BUSINESS AND CONSUMER UNCERTAINTY DURING THE PANDEMIC: A SECTOR ANALYSIS IN EUROPEAN COUNTRIES

Oscar Claveria[1]

[1] AQR-IREA, University of Barcelona, Barcelona, Spain, oclaveria@ub.edu.

Abstract. This paper examines the evolution of business and consumer uncertainty at sector level amid the coronavirus pandemic in 32 European countries and the European Union. Since uncertainty is not directly observable, we approximate it using a geometric discrepancy indicator. This approach allows us quantifying the proportion of disagreement in business and consumer expectations of 32 countries. We have used information from all monthly forward-looking questions contained in the *Joint Harmonised Programme of Business and Consumer Surveys* conducted by the European Commission: the industry survey, the service survey, the retail trade survey, the building survey and the consumer survey. First, we have calculated a discrepancy indicator for each of the 17 survey questions analysed, which allows approximating the proportion of uncertainty about different aspects of economic activity, both form the demand and the supply sides of the economy. We then use these indicators to calculate disagreement indices at the sector level. We graphic the evolution of the degree of uncertainty in the main economic sectors of the analysed economies up to June 2020. We observe marked differences, both across variables, sectors and countries since the inception of the COVID-19 crisis. Finally, by adding the sectoral indicators, an indicator of business uncertainty is calculated and compared with that of consumers. Again, we find substantial differences in the evolution of uncertainty between managers and consumers. This analysis seeks to offer a global overview of the degree of economic uncertainty in the midst of the coronavirus crisis at the sectoral level.

Keywords: COVID-19; Economic Uncertainty; Economic Activity; Prices; Employment; Expectations; Disagreement.

1. Introduction

The analysis of economic uncertainty gains renewed interest since the advent of the coronavirus pandemic and the subsequent economic disruption caused by the lockdown. There is ample evidence that uncertainty shocks have an effect on real activity (Baker et al. 2016; Bloom 2009). Since economic uncertainty is not directly observable, several strategies have been designed to proxy it by: a) using the realized volatility in equity markets (Bekaert et al. 2013; Caggiano et al. 2014), b) estimating econometric unpredictability –understood as the conditional volatility of the unforecastable components of a broad set of economic variables (Jurado et al. 2015; Lanzilotta et al. 2023; Meinen & Roehe 2017)–, and c) computing survey-derived measures of expectations dispersion (Clements & Galvão 2017; Krüger & Nolte 2016; Krüger & Pavlova 2023). The ex-ante nature of this latter approach has generated a growing current in the literature based on this type of metrics (Dovern 2015; Mankiw et al. 2003).

Disagreement measures based on survey expectations make use of prospective information, as agents are asked about the expected future evolution of a wide range of variables. While most studies rely on quantitative macroeconomic expectations made by professional forecasters (Lahiri & Sheng 2010; Oinonen & Paloviita 2017; Zhao 2022), an alternative source of survey expectations are business and consumer tendency surveys, which are increasingly used to proxy economic uncertainty via disagreement in agents' expectations (Binding & Dibiasi 2017; Claveria & Sorić 2023; Das et al. 2019). See Grimme et al. (2014) for the evaluation of a combination of different types of measures.

The European Commission (EC) conducts monthly business and consumer tendency surveys in which respondents are asked whether they expect a set of economic variables to rise, fall or remain unchanged. We use all the forward-looking information coming from these surveys to proxy economic uncertainty in 32 European countries and the European Union (EU). To this end, we use Claveria's (2021) geometric indicator of discrepancy to compute the proportion of disagreement among firms and households.

Given that survey expectations: (a) are based on the knowledge of respondents operating in the market, (b) provide detailed information about a wide range of economic variables, and (c) are available ahead of the publication of official quantitative data, the proposed approach to measure economic uncertainty allows us to give a quick snapshot of economic uncertainty amid the COVID-19 pandemic in real time.

The main aim of the study is to provide some insight regarding the recent evolution of uncertainty across economic sectors, economic agents and countries, both from the demand and the supply sides of the economy. As pointed out by Castelnuovo (2022), sectoral data represents a valuable source of information to shed light on the channels responsible of the transmission of uncertainty shocks to the real economy. However, there are practically no studies in the literature that approximate economic uncertainty at a sectoral level. Castelnuovo et al. (2022) employed data on industrial production coming from a variety of production sectors in the United States to estimate sector-specific models. Ma and Samaniego (2019) used firm-level forecast errors on earnings-per-share to estimate sectoral-specific uncertainty, and Segal (2019) proxied uncertainty for the consumption and investment sectors using measures of volatility.

To the best of our knowledge, this is the first attempt to approximate economic uncertainty at a sectoral level by means of business and consumer survey expectations. The remainder of this paper is structure as follows. Next section describes the data and describes the methodological approach to compute disagreement among agents. A graphical analysis is provided in Section 3. Section 4 discusses the results. Finally, Section 5 concludes and provides some recommendations for future research.

2. Data and Methodology

In order to approximate economic uncertainty at a sectoral level, in this study we make exclusive use of firms' and consumers' qualitative expectations collected by the EC as part of the *Joint Harmonised Programme of Business and Consumer Surveys*. These surveys provide information on agents' expectations regarding a wide range of variables. Business managers and consumers are asked both about their perception of the recent evolution of economic variables (backward-looking questions), as well as the expected evolution of said variables (forward-looking questions). Specifically, we use all forward-looking monthly raw data from all business and consumer surveys conducted by the EC (see Table 1).

Industry survey
I5 – Production expectations for the months ahead
I6 – Selling price expectations over the next 3 months
I7 – Employment expectations over the next 3 months
Service survey
S3 – Expectation of the demand over the next 3 months
S5 – Expectations of the employment over the next 3 months
S6 – Expectations of the prices over the next 3 months
Retail trade survey
R3 – Orders expectations over the next 3 months
R4 – Business activity expectations over the next 3 months
R5 – Employment expectations over the next 3 months
R6 – Prices expectations over the next 3 months
Building survey
B4 – Employment expectations over the next 3 months
B5 – Prices expectations over the next 3 months
Consumer survey
C2 – Financial situation over next 12 months
C4 – General economic situation over next 12 months
C6 – Price trends over next 12 months
C7 – Unemployment expectations over next 12 months
C9 – Major purchases over next 12 months

Table 1 Survey indicators

The sample period goes from 2016.M5 to 2020.M2, since we wanted to focus on the evolution of disagreement during the months previous to the coronavirus pandemic. This allowed us to include all the available information from all the surveys in all the 32 economies in which the surveys are now conducted. This is the first study that includes Montenegro, North Macedonia, Albania, Serbia and Turkey, which were recently added to the survey.

In business surveys, respondents are asked about their expectations regarding firm specific factors such as production, selling prices and employment and, they are faced with three options: "up", "unchanged" and "down". P_t measures the share of respondents reporting an increase in the variable, E_t no change, and M_t a decrease. The most common way of presenting survey data is the balance, B_t, which is computed as the subtraction between the two extreme categories: $B_t = P_t - M_t$.

Consumers, for their part, are asked about objective variables (e.g. how they think the general economic situation in the country will change over the next twelve months) and subjective variables (e.g. major purchases, savings, etc.). Consumers have three additional response categories: two at each end ("a lot better/much higher/sharp increase", and "a lot worse/much lower/sharp decrease"), and a "don't know" option. As a result, PP_t measures the percentage of respondents reporting a sharp increase in the variable, P_t a slight increase, E_t no change, M_t a slight fall, MM_t a sharp fall and, N_t don't know.

