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Inflation expectations of euro area consumers and firms

Conor Parle and Zivile Zekaite

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This *Economic Letter* examines what information is most relevant for the inflation expectations of consumers and firms in the euro area. We find that confidence in the economy is very important. However, the relationship between confidence and inflation expectations for consumers is negative, while it is positive for firms. Actual consumer price inflation, especially for food and energy, is also strongly associated with expectations of future inflation but to a varying degree. Producer price inflation is an important predictor of firms' expectations. In addition, employment expectations are relevant for firms and past economic situation plays a large role for consumers. Our results shed some light as to why euro area consumers' and firms' inflation expectations diverged at the start of the COVID-19 crisis.

Introduction

Inflation expectations are an important channel through which euro area monetary policy affects inflation.² Expected inflation can feed into actual inflation through economic and financial decisions of households and firms, such as consumption, investment, price and wage setting. Macroeconomic theory suggests that if economic agents expect higher future inflation, this should lower real interest rates and stimulate current consumption, assuming current consumption depends negatively on real interest rates.³ Nevertheless, the relationship between spending and inflation expectations could also be negative. This can occur if consumers associate higher future inflation with a negative effect on their future spending power (lower interest rate on savings) or with negative economic outcomes leading to higher precautionary savings (Dräger and Nghiem, 2020).

Prices can change due to different shocks hitting the economy. Shocks to demand push inflation and output in the same direction, while shocks to supply, i.e. production in the economy, tend to push them in different directions. Therefore, the economic context and interpretation by different agents matter for how expectations are formed. If consumers and firms expect higher prices but simultaneously expect worsening economic conditions, higher inflation expectations need not necessarily lead to higher consumption today resulting in stronger economic growth. Consumption,

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² The primary objective of the European Central Bank is to maintain price stability, defined as overall consumer price inflation of below, but close to, 2%. Inflation rates are calculated as percentage year-on-year changes in the Harmonised Index of Consumer Prices (HICP).

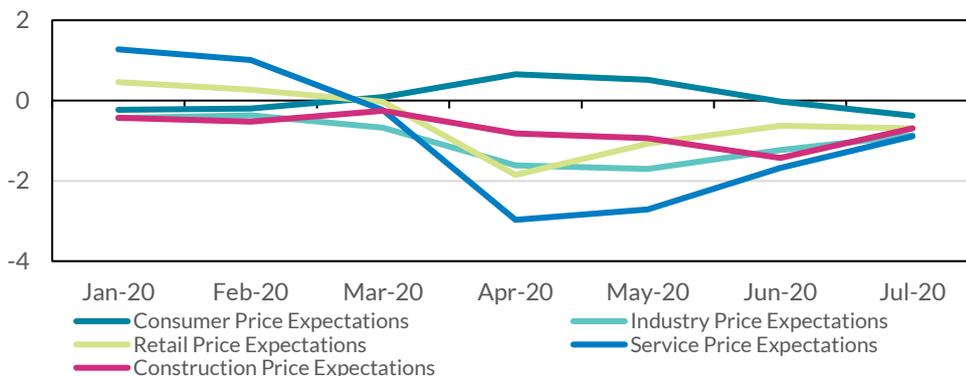
³ In this case, the substitution effect (higher consumption today as returns on savings fall) is greater than the income effect (consumption decreases due to lower income on savings).

investment and employment may decline instead. For instance, Candia et al. (2020) show that households in advanced economies tend to have such a “supply-side interpretation” of news about inflation, i.e. higher inflation is associated with worse economic outcomes. In contrast, a “demand-side” view associates good economy with higher inflation due to demand-driven price inflation. This pattern is also observed for the six largest euro area countries over the period between January and June 2020 (Candia et al., 2020). Their evidence for firms in selected countries is mixed.

Therefore, it is important to understand how households and firms form their inflation expectations since they are relevant for monetary policy transmission to the economy. In general, many factors can influence inflation expectations of different agents, including actual inflation, socio-demographic factors, views about the economy and knowledge of the central bank’s objective. In comparison with professional forecasters, expectations of firms and households are typically less in line with a central bank’s price stability objective, more volatile and exhibit a high degree of dispersion among different firms and households (Kumar et al., 2015; Tenreyro, 2019).

