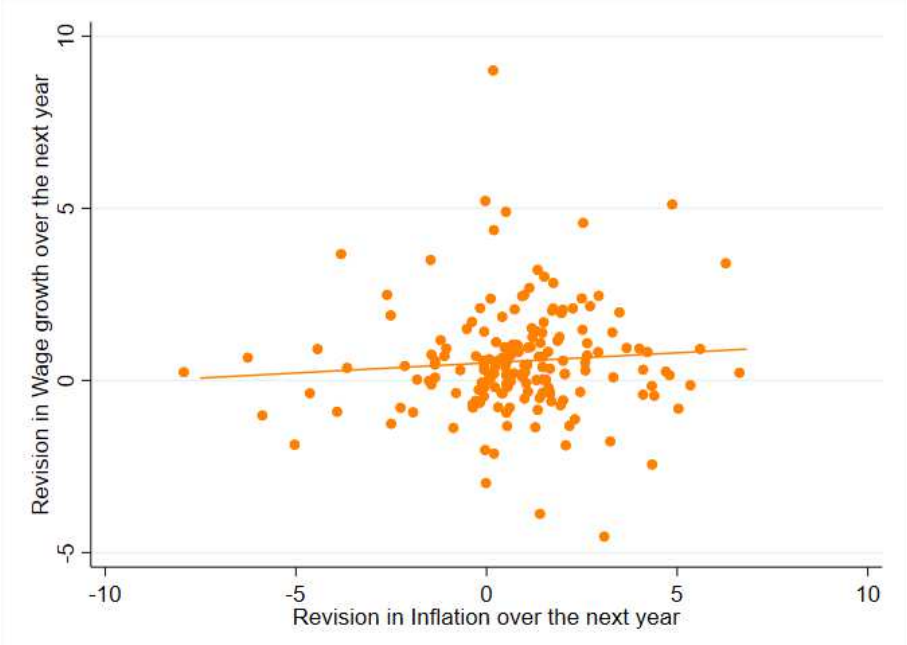
Notes: For each firm answering twice to the questionnaire (ie in one of the waves in 2020 and in 2021), we have calculated revision as the difference between the answer provided in 2021 and the answer provided in 2020. The Figure reports scatter plots comparing revisions of inflation expectations over the next year to perception over the past year (Panel A), revisions over the long run with revisions in perceived inflation (long term inflation refers to the pooling of answers 2-year, 3 to 5-year and 5-year horizons) (Panel B) and revisions in inflation expectation over the next year and revisions in long term inflation expectations.

Figure A10: Correlation of Revisions in Wage growth and Revisions in Inflation

Panel A Revision over the next year vs prices over the last year



Panel B Revision over the next year vs prices over the next year



Notes: For each firm answering twice to the questionnaire (ie in one of the waves in 2020 and in 2021), we have calculated revision as the difference between the answer provided in 2021 and the answer provided in 2020. For wage growth, the revisions are calculated using answers on aggregate wage growth in 2020 and firms' expected wage growth in 2021. The Figure plots revisions of wage expectations over the next year compared with revisions in perceived inflation (Panel A) and revisions in wage growth expectations compared with revisions in inflation over the next year.

Table A11 Determinants of Real Wage Growth Perceptions and Expectations

	Aggregate wage	Aggregate wage	Firms' wages	All wages
	Last year	One year ahead	One year ahead	One year ahead
Sector				
Construction	-0.456 (0.617)	-0.645 (0.523)	-0.123 (0.317)	-0.317 (0.279)
Manufacturing	0.522 (0.449)	0.336 (0.258)	0.367 (0.233)	0.361** (0.170)
Services	Ref	Ref	Ref	Ref
Size				
>50 employees	0.822 (0.529)	0.512* (0.288)	0.407* (0.227)	0.443** (0.178)
≤50 employees	Ref	Ref	Ref	Ref
Position				
CEO	Ref	Ref	Ref	Ref
CFO	-0.704 (0.435)	-0.403 (0.290)	-0.355 (0.226)	-0.365** (0.178)
Other	-1.639* (0.860)	-0.459 (0.386)	-0.148 (0.324)	-0.258 (0.248)
Question used				
Price	-0.742* (0.434)	-0.805** (0.387)	-	-0.829** (0.390)
Inflation without info.	Ref	Ref	-	Ref
Inflation with info.	-	0.776*** (0.218)	-	0.729*** (0.205)
Wave				
Nov 2020	-0.340 (0.397)	0.043 (0.300)		0.024 (0.299)
Dec 2020	Ref	Ref		Ref
May 2021	-	-		-0.414** (0.192)
R2	0.082	0.100	0.022	0.060
# observations	268	343	475	818

Notes: We report results of OLS regressions where the endogenous variable is the real wage growth perceived by firms' managers calculated as the difference between perceived or expected wage growth minus perceived or expected inflation over a one year horizon. Column 1 reports results using aggregate wage growth perception (waves 3 and 4 of the survey, excluding answers where firms were provided with information on past inflation), column 2 reports results using aggregate wage growth expectations (waves 3 and 4 of the pilot survey), column 3 reports results using answers on the firm-level expected wage growth (wave 5) and column 4 reports results pooling together answers on expected wage growth collected in waves 3, 4 and 5. All regressions also include region fixed effects. Statistical significance is indicated by *** for 1% ; ** 5% ; and * for 10%.

Table A12: Determinants of Wage Growth Perceptions and Expectations – Heterogeneity

	Aggregate wage		Firms' wages	All wages
	Last year	One year ahead	One year Ahead	One year ahead
Panel A: Position				
Firms' Aggregate Inflation Expectations interacted with:				
CEO	0.064	0.045	0.131*	0.096**
	(0.050)	(0.043)	(0.073)	(0.045)
CFO	0.013	0.018	0.038	0.023
	(0.053)	(0.044)	(0.044)	(0.032)
Other	0.026	0.081	-0.076	-0.010
	(0.029)	(0.056)	(0.047)	(0.037)
R2	0.067	0.046	0.058	0.094
Panel B: Sector				
Firms' Aggregate Inflation Expectations interacted with:				
Construction	0.053	-0.013	0.371**	0.197**
	(0.064)	(0.049)	(0.106)	(0.085)
Manufacturing	-0.001	0.075	-0.014	0.020
	(0.039)	(0.043)	(0.043)	(0.035)
Services	0.034	0.045	0.024	0.009
	(0.042)	(0.038)	(0.038)	(0.027)
R2	0.039	0.048	0.096	0.104
Panel C: Size				
Firms' Aggregate Inflation Expectations interacted with:				
>50 employees	0.027	-0.017	0.006	-0.009
	(0.055)	(0.032)	(0.032)	(0.023)
≤50 employees	0.010	0.099**	0.085	0.095**
	(0.029)	(0.049)	(0.058)	(0.040)
R2	0.034	0.061	0.046	0.096
# observations	268	343	475	818

Notes: We report results of OLS regressions where the endogenous variable is the quantitative answer on aggregate wage expectations (perceived – column 1 and expected column 2), on expected firm's wage growth (column 3) and taking answers on aggregate and firms' wage growth together (columns 4). All regressions also include sector, size, position, phrasing, date (wave) and region fixed effects (as in Table 7). Statistical significance is indicated by *** for 1% ; ** 5% ; and * for 10%.