The most widespread measures of disagreement among survey respondents use the dispersion of balances as a proxy for uncertainty (Bachmann et al. 2013; Girardi & Reuter 2017; Mokinski et al. 2015). Bachmann et al. (2013) proposed an indicator of disagreement based on the square root of the variance of the balance:

$$\text{DISP}_t = \sqrt{P_t + M_t - (P_t - M_t)^2} \qquad (1)$$

See Dibiasi and Iselin (2021) for a comparison of (1) to Theil's disconformity coefficient (Theil 1955) and analysis of firms' direct perception of investment uncertainty. By means of a simulation experiment, Claveria et al. (2019) showed that the omission of neutral responses in (1) resulted in an overestimation of the level of disagreement. As a result, the authors developed a discrepancy metric that incorporated the information coming from all three reply options (P, M and E):

$$\text{DISC}_t = 1 - \left[\frac{\sqrt{\left(P_t - 1/3\right)^2 + \left(E_t - 1/3\right)^2 + \left(M_t - 1/3\right)^2}}{\sqrt{2/3}} \right] \qquad (2)$$

Claveria (2018; 2021a) extended this methodology for a larger number of reply options. Assuming a Likert-type questionnaire with K reply options, where $R_{i,t}$ denotes the aggregate percentage of responses in category i at time t, where $i = 1, \ldots, K$ and $t = 1, \ldots, n$, the author derived the following metric of disagreement for any given period t:

$$D_t = 1 - \left[\frac{\sqrt{\sum_{i=1}^{K}\left(R_{i,t}-\frac{1}{K}\right)^2}}{\sqrt{(K-1)/K}}\right] \tag{3}$$

This measure provides the proportion of disagreement among respondents, and can be regarded as a generalization of (2). This metric is bounded between zero and one, and can be interpreted as follows: 1 denotes maximum disagreement (100%) –indicating that the answers are equidistributed among all response categories–, while 0 corresponds to minimum disagreement, where one category draws all the answers.

When comparing the evolution of the geometric measure of disagreement (3) to that of the standard deviation of the balance (1) in several European countries, Claveria (2021b) obtained a high positive correlation between both metrics of dissension, and found that the main difference between both measures mainly lied in their average level and their dispersion, being DISP more volatile and higher in most countries. See Claveria and Sorić (2023) for an application of the methodology to estimate labour market uncertainty via disagreement in agents' expectations.
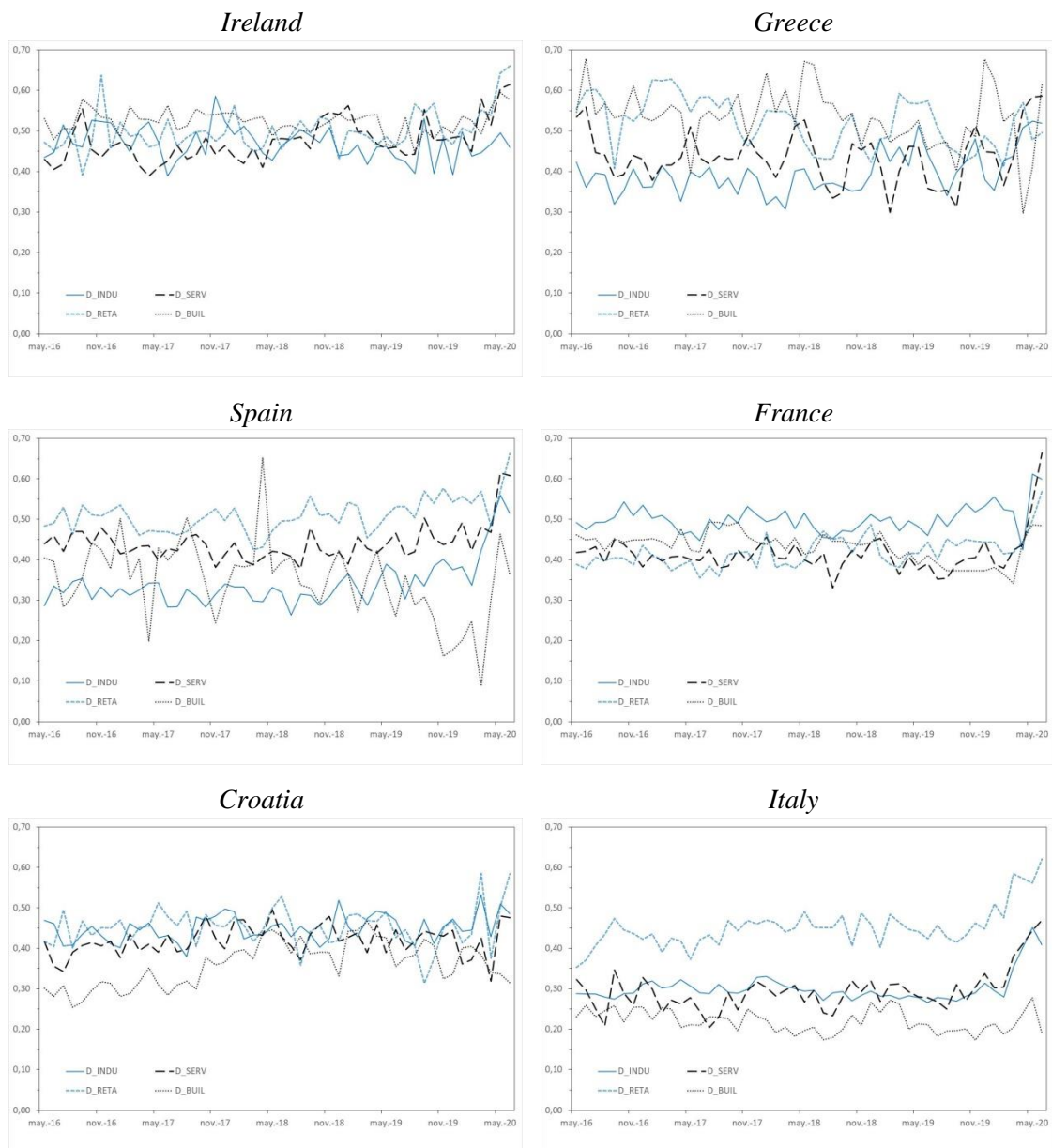
3. Graphical Analysis

In this section, we used qualitative survey data from the five independent tendency surveys conducted by the EC – the industry survey (INDU), the service survey (SERV), the retail trade survey (RETA), the construction survey (BUIL), and the consumer survey (CONS) – to compute the proportion of disagreement among respondents. By averaging the information coming from the different variables in each survey, we computed sector indicators of disagreement, which we in turn used to compute a business disagreement indicator that aggregates the information coming from the four sector indicators. We employed all these indicators to examine the evolution of uncertainty, both from the demand (Fig. 1) and the supply sides of the economy (Fig. 2). Then, in Table 2 we ranked the countries according to their average values of disagreement across the sample.

Belgium

Bulgaria

Czech Republic

Denmark

Germany

Estonia

Fig. 1a. Evolution of industry, service, retail trade and construction disagreement
Notes: The solid blue line represents the evolution of industry disagreement, the dashed black line the evolution of service disagreement, the dashed blue line the evolution of retail trade disagreement, and the dotted black line the evolution of construction disagreement.