The COVID-19 crisis provides a good example of when such an understanding is crucial. According to the European Commission’s surveys, short-term inflation expectations of euro area consumers and firms moved in opposite directions at the onset of the pandemic (see Figure 1).⁴ Against the backdrop of a common negative economic shock and a sharp fall in confidence, firms interpreted this as having a negative impact on future prices, while consumers expected price increases. Thus, higher consumers’ inflation expectations may not lead to higher consumption today, as suggested by economic theory. As economic conditions improved and confidence partially recovered throughout June and July, consumers’ inflation expectations fell, and firms’ inflation expectations rose.

Figure 1. Euro area inflation expectations of consumers and firms



Notes: data are obtained from the European Commission’s Business and Consumer surveys. For consumers, the expectations relate to a forward-looking assessment of consumer price changes in the following twelve months in comparison to the past twelve months, and for firms the question relates to expected selling prices in the following three months. All data are normalised (mean of zero, standard deviation of one, sample stretches from January 1985 to July 2020⁵).

⁴ The European Commissions surveys ask about how prices will change in the future. We take the balance statistic of responses to these questions as a proxy for inflation expectations. See the data section for details.

⁵ Some series are shorter but are normalised using data from series start.

Consequently, this *Economic Letter* aims to answer the following questions. First, what factors may be relevant in general for the formation of inflation expectations of consumers and firms in the euro area? Second, do these factors help explain the “diverging dynamics” of inflation expectations during the COVID-19 crisis or did different factors become important during the initial phase of the pandemic?

While our findings do not imply causal relationships, they provide evidence that firms and consumers form their inflation expectations differently, especially with regard to respective confidence indicators, but also in relation to previously observed prices. We confirm that the findings of Candia et al. (2020) are valid for euro area consumers, not only for the most recent period, but more generally also. We add to their study by providing the results for euro area firms across sectors. This has implications for the use of inflation expectations as a monetary policy tool in itself, and suggests that there is a role for clearer communication to steer public expectations.

The next section describes the data used and methodology. We then discuss the results, alongside potential policy implications, and conclude.

Data and Methodology

We consider several macroeconomic and survey variables as potential predictors of euro area inflation expectations of consumers and firms. We look at firms operating in different economic sectors: construction, retail, services and industry (manufacturing). All data are monthly and cover the period from August 2003 to May 2020. For firms in the services and retail sectors the period begins later (June 2006), due to data limitations for producer price inflation. Note that the aim here is to assess the associations of different information with inflation expectations rather than make strong causal statements about relationship between inflation expectations and other survey variables.

Our measures of inflation expectations are obtained from the European Commission’s Business and Consumer surveys and reflect aggregated country-level information. Consumers are asked about expected *consumer price developments* over the next *twelve* months, while firms are asked about their expected *selling price developments* over the next *three* months.⁶ The balance statistic that shows the gap between a share of respondents who expect prices to “increase” and those who expect them to “decrease” is a dependent variable in a given regression model (these data are shown in Figure 1). We estimate five models, i.e. one for each respondent group.

Previous studies have shown that consumer sentiment correlates negatively with their inflation expectations (Berge, 2017). Ehrmann et al. (2017) show that consumers with a difficult financial situation (current or expected) and with pessimistic views about future economic situation tend to have higher

⁶ One caveat here, which unfortunately cannot be overcome, is that the difference in the time horizon of inflation expectations may reduce the comparability of the results somewhat.

inflation expectations. Thus, the first group of predictors in each model includes a sector-specific confidence indicator (COF) produced by the European Commission based on the selected survey questions. It also includes the remaining survey questions that refer to the assessment of unemployment, firms' production, consumers' financial situation, etc. For consumers, we omit the assessment of past price changes as we include realised inflation figures, although the main results remain broadly unchanged if we do not omit this variable.⁷ The full list of the questions used in each model is provided in the Appendix.

