# Uncertainty and its cross-sectional effect on Consumption during COVID: Evidence of survey data

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*"We are now experiencing a whole new level of uncertainty, as questions only the virus can answer complicate the outlook" Fed Chairman Jerome Powell, 2020*

**Introduction**

The concept of uncertainty has gained unprecedented academic interest since the surge of COVID-19's health crisis. Country-specific lockdown measures and shutdowns of economies have rendered nations in a state of heightened uncertainty challenging fiscal and monetary policy due to seemingly unknown territory. What is the effect of uncertainty related to COVID on real consumption in Europe?

Various strands of literature have emerged over time studying the negative impact on economic activity during periods such as the Great Depression (Romer, 1990). Romer (1990) examines the real option effect of uncertainty on consumption by formulating an uncertainty hypothesis model, predicting consumption of durable and semi-durable goods to be depressed due to temporary uncertainty caused by the Great Crash, durables notably more. The results show that the heightened uncertainty deepened the recession leading to a downward spiral of dampened real economic effects materializing in consumption and production (Romer, 1990). Romer's work is an extension of Ben Bernanke's (1983) concept of the irreversibility of investments, in which investors delay their investments due to heightened uncertainty resulting in a negative impact on real economic activity. With the wake of the Great Recession in 2008 and the subsequent European sovereign debt crisis, uncertainty soared, and academic interest in this 'amorphous'[1] concept peaked. This allowed novel strands of literature to manate in its efforts to measure uncertainty. Baker, Bloom & Davis (2016) developed the Economic Policy Uncertainty Index, a word count-based measure sourced from newspaper and online. Bachmann, Elstner, & Sims (2013) develop proxies for business uncertainty based on survey expectations for Germany and the United States. Based on micro data, dispersion of survey responses is calculated to quantify the level of uncertainty, arguing in its findings that uncertainty is rather an effect of crises than a cause. (Bachmann et al., 2013)

As the COVID 19 pandemic progresses, the economy and its actors are exposed to various social-distancing measures and restrictions since the first quarter of 2020. While models about uncertainty predict certain effects on real consumption, the behavior and development may be distinct to previous studied periods such as the Great Depression or the Great Recession.

This paper studies how COVID-19 affects economic actors' current expectations of the future and the resulting real effect on consumption/production across Europe. It also provides insight on how far increased number of new COVID cases impact consumption growth. As uncertainty can render stakeholders to forego investment, consumption, production / delay, this has a real effect on economic outcome and can leave monetary, fiscal policy ineffective.

In an OLS regression model, the author studies the impact of heightened uncertainty measured as cross-sectional dispersion of survey responses from Q1 2019 to Q4 2020 on real consumption across Europe. The data is drawn from The Joint Harmonised EU Programme of Business and Consumer Surveys" of the European Commission database publicly available. While dispersion is calculated in

[1] Bloom, Nicholas. 2014. "Fluctuations in Uncertainty." Journal of Economic Perspectives, 28 (2): 153-76

the leading paper of Bachman et al. with micro data, this paper is conducting the analysis on macro level data similar to Girardi and Reuter (2016).#

Data analysis shows an inverse relationship between the number of new COVID cases and total consumption growth. In addition, introducing the uncertainty as survey-based dispersion, findings reveal a positive coefficient, i.e. heightened uncertainty levels result in a slightly positive consumption growth. This is contrary to expectations and existing empirical evidence, however studying the period between 2000q1 to 2018q2, data analysis suggests an inverse relationship alluding to the theory that COVID-induced uncertainty has an unprecedented impact on consumption growth.

This paper contributes to the existing literature on uncertainty by examining the cross-country impact of uncertainty on consumption growth during COVID. By using survey-based variables, the author adds novel empirical evidence to the survey dispersion approach as a goal to measure uncertainty levels. This can be a foundation for improved decision-making of policy makers and key economic stakeholders. In understanding the impact uncertainty has on real economic activity, measures can be allocated more efficiently.

This paper is organized as follows: Section 2 provides the theoretical frameworks for the hypotheses. Section 3 elaborates on the data and variables for the model, while section 4 displays the methods and main results from the analysis. Section 5 and 6 focus on the robustness and extension of the model. Limitations and conclusion follow.

**Related Literature**

Even though literature on uncertainty has experienced a momentum in the recent decade, the concept has been of interest for a while. In a neoclassical approach, Frank Knight (1921) defines in his book the difference between risk and uncertainty, which represents one of the first formative contribution in this field. Knight's distinction is based on the measurability of the probability related to an outcome, with "true uncertainty" being "not susceptible to measurement". According to Bernanke (1983), introducing "uncertainty" due to lack of information depresses investment and hiring choices as the option of waiting becomes more beneficial. His study assumes that investments are "irreversible" in nature and uncertainty is temporary.