Ireland

Greece

Spain

France

Croatia

Italy

Fig. 1b. Evolution of industry, service, retail trade and construction disagreement
Notes: The solid blue line represents the evolution of industry disagreement, the dashed black line the evolution of service disagreement, the dashed blue line the evolution of retail trade disagreement, and the dotted black line the evolution of construction disagreement.

Cyprus

Latvia

Lithuania

Hungary

Malta

Netherlands

Fig. 1c. Evolution of industry, service, retail trade and construction disagreement
Notes: The solid blue line represents the evolution of industry disagreement, the dashed black line the evolution of service disagreement, the dashed blue line the evolution of retail trade disagreement, and the dotted black line the evolution of construction disagreement.

Austria

Poland

Portugal

Romania

Slovenia

Slovakia

Fig. 1d. Evolution of industry, service, retail trade and building disagreement
Notes: The solid blue line represents the evolution of industry disagreement, the dashed black line the evolution of service disagreement, the dashed blue line the evolution of retail trade disagreement, and the dotted black line the evolution of construction disagreement.

Finland

Sweden

United Kingdom

Montenegro

North Macedonia

Albania

Fig. 1e. Evolution of industry, service, retail trade and building disagreement
Notes: The solid blue line represents the evolution of industry disagreement, the dashed black line the evolution of service disagreement, the dashed blue line the evolution of retail trade disagreement, and the dotted black line the evolution of construction disagreement.
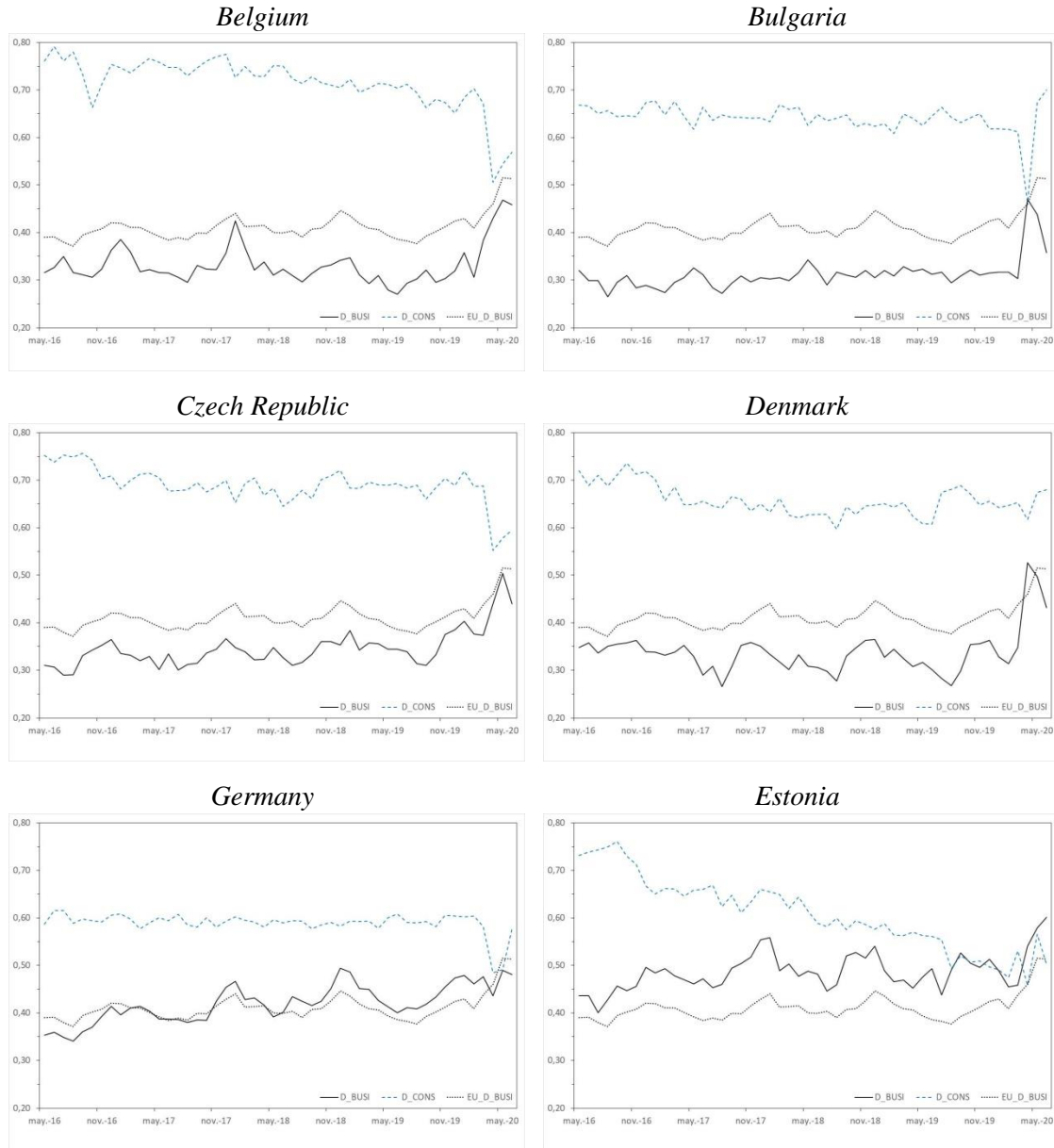
Fig. 1f. Evolution of industry, service, retail trade and construction disagreement
Notes: The solid blue line represents the evolution of industry disagreement, the dashed black line the evolution of service disagreement, the dashed blue line the evolution of retail trade disagreement, and the dotted black line the evolution of construction disagreement.