Actual observed prices may also be important when consumers form inflation expectations (Trehan, 2011; Kumar et al., 2015; D'Acunto et al., 2019). The second group of predictors hence consists of lagged inflation rates of the 94 sub-indices of the HICP. Data are sourced from Eurostat. The knowledge of recent consumer price inflation figures is also likely to influence firms' future pricing decisions. Kumar et al. (2015) find that firms' managers may also rely on their personal shopping experience when forming their inflation expectations, hence it may be warranted to include consumer price inflation also in the models for firms.

For firms, we also add lagged sector producer price inflation (PPI) based on Eurostat data to account for prices specific to these sectors. For the industry (construction) sector, we include industry (construction) PPI. For the retail and services sectors, we use both the services and industry PPIs.⁸

Finally, to control for the impact of monetary policy conditions and fiscal policy we include a lagged shadow interest rate (SR) for the euro area and a lagged change in euro area debt to GDP ratio (DR), interpolated linearly to monthly frequency.⁹

The model specification is as follows:

$$\begin{aligned} InflExp_{i,t} = & \beta_0 + \Omega SurveyResponses_{i,t} + \Gamma HICPInflation_{i,t-1} \\ & + \Theta SectorProducerPriceInflation_{i,t-1} + \\ & + \Psi SR_{i,t-1} + \Upsilon \Delta DR_{i,t-3} + \epsilon_{i,t} \end{aligned} \quad (1)$$

where $InflExp_{i,t}$ represents the balance statistic for inflation expectations of a respondent group i , i.e. either consumers or firms in a specific sector, at time t .

We use an elastic net regularisation approach to estimate the above coefficients (see Zou and Hastie, 2005). This method is very useful with models like ours, which have many predictors that are strongly correlated over a relatively short sample. The elastic net approach shrinks coefficients of those predictors that are redundant to zero and identifies the most important predictors (for details, see also Zekaite, 2020). All data is normalised prior to the estimation.

⁷ For instance, Zekaite (2020) demonstrates that consumers' perceived inflation is strongly affected by actual observed inflation rates. However, if we do include this question, the key predictor becomes inflation perceptions, which appear to be relatively more important than other key variables, but the main results remain broadly unchanged.

⁸ Services and construction PPI data are quarterly and are thus interpolated linearly to monthly frequency.

⁹ Data on shadow rates are available at Leo Krippner's website [here](#).

Results

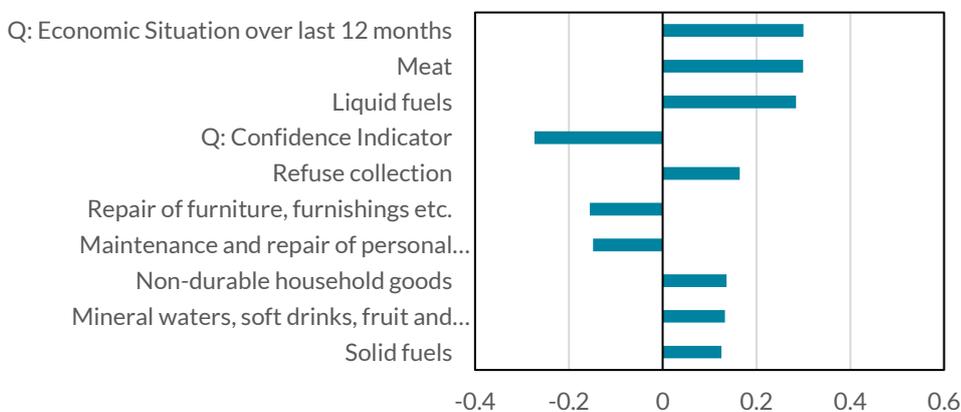
Due to the normalisation of data, the absolute value of the estimated coefficients reflect the relative importance of each predictor in the inflation expectations formation process. We report the ten largest coefficients (according to their absolute value) for the consumers' model in Figure 2 and for the firms' models in Figure 3.

Four equally important variables that are most strongly associated with consumer inflation expectations are: past economic situation, meat and liquid fuel price inflation, and consumer confidence. The next six predictors all have smaller coefficients and relate to HICP items, reflecting the role of observed inflation for consumer inflation expectations.