In Fig.1 we observe that the evolution of disagreement varies both across sectors and countries. If we focus on the last months of 2020, when the effects of the first wave of the coronavirus crisis where already palpable, we find different patterns regarding the evolution across sectors. In most cases, disagreement in the industry sector (INDU) starts to decrease in April or May 2020, and in the construction sector (BUIL) even before that. In contrast, disagreement in the service sector and the retail trade sector continues to rise (France, Italy and Estonia).
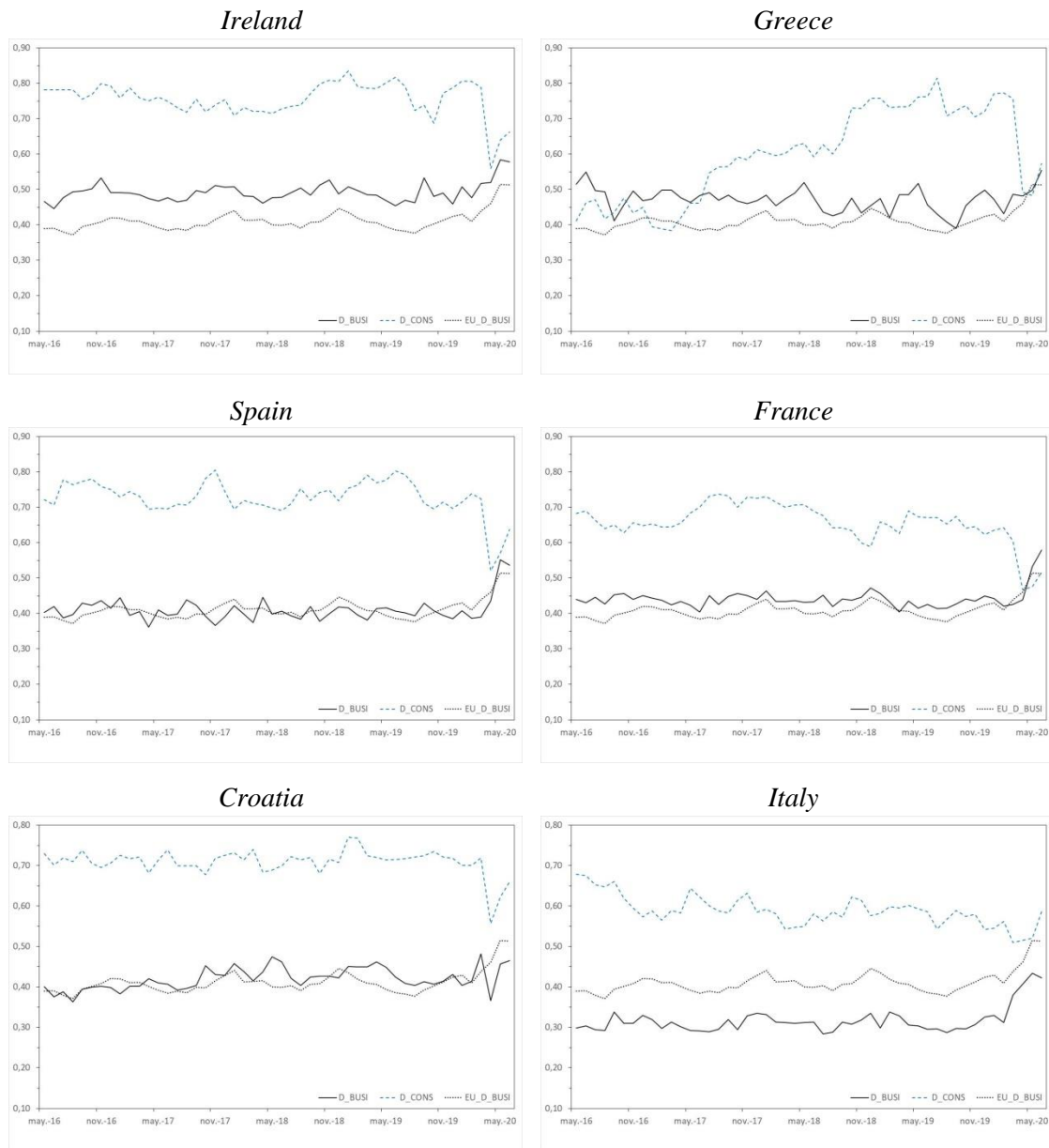
In Belgium, Germany, Greece, Spain, Croatia, Latvia, Poland or Slovenia retail trade (RETA) disagreement shows an increasing trend as of June 2020. In Finland, Sweden, Lithuania, the Netherlands, Hungary, Portugal, Montenegro, and North Macedonia it is service disagreement that maintains its growing trend. In other countries like Bulgaria, Czechia, Romania, Albania and Denmark, disagreement in all sectors co-evolves, decreasing after April or May 2020, as opposed to Cyprus and the United Kingdom where disagreement in all sectors rises. In Austria and Slovakia industry disagreement does not decrease and shows an increasing trend in June 2020. Cyprus, Greece and Turkey are the only countries in which disagreement in the building sector keeps rising in June 2020.

Next, in Fig.2 we compared the evolution of business disagreement vs. consumer disagreement in each economy.

Belgium

Bulgaria

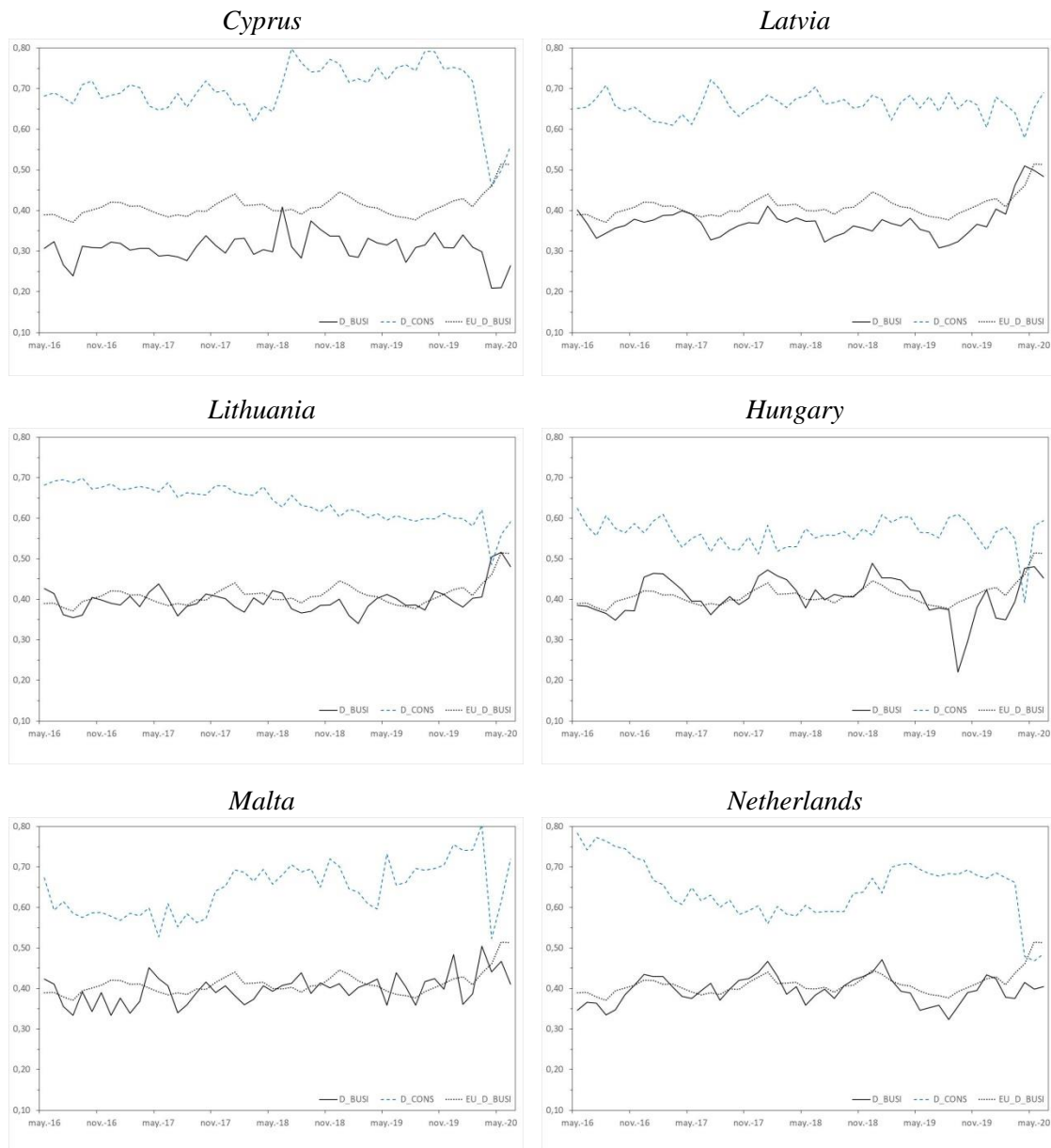### Czech Republic

Denmark

Germany

Estonia

Fig. 2a. Evolution of business disagreement vs. consumer disagreement
Notes: The solid black line represents the evolution of business disagreement in each country –aggregate disagreement for industry, service, retail trade and construction–, the dashed blue line the evolution of consumer disagreement in each country, and the dotted black line the evolution of aggregate business disagreement in the EU.

Ireland

Greece

Spain

France

Croatia

Italy

Fig. 2b. Evolution of business disagreement vs. consumer disagreement
Notes: The solid black line represents the evolution of business disagreement in each country –aggregate disagreement for industry, service, retail trade and construction–, the dashed blue line the evolution of consumer disagreement in each country, and the dotted black line the evolution of aggregate business disagreement in the EU.
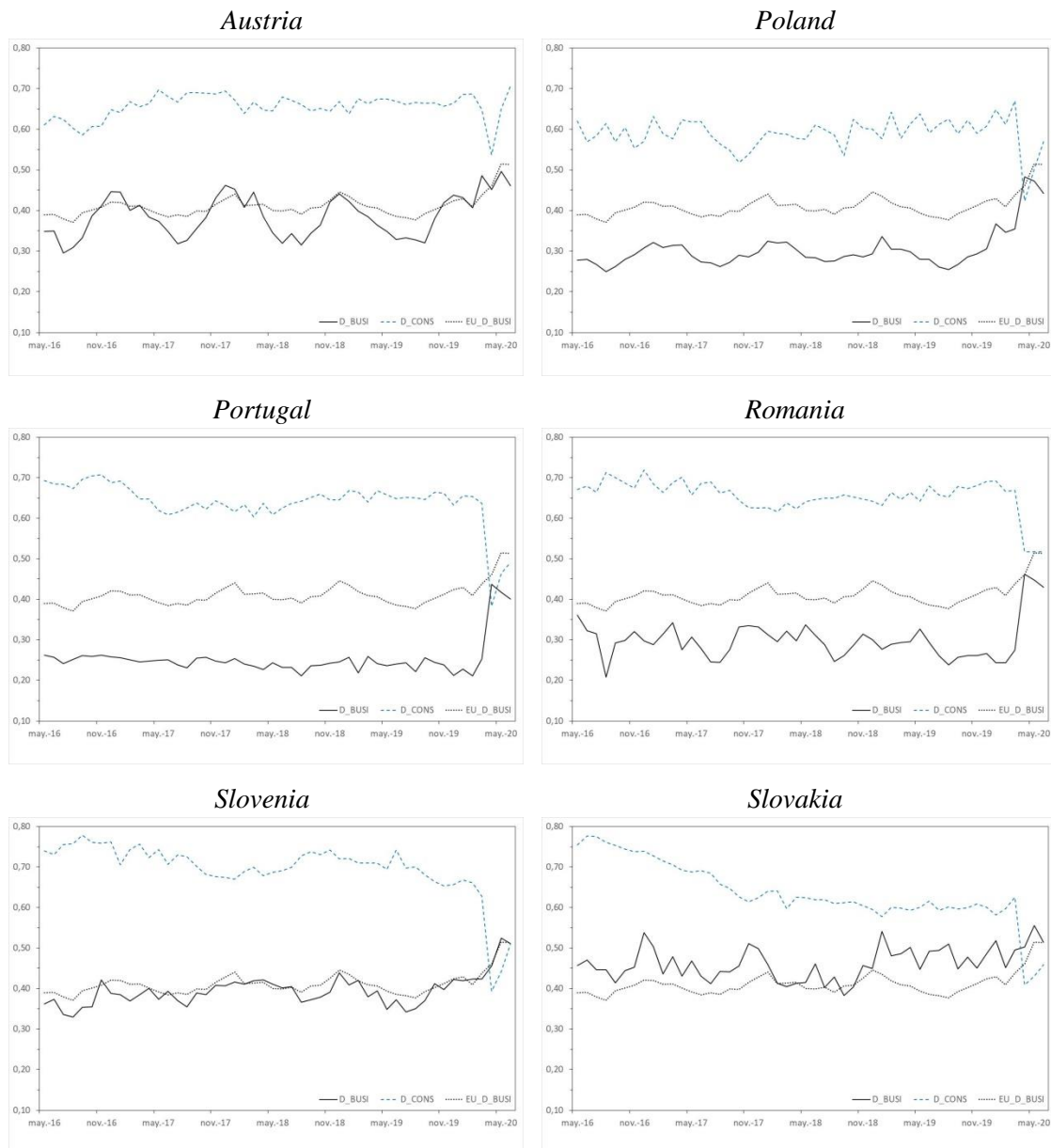
Cyprus

Latvia

Lithuania

Hungary

Malta

Netherlands

Fig. 2c. Evolution of business disagreement vs. consumer disagreement
Notes: The solid black line represents the evolution of business disagreement in each country –aggregate disagreement for industry, service, retail trade and construction–, the dashed blue line the evolution of consumer disagreement in each country, and the dotted black line the evolution of aggregate business disagreement in the EU.
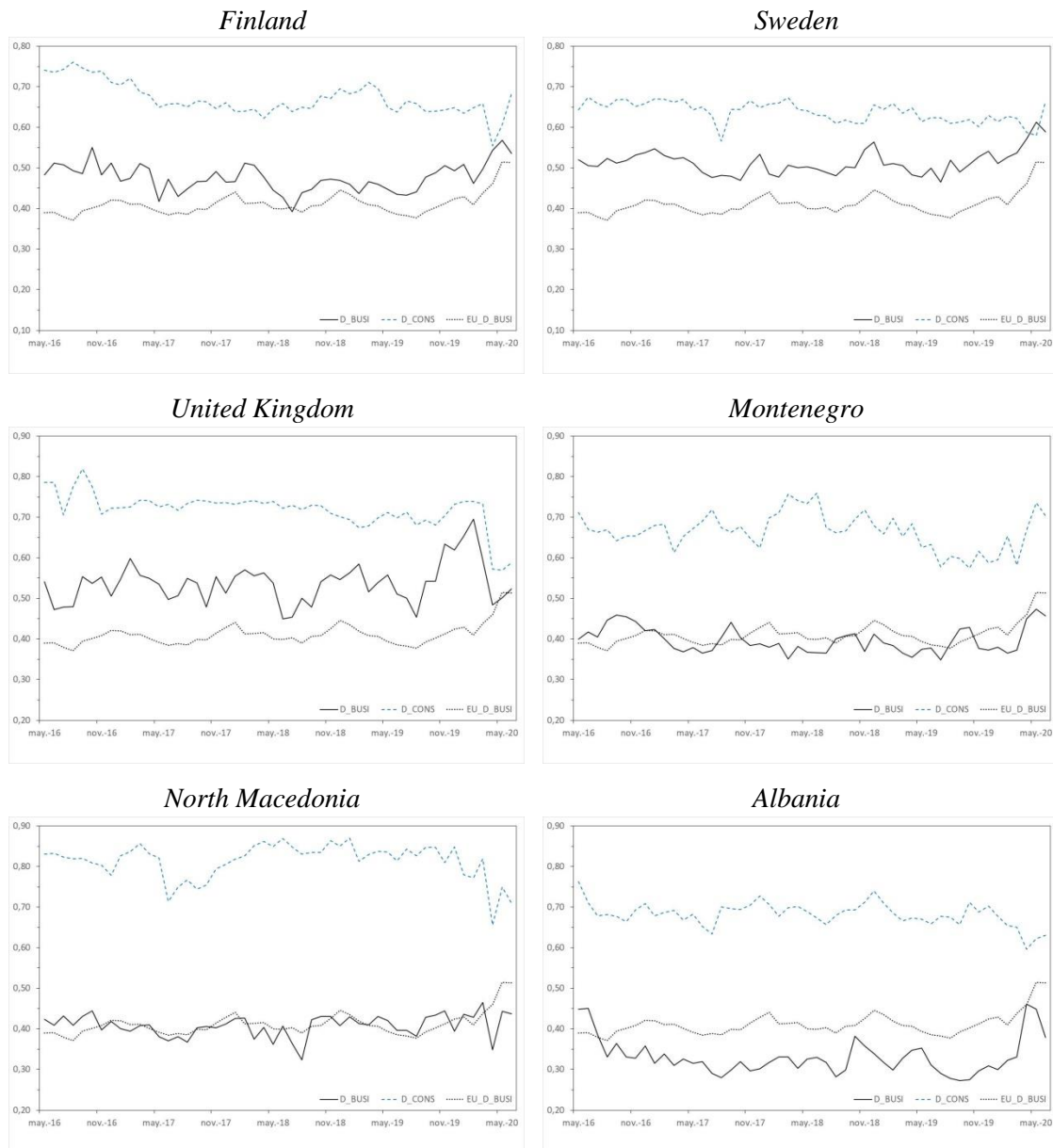
Austria