Most variables have positive coefficients, as would be expected.¹⁰ A negative coefficient for consumer confidence is in line with its negative unconditional correlation (although somewhat weak at -0.1). Lower confidence is thus associated with higher prices in the future.

In order to explain this result in more detail, we run the same model but this time we disaggregate the consumer confidence indicator into its separate questions.¹¹ Two out of four confidence components appear among the top 10 predictors; the general economic situation over the next 12 months and financial situation over the next 12 month both have a negative relationship with inflation expectations.

Figure 2. Top 10 predictors of consumers' expectations



Notes: This figure shows the results of the elastic net regularisation regression in equation (1) for consumers. The horizontal bars denote the 10 largest coefficients. In each case entries preceded by "Q:" refers to a question from the EC survey. All other entries are HICP components.

It should be noted that future economic expectations tend to correlate negatively with inflation expectations while observed past economic situation correlates positively. This contrasting relationship is open for further research into the dynamics of differences in the impact of future expectations and past observations. Moreover, it further motivates the role

¹⁰ Two HICP components have negative coefficients but their unconditional correlations with expectations are positive, highlighting a limitation of the elastic net method to completely address all cross correlations of independent variables.

¹¹ The results are not reported here to preserve space. We also carry out this exercise for firms. The main findings with respect to other predictors remain broadly unchanged.

that monetary authorities can play in clear communication of macroeconomic relationships.

Moving on to the results for firms, the top left panel in Figure 3 shows the results for the construction sector. The sector-specific confidence is by far the most important predictor and is positively related to inflation expectations. Past building activity, liquid fuel price inflation and insufficient demand also appear to be important factors, albeit to a much smaller degree, weighing positively (past activity and fuel prices) and negatively (insufficient demand) on inflation expectations. The rest of coefficients are quite small and relate to several HICP sub-components and factors limiting the production. If the confidence indicator is disaggregated, future employment expectations and evolution of current overall order books come at the top among all predictors, both with positive coefficients. However, the coefficient of employment expectations is nearly twice larger.

In the services sector (top right panel in Figure 3), the largest coefficients are associated with future employment expectations and with the confidence indicator, both being positive. In addition, several HICP items have positive and relatively large coefficients, suggesting a role of past inflation in inflation expectations, with liquid fuels once again playing a prominent role. The results also indicate a role for services PPI, which has a positive relationship with expectations. In terms of confidence indicator's components, two of the three are driving the overall effect. Expectations of future demand and past demand conditions both are positively associated with inflation expectations, with the former playing a greater role.

The top predictor of retail sector inflation expectations (bottom left panel in Figure 3) is future orders' expectations, although a number of other factors are also relatively important, predominantly with positive coefficients. Among those are several HICP sub-components, including liquid fuels, confidence indicator and industry PPI. The confidence effect is explained by past business activity (sales), which is positively associated with inflation expectations.

For industry (see the bottom right panel in Figure 3), future employment expectations, price inflation of liquid fuels and overall confidence each are strongly positively associated with firms' inflation expectations. A smaller role is also observed for recent production trends and several HICP items as well as for industry PPI. The positive effect of confidence is mostly explained by the assessment of stocks of finished products (negative coefficient)¹² and by the assessment of order-book levels (positive coefficient). The third components of the confidence indicator, i.e. production expectations for the months ahead, also has a positive relationship but is less important.

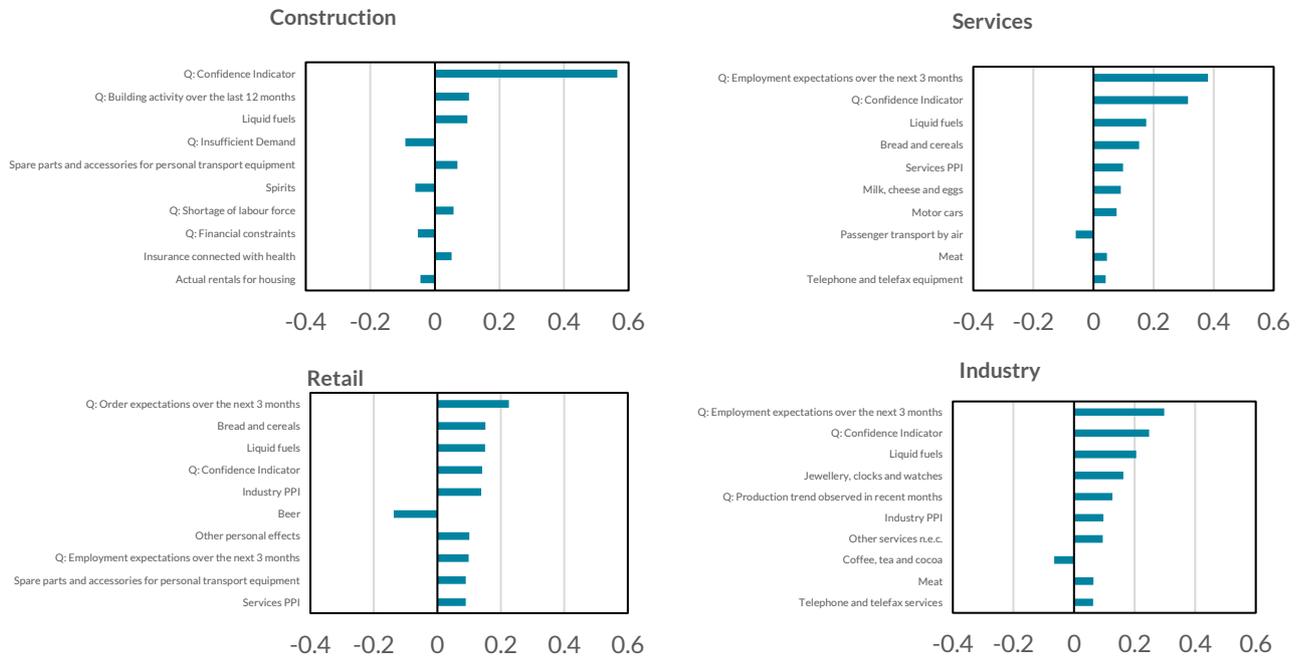
The main results discussed above also hold after excluding the period of COVID-19 from the sample, i.e. the months after January 2020. Thus, our findings are not driven by only a couple of months at the end of the period.

Our key findings can be summarised as follows. Firstly, confidence is highly important for all groups of respondents, but it affects inflation expectations of consumers in a different way as compared with firms. The negative

¹² This question is given a negative sign in the construction of the confidence indicator.

relationship between inflation expectations and confidence for consumers is in line with Candia et al. (2020). Similar results have also been reported in other studies (Berge, 2017; Ehrmann et al., 2017).

Figure 3. Top 10 explanatory variables of firms' expectations



Notes: These figures show the results of the elastic net regularisation regressions outlined in the previous section. The horizontal bars denote the 10 largest coefficients. In each case entries preceded by “Q:” refers to a question from the EC survey. All other entries are HICP components.

Secondly, changes in the growth rate of the HICP components play a role in the formation of inflation expectations. Energy price inflation matters for all survey respondents. Higher energy prices are associated with higher expected future consumer/selling prices. As energy prices are highly important in production, this is not surprising. Food price inflation is also relevant for consumers and to a smaller extent for firms, with the exception of the construction sector where it plays no role. These results are in line with existing literature (Trehan, 2011; Kumar et al., 2015). Non-energy and non-food HICP components generally play some role for the dynamics of inflation expectations, although they are less important for the construction sector. Similarly, sector’s producer price inflation is also typically among the most important predictors of firms’ inflation expectations.