Poland

Portugal

Romania

Slovenia

Slovakia

Fig. 2d. Evolution of business disagreement vs. consumer disagreement
Notes: The solid black line represents the evolution of business disagreement in each country –aggregate
disagreement for industry, service, retail trade and construction–, the dashed blue line the evolution of consumer
disagreement in each country, and the dotted black line the evolution of aggregate business disagreement in the EU.

Finland

Sweden

United Kingdom

Montenegro

North Macedonia

Albania

Fig. 2e. Evolution of business disagreement vs. consumer disagreement
Notes: The solid black line represents the evolution of business disagreement in each country –aggregate disagreement for industry, service, retail trade and construction–, the dashed blue line the evolution of consumer disagreement in each country, and the dotted black line the evolution of aggregate business disagreement in the EU.

Serbia

Turkey

Euro Area

European Union

Fig. 2f. Evolution of business disagreement vs. consumer disagreement
Notes: The solid black line represents the evolution of business disagreement in each country –aggregate disagreement for industry, service, retail trade and construction–, the dashed blue line the evolution of consumer disagreement in each country, and the dotted black line the evolution of aggregate business disagreement in the EU.

In Table 2, we ranked the countries in increasing order according to their average values of disagreement during the sample period. By incorporating both the EA and the EU, the rankings show the relative position of the different countries analyzed with respect to the eurozone and the union as a whole.

D_INDU	D_SERV	D_RETA	D_BUIL	D_BUSI	D_CONS	D_TOTAL
Portugal	Romania	Portugal	Italy	Portugal	Germany	Portugal
Romania	Poland	Denmark	Cyprus	Romania	Hungary	Poland
Cyprus	Latvia	Austria	Belgium	Poland	Poland	Italy
Bulgaria	Bulgaria	Lithuania	Portugal	Cyprus	Sweden	Bulgaria
Italy	Italy	Poland	Albania	Bulgaria	Italy	Romania
Poland	Denmark	Belgium	Serbia	Italy	Bulgaria	Hungary
Montenegro	Albania	Malta	Bulgaria	Albania	Lithuania	Denmark
Latvia	Cyprus	Czech Rep.	Poland	Belgium	Austria	Cyprus
Spain	Portugal	Bulgaria	Romania	Denmark	Portugal	Germany
Czech Rep.	Czech Rep.	Cyprus	Czech Rep.	Czech Rep.	**EU**	Albania
Albania	Hungary	Netherlands	Denmark	Latvia	**Euro Area**	Latvia
Netherlands	Belgium	Albania	Macedonia	Serbia	Romania	Czech Rep.
Belgium	Slovenia	Romania	Slovenia	Austria	Latvia	Lithuania
Serbia	Macedonia	Latvia	Montenegro	Slovenia	Denmark	Austria
Greece	Serbia	Hungary	Germany	Netherlands	France	Netherlands
Germany	Lithuania	France	Spain	Montenegro	Turkey	Malta
EU	Netherlands	Slovenia	Malta	Lithuania	Czech Rep.	Belgium
Euro Area	**EU**	Croatia	Croatia	Malta	Montenegro	Montenegro
Austria	France	Italy	**EU**	Hungary	Estonia	Serbia
Macedonia	**Euro Area**	**EU**	Austria	Macedonia	Finland	Greece
Lithuania	Croatia	**Euro Area**	**Euro Area**	Spain	Albania	**EU**
Hungary	Finland	Serbia	Slovakia	**EU**	Croatia	Slovenia
Slovenia	Montenegro	Germany	Hungary	**Euro Area**	Serbia	**Euro Area**
Denmark	Greece	Montenegro	Netherlands	Germany	Slovakia	Estonia
Malta	Austria	Ireland	France	Croatia	Slovenia	France
Croatia	Spain	Slovakia	Lithuania	France	Netherlands	Slovakia
Estonia	Estonia	Spain	UK	Slovakia	Belgium	Croatia
Slovakia	Malta	Macedonia	Sweden	Greece	Cyprus	Spain
Ireland	Germany	Greece	Estonia	Finland	Malta	Finland
Turkey	Ireland	Finland	Latvia	Estonia	Spain	Sweden
Finland	Slovakia	Sweden	Finland	Ireland	Greece	Macedonia
Sweden	UK	Estonia	Ireland	Sweden	UK	Turkey
France	Sweden	Turkey	Greece	UK	Ireland	Ireland
UK	Turkey	UK	Turkey	Turkey	Macedonia	UK

Table 2. Ranking of countries according to the average degree of disagreement by sector
Notes: D_INDU refers to the aggregate indicator for the industry, D_SERV for the service sector, D_RETA for the retail trade sector, D_BUIL for the building sector; D_BUSI refers to the business disagreement indicator and is obtained as the arithmetic mean of all aggregate sector indicators, and D_TOTAL averages the business and the consumer discrepancy indicators. Data for the building survey for the UK finishes in November 2019.

18

Finally, in Fig.3 we graphed for each survey, the evolution of disagreement across the different questions in each sector. We restricted the analysis to the EU.

Fig. 3. Evolution of disagreement across questions and surveys in the EU
Notes: Each line represents the evolution of disagreement for a specific survey indicator as noted in the legend.

19

We observe that in most sectors, the evolution of disagreement across sectors follows a similar pattern since the start of the pandemic. The two main exceptions are consumers and the retail trade sector, where we find negative correlations in the evolution of disagreement across questions. Specifically, we observe a great jump in the level of disagreement in the expectations of business activity in the retail trade sector (D_R4) in April 2020. This evolution is similar to the disagreement in the expectations of orders in the retail trade sector (D_R3), and opposed to that of prices and employment in the sector.

Similarly, in Fig.3 we also observe that consumers' perception of uncertainty, as captured by the metric of disagreement, strongly diverges across questions. While disagreement about the expected general economic situation (D_C4) and expected unemployment (D_C7) experienced a major downturn at the beginning of the pandemic and then a sudden recovery in April 2020, disagreement regarding expectations about price trends (D_C6) and major purchases (D_C9) experienced the opposite evolution.