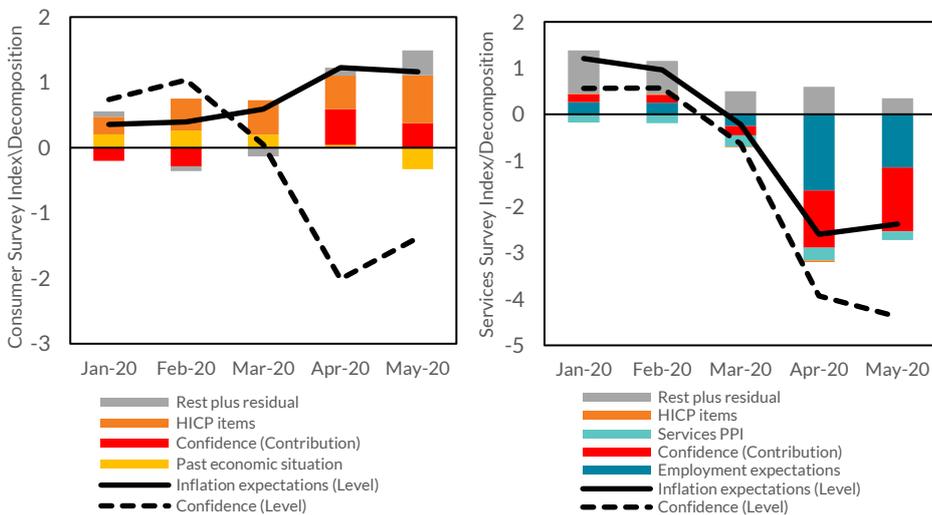
Finally, labour market conditions seem to be more important for firms than for consumers. Some measure of labour market conditions features among the most important factors for all firms. Increasing selling prices are associated with higher future firms’ employment expectations. In contrast, (un)employment does not feature among the top predictors of consumers’ inflation expectations.

Overall, the results shed some light on the divergence between firms’ and consumers’ inflation expectations during the beginning of COVID-19 crisis. The largest single month fall in confidence across all sectors was recorded in April that lead to higher inflation expectations of consumers but lower

expectations of firms. Employment expectations of firms dropped sharply dragging down their inflation expectations further. Meanwhile, consumers' expectations regarding future unemployment do not appear to matter significantly for their inflation expectations (although they increased sharply). At the same time, food price inflation rose sharply affecting consumer to a larger extent than firms. Lower energy inflation, which plays a larger role for consumers, is likely to have partially offset this effect.

These effects that are creating a divergence between inflation expectations are reflected in Figure 4. It shows the historical decomposition of inflation expectations for consumers' and firms in the aggregate services sector. The services sector is chosen as an example due to being more negatively affected by the pandemic and showing a larger divergence from consumers (see Figure 1).¹³

Figure 4. Decomposition of inflation expectations during COVID-19 (LHS: Consumer Survey, RHS Services Survey)



Notes: This figure shows the decomposition of inflation expectations of consumers' (left panel) and firms' in the services sector (right panel) in January 2020 - May 2020. Each bar shows the individual contributions of top 10 predictors (HICP items are grouped together) and a combined contribution of all the rest of predictors, including a residual. Solid (dashed) black line depicts inflation expectations (sector-specific confidence indicator). All data are normalised to have a zero mean and a standard deviation of one.

Conclusion

This letter examines what information helps to explain consumers' and firms' inflation expectations in the euro area. Our results also shed some light on the divergence observed between inflation expectations of consumers and firms in all sectors at the onset of the COVID-19 crisis.

Confidence is strongly associated with inflation expectations for both consumers and firms. However, consumers' confidence tends to move

¹³ This is confirmed by recent euro area Purchasing Managers' Index data published by IHS Markit, where it was seen that the services sector experienced a greater negative shock than manufacturing, and this shock persisted for longer.

negatively with inflation expectations, while firms' confidence is positively related to expectations. Consumers associate increasing prices with worse expected general economic situation and worse future financial situation of their own. The sub-components of consumer price inflation and producer price inflation also appear to be important for inflation expectations, especially food and energy price inflation. For firms, another important factor positively associated with inflation expectations is their employment expectations. At the same time, unemployment expectations do not feature as a key factor in the model for consumers.

Our results also shed light on the relationship between consumption and inflation. In a standard Euler equation model, consumption today depends positively on future consumption and negatively on real interest rates (hence implicitly positively on inflation). Based on our findings higher inflation and consumption expectation may not spur consumption in the current period by as much as was previously expected.

This may have some implications for monetary policy that aims to increase inflation expectations to encourage higher consumption and investment spending as a result of lower real interest rates. Moreover, as actual inflation matters for inflation expectations this underscores the importance of acting to stabilise the economy. However, a great deal more research needs to go into understanding how inflation expectations of consumers and firms are formulated and how they affect consumption and investment decisions to fully understand monetary policy implications.

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Appendix

Table A1. Questions included as independent variables in the elastic net regression

Sector	Questions
Consumer	<p style="text-align: center;">Confidence Indicator:</p> <ul style="list-style-type: none"> • How has the financial situation of your household changed over the last 12 months? (+) • How do you expect the financial position of your household to change over the next 12 months? (+) • General economic situation over next 12 months (+) • Compared to the past 12 months, do you expect to spend more or less money on major purchases over next 12 months? (+)
	<p style="text-align: center;">Remaining questions:</p> <ul style="list-style-type: none"> • How do you think the general economic situation in the country has changed over the past 12 months? • How do you expect the number of people unemployed in this country to change over the next 12 months? • In view of the general economic situation, do you think that now is the right moment for people to make major purchases such as furniture, electrical/electronic devices, etc.? • In view of the general economic situation, do you think that now is a very good/fairly good/not good/very bad moment to save? • Over the next 12 months, how likely is it that you save any money? • Statement on financial situation of household
Industry	<p style="text-align: center;">Confidence Indicator:</p> <ul style="list-style-type: none"> • Do you consider your current overall order books to be... (more than sufficient, sufficient, not sufficient)? (+) • Do you consider your current stock of finished products to be... (too large, adequate, not sufficient)? (-) • How do you expect your production to develop over the next 3 months? (+)
	<p style="text-align: center;">Remaining questions:</p> <ul style="list-style-type: none"> • How has your production developed over the past 3 months? • Do you consider your current export order books .. (more than sufficient/sufficient/not sufficient)? • How do you expect your firm's total employment to change over the next 3 months?
Services	<p style="text-align: center;">Confidence Indicator:</p> <ul style="list-style-type: none"> • How has your business situation developed over the past 3 months? (+) • How has demand (turnover) for your company's services changed over the past 3 months? (+) • How do you expect the demand (turnover) for your company's services to change over the next 3 months? (+)
	<p style="text-align: center;">Remaining questions:</p> <ul style="list-style-type: none"> • How has your firm's total employment changed over the past 3 months? • How do you expect your firm's total employment to change over the next 3 months?

Source: European Commission (2020).

Table A1. Cont.

Sector	Questions
Retail	<p style="text-align: center;">Confidence Indicator:</p> <ul style="list-style-type: none"> • How has (have) your business activity (sales) developed over the past 3 months? (+) • Do you consider the volume of stock you currently hold to be... (too large, adequate, too small)? (-) • How do you expect your business activity (sales) to change over the next 3 months? (+)
	<p style="text-align: center;">Remaining questions:</p> <ul style="list-style-type: none"> • How do you expect your orders placed with suppliers to change over the next 3 months? • How do you expect your firm's total employment to change over the next 3 months?
Construction	<p style="text-align: center;">Confidence Indicator:</p> <ul style="list-style-type: none"> • Do you consider your current overall order books to be... (more than sufficient, sufficient, not sufficient)? (+) • How do you expect your firm's total employment to change over the next 3 months? (+)
	<p style="text-align: center;">Remaining questions:</p> <ul style="list-style-type: none"> • How has your building activity developed over the past 3 months? • What main factors are currently limiting your building activity? 1. None 2. Insufficient Demand 3. Weather Conditions 4. Shortage of Labour Force 5. Shortage of Material/Equipment 6. Other Factors 7. Financial Constraints¹⁴

Source: European Commission (2020).

¹⁴ Each of these sub-responses creates a new sub-index denoted 2.1 to 2.7 in results depending on frequency of responses.



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