Finally, when comparing the evolution of aggregate disagreement indicators for the respective sectors and consumers, we observe inverse trajectories between businesses and consumers. However, since May 2020 we found a divergent evolution in industry and construction, which began to decrease, while uncertainty in service and retail continued to increase.

4. Discussion

The analysis of the evolution of economic uncertainty during the coronavirus pandemic was done by approximating it through a geometric-based disagreement indicator. This approach allowed us to make use of business and consumer survey expectations about a wide range of economic variables from different sectors (industry, retail trade, services and construction), as well as different agents (managers and consumers). By applying Equation (3), we transformed the survey response shares into the proportion of disagreement for each question, thus being able to proxy economic uncertainty in the different sectors considered in the study.

The inverse trajectory of aggregate disagreement in business sectors and consumers, suggests differences between managers' and consumers' expectations. Claveria (2021b) obtained similar results when comparing manufacturing firms and households. However, since May 2020 we observed a divergent evolution in industry and construction, which began to decrease, while uncertainty in service and retail continued to increase. This result is in line with a recent study by Meyer et al. (2022), in which the authors found that firm-level risk perceptions skewed heavily to the downside in spring 2020. Similarly, Altig et al. (2020) considered several economic uncertainty indicators for the US and UK before and during the COVID-19 pandemic, and found that all indicators showed huge uncertainty jumps in reaction to the pandemic and its economic fallout, but that peak amplitudes differed greatly between the different proxies. Taking as reference the financial crisis prior to the pandemic, Reifschneider and Tulip (2019) also found evidence that estimates of uncertainty about future real activity in the US increased after the crisis.

The possible reasons for the divergence between the evolution of economic uncertainty between managers and consumers may be due to different factors. On the other hand, it should be noted that the uncertainty measure used in the study is an indicator of disagreement, that captures the proportion of discrepancy among agents' expectations. On the other hand, another reason for this finding is the different nature of the questions between business and consumer surveys, in the sense that managers' expectations refer to firm-specific factors, while consumers' expectations refer to the general economic situation. Finally, the greater heterogeneity that would be expected in the sample of households compared to that of companies, can also help explain why the average degree of dissatisfaction of consumers is higher than that of companies, and that it evolves inversely. As noted by Lahiri and Sheng (2010), aggregate forecast uncertainty can be expressed as the disagreement among the forecasters plus the perceived variability of future aggregate shocks. Therefore, it could be the case that this last component of forecast uncertainty, that is, the expected variability of aggregate shocks, is much larger among consumers. Consequently, the inherent difference in the composition of both groups of respondents could be explaining the different results found regarding the evolution of disagreement between both types of agents.

5. Conclusion

This paper examined the evolution of economic uncertainty during the COVID-19 crisis at a sector level. The analysis was carried out in 32 European countries and the European Union (EU). Since uncertainty is not directly observable, we approximated it using a geometric discrepancy indicator. This approach allows quantifying the proportion of dissent in business and consumer expectations. To the best of our knowledge, this is the first attempt to proxy economic uncertainty at a sectoral level by means of disagreement indicators.

We used information from all monthly forward-looking questions contained in *Joint Harmonised Programme of Business and Consumer Surveys* conducted by the European Commission –the industry survey, the service survey, the retail trade survey, the building survey and the consumer survey–. First, we calculated a discrepancy indicator for each of the 17 forward-looking survey questions available, allowing to proxy the proportion of uncertainty about different aspects of economic activity, both form the demand and the supply sides of the economy.

We computed the degree of disagreement at the sector level for all countries and graphed the evolution of economic uncertainty up to June 2020. In most sectors, the evolution across variables followed a similar pattern since the start of the pandemic. The only exception is the retail trade sector. Similarly, consumers' expected uncertainty strongly diverged across questions: disagreement regarding the expected general economic situation and unemployment experienced a major downturn at the beginning of the pandemic and then a sudden recovery in April 2020, as opposed to disagreement about expected price trends and major purchases.

This analysis attempted to offer a global overview of the degree of economic uncertainty in the midst of the coronavirus crisis at the sectoral level. The obtained results provide a snapshot of economic uncertainty –proxied via indicators of disagreement built with business and consumer survey expectations– in European countries in the midst of the coronavirus pandemic. These findings give insight regarding the different evolution of uncertainty across economic sectors and agents.

The differences observed between managers and consumers with respect to the evolution of expected uncertainty highlight the importance of analyzing economic uncertainty from a disaggregated perspective. This result is of great relevance for researchers, especially when evaluating the impact of uncertainty shocks at the aggregate level on economic activity, since the net effect may be attenuated when there are notable differences between the risk expectations of the different types of agents, for example managers versus consumers. Therefore, the obtained results point to the importance of working with sectoral data to understand the different dynamics triggered by uncertainty shocks in different sectors.

Finally, we want to note some of the limitations of the present study. On the one hand, it should be highlighted that the findings of this research may be conditioned by the approximation of economic uncertainty, which has been estimated by means of disagreement among agents' survey expectations. On the other hand, we want to point out the differences in the nature of the questions between business and consumer surveys, in the sense that managers' expectations refer to specific factors of the company, while consumers' expectations refer to the general development of economic activity.

However, the main aim of this research was to advance in the sectoral analysis of economic uncertainty, making use of information from tendency surveys. In this sense, an issue left for further research is the comparison of the considered discrepancy metric with other disagreement measures and with other uncertainty methodologies to proxy uncertainty, thus shedding light on the differences between the alternative approaches to measuring economic uncertainty. Another question left for further research is to evaluate the effect of uncertainty shocks at the sectoral level on the specific activity of each sector.

Funding

Conflicts of interest

The author states that there is no conflict of interests. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

Availability of data and material

The dataset used and/or analysed during the current study is:

The Joint Harmonised EU Consumer Survey conducted by the European Commission, which can be freely downloaded at: https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/business-and-consumer-surveys_en.

Bibliography

Altig, Dave, Scott Baker, Jose Maria Barrero, Nicholas Bloom, Philip Bunn, Scarlet Chen, Steven J. Davis, Julia Leather, Brent Meyer, Emil Mihaylov, Paul Mizen, Nicholas Parker, Thomas Renault, Pawel Smietanka, and Gregory Thwaites. 2020. "Economic Uncertainty Before and During the COVID-19 pandemic." Journal of Public Economics, 191, 104274. https://doi.org/10.1016/j.jpubeco.2020.104274.

Bachmann, Ruediger, Steffen Elstner, and Eric R. Sims. 2013. "Uncertainty and Economic Activity: Evidence from Business Survey Data." American Economic Journal: Macroeconomics 5 (2): 217–49. https://doi.org/10.1257/mac.5.2.217.

Baker, Scott R., Nicholas Bloom, and Steven J. Davis. 2016. "Measuring Economic Policy Uncertainty*." Quarterly Journal of Economics 131 (4): 1593–1636. https://doi.org/10.1093/qje/qjw024.

Bekaert, Geert, Marie Hoerova, and Marco Lo Duca. 2013. "Risk, Uncertainty and Monetary Policy." Journal of Monetary Economics 60 (7): 771–88. https://doi.org/10.1016/j.jmoneco.2013.06.003.

Binding, Garret, and Andreas Dibiasi. 2017. "Exchange Rate Uncertainty and Firm Investment Plans Evidence from Swiss Survey Data." Journal of Macroeconomics 51 (March): 1–27. https://doi.org/10.1016/j.jmacro.2016.11.004.

Bloom, Nicholas. 2009. "The Impact of Uncertainty Shocks." 2009. Econometrica 77 (3): 623–85. https://doi.org/10.3982/ecta6248.

Caggiano, Giovanni, Efrem Castelnuovo, and Juan Manuel Figueres. 2017. "Economic Policy Uncertainty and Unemployment in the United States: A Nonlinear Approach." Economics Letters 151 (February): 31–34. https://doi.org/10.1016/j.econlet.2016.12.002.

Castelnuovo, Efrem. 2022. "Uncertainty Before and During COVID-19: A survey." Journal of Economic Surveys 37 (3): 821–864. https://doi.org/10.1111/joes.12515

Castelnuovo, Efrem, Kerem Tuzcouglu, and Luis Uzeda. 2022. "Sectoral Uncertainty." Staff Working Paper 2022-38, Bank of Canada.

Clavería, Oscar. 2018. "A New Metric of Consensus for Likert Scales." University of Barcelona Regional Quantitative Analysis Group. AQR Working Papers 2018/10 (October). https://econpapers.repec.org/RePEc:aqr:wpaper:201810.

23

———. 2021a. "A New Metric of Consensus for Likert-type Scale Questionnaires: An Application to Consumer Expectations." Journal of Banking and Financial Technology, 5(1): 35–43. https://doi.org/10.1007/s42786-021-00026-5.

———. 2021b. "Uncertainty Indicators Based on Expectations of Business and Consumer Surveys." Empirica 48 (2): 483–505. https://doi.org/10.1007/s10663-020-09479-1.

Clavería, Oscar, Enric Monte, and Salvador Torra Porras. 2019. "Economic Uncertainty: A Geometric Indicator of Discrepancy among Experts' Expectations." Social Indicators Research 143 (1): 95–114. https://doi.org/10.1007/s11205-018-1984-2.

Claveria, Oscar, and Petar Sorić. 2023. "Labour Market Uncertainty After the Irruption of COVID-19." Empirical Economics, 64 (4): 1897–1945. https://doi.org/10.1007/s00181-022-02304-7.

Clements, Michael P., and Ana Beatriz Galvão. 2017. "Model and Survey Estimates of the Term Structure of US Macroeconomic Uncertainty." International Journal of Forecasting 33 (3): 591–604. https://doi.org/10.1016/j.ijforecast.2017.01.004.

Das, Abhiman, Kajal Lahiri, and Yongchen Zhao. 2019. "Inflation Expectations in India: Learning from Household Tendency Surveys." International Journal of Forecasting 35 (3): 980–93. https://doi.org/10.1016/j.ijforecast.2019.03.007.

Dibiasi, Andreas, and David Iselin. 2021. "Measuring Knightian Uncertainty." Empirical Economics, 61 (4): 2113–2141. https://doi.org/10.1007/s00181-021-02106-3.

Dovern, Jonas. 2015. "A Multivariate Analysis of Forecast Disagreement: Confronting Models of Disagreement with Survey Data." European Economic Review 80 (November): 16–35. https://doi.org/10.1016/j.euroecorev.2015.08.009.

Gelper, Sarah, and Christophe Croux. 2010. "On the Construction of the European Economic Sentiment Indicator." Oxford Bulletin of Economics and Statistics 72 (1): 47–62. https://doi.org/10.1111/j.1468-0084.2009.00574.x.

Girardi, Alessandro, and Andreas Reuter. 2016. "New Uncertainty Measures for the Euro Area Using Survey Data." Oxford Economic Papers-New Series 69 (1): 278–300. https://doi.org/10.1093/oep/gpw058.

Grimme, Christian, Steffen Henzel, and Elisabeth Wieland. 2014. "Inflation Uncertainty Revisited: A Proposal for Robust Measurement." Empirical Economics 47 (4): 1497–1523. https://doi.org/10.1007/s00181-013-0789-z.

Jurado, Kyle, Sydney C. Ludvigson, and Serena Ng. 2015. "Measuring Uncertainty." The American Economic Review 105 (3): 1177–1216. https://doi.org/10.1257/aer.20131193.

Krüger, Fabian, and Ingmar Nolte. 2016. "Disagreement versus Uncertainty: Evidence from Distribution Forecasts." Journal of Banking and Finance 72 (November): S172–86. https://doi.org/10.1016/j.jbankfin.2015.05.007.

24

Krüger, Fabian, and Lora Pavlova. 2023. "Quantifying Subjective Uncertainty in Survey Expectations." International Journal of Forecasting: 1–15. https://doi.org/10.1016/j.ijforecast.2023.06.001.

Lahiri, Kajal, and Xuguang Simon Sheng. 2010. "Measuring Forecast Uncertainty by Disagreement: The Missing Link." Journal of Applied Econometrics 25 (4): 514–38. https://doi.org/10.1002/jae.1167.

Lanzilotta, Bibiana, Gabriel Merlo, Gabriela Mordecki, and Viviana Umpierrez. 2023. Understanding "Uncertainty Shocks in Uruguay Through VAR Modeling." Journal of Business Cycle Research: 1–21. https://doi.org/10.1007/s41549-023-00081-5.

Ma, Xiaohan, and Roberto Samaniego. 2019. "Deconstructing Uncertainty." European Economic Review 119: 22–41. https://doi.org/10.1016/j.euroecorev.2019.06.004.

Mankiw, N. Gregory, Ricardo Reis, and Justin Wolfers. 2003. "Disagreement about Inflation Expectations." Nber Macroeconomics Annual 18 (January): 209–48. https://doi.org/10.1086/ma.18.3585256.

Meinen, Philipp, and Roehe Oke. 2017. "On Measuring Uncertainty and Its Impact on Investment: Cross-Country Evidence from the Euro Area." European Economic Review 92 (February): 161–79. https://doi.org/10.1016/j.euroecorev.2016.12.002.

Meyer, Brent, Emil Mihaylov, Jose Maria Barrero, Steven J. Davis, David Altig, and Nicholas Bloom. 2022. "Pandemic-Era Uncertainty." Journal of Risk and Financial Management 15: 338. https://doi.org/10.3390/jrfm15080338.

Mokinski, Frieder, Xuguang Simon Sheng, and Jingyun Yang. 2015. "Measuring Disagreement in Qualitative Expectations." Journal of Forecasting 34 (5): 405–26. https://doi.org/10.1002/for.2340.

Oinonen, Sami, and Maritta Paloviita. 2017. "How Informative Are Aggregated Inflation Expectations? Evidence from the ECB Survey of Professional Forecasters." Journal of Business Cycle Research 13 (2): 139–63. https://doi.org/10.1007/s41549-017-0017-6.

Reifschneider, David, and Petar Tulip. 2019. "Gauging the Uncertainty of the Economic Outlook Using Historical Forecasting Errors: The Federal Reserve's Approach." International Journal of Forecasting 35 (4): 1564–1582. https://doi.org/10.1016/j.ijforecast.2018.07.016

Segal, Gill. 2019. "A Tale of Two Volatilities: Sectoral Uncertainty, Growth, and Asset Prices." Journal of Financial Economics 134 (1): 110–140. https://doi.org/10.1016/j.jfineco.2019.03.002.

Zhao, Yongchen. 2022. "Uncertainty and disagreement of inflation expectations: Evidence from household-level qualitative survey responses." Journal of Forecasting 41 (4): 810–8289. https://doi.org/10.1002/for.2834.

25