Romer (1990) expands Bernanke's work by transferring it to consumption expenditures. Her consumer behavior model distinguishes between the consumption of durable and non-durable goods showing that short-term uncertainty about future income ceases consumer spending on durables. (Romer, 1990). The model is extended by capturing the 'varying degrees of resalability' predicting the good to be less impacted by uncertainty with increasing reversibility as well as the lifetime of a durable good. Central to the paper is the hypothesis that the heightened uncertainty generated through the Great Crash caused consumers to forego purchases of durable and semi-durable goods intensifying the economic recession. Romer's work sets the foundation to the effect of uncertainty on consumer behavior with varying forms of goods, that will be subject of this paper. The measurement of uncertainty is conducted separately for consumer and for forecast uncertainty by qualitatively examining historic newspaper articles and forecast reports.

Bachmann et. al (2013) construct an uncertainty measure that is derived from cross-sectional dispersion of business surveys using micro-data. Derived from a single answer, the results generate an aggregate uncertainty measure. As the data is not publicly available, Reuter et. al (2016) further simplify the measure calculations by applying the formula to macro-data from the European Commission. This simplified formula will be used in this paper as basis for calculating consumer and business uncertainty measures across Europe.

Bloom et al. (2016) paved the way to further measure uncertainty by constructing a standardized 'Economic Policy Uncertainty Index' across countries. The partially text-based search method is automatized and based on the most influential newspapers. The paper utilizes "these new measures to investigate the effects of policy uncertainty on firm-level stock price volatility implied by equity options, firm-level investment rates and employment growth rates and on aggregate investment, output and employment."

Jurado, Ludvigson and Ng (2015) challenge in how far existing uncertainty proxies (e.g., stock market volatility, cross-sectional forecast dispersion or text-based newspaper indices) are representative of real macroeconomic uncertainty as they are strongly impacted by other parameters. To isolate and directly measure uncertainty, Jurado et. al (2015) make use of a vast data set representing various macroeconomic factors including firm growth rates and other forecasting factors. Key to their thesis is the aspect to prove uncertainty in the bulk of macroeconomic activity at the same time.

**THEORY**

**1. Testing the precautionary saving motive with the Euler equation**

A growing body of literature empirically tests theoretical models by introducing uncertainty into an intertemporal consumption behavior model to understand its effect on saving and consuming. Keynesian behavior models predict that heightened income uncertainty will cause consumers to build up precautionary savings and delaying consumption causing it to grow in the future – 'the precautionary motive'. A dominant strand of researchers tested the impact of precautionary savings by using the Euler equation framework in a linearized approximation (Dynan, 1993). In the following, this model will be used to show how consumption is influenced by temporarily introduced uncertainty and in how far empirical testing can predict the outcome of the paper's hypothesis.

Dynan (1993) linearly tests the relationship between expected consumption growth and expected consumption growth squared namely expected consumption risk using household panel data.

Consider a general model of consumption with the maximization problem (the following is in line with Dynan's derivation of the regression framework, 1993):

$$\text{Max } E_t \sum_{j=0}^{T-t} \left(\frac{1}{1+\delta}\right)^j \left(\frac{1}{1-\rho}\right) C_{t+j}^{1-\rho}. \qquad (1)$$

Integrating the Euler equation assumes that marginal utility of consumption is proportional to the expected marginal utility of individual i in period t (Christelis et al., 2016). The derived Euler Equation in this maximization problem is as follows with interest rate r:

$$\left(\frac{1+r_i}{1+\delta}\right) E_t[U'(C_{i,t+1})] = U'(C_{it}). \qquad (2)$$

As (2) is not linear, the second order Taylor approximation is used to linearize the Euler equation with the utility maximization problem into the linear relationship between expected consumption growth and expected consumption growth squared.

$$E_t\left[\frac{C_{i,t+1}-C_{it}}{C_{it}}\right]=\frac{1}{\xi}\left(\frac{r_i-\delta}{1+r_i}\right)+\frac{\rho}{2}E_t\left[\left(\frac{C_{i,t+1}-C_{it}}{C_{it}}\right)^2\right], \quad (3)$$

Source: Dynan "How prudent are consumers?"

$$\frac{1}{M}\sum_{t=1}^{M}GC_{it}+\mu_i=\frac{1}{\xi}\left(\frac{r_i-\delta}{1+r_i}\right)+\frac{\rho}{2}\left(\frac{1}{M}\sum_{t=1}^{M}GC_{it}^2\right)+\nu_i+\eta_{it}, \quad (4)$$

Source: Dynan "How prudent are consumers?"

The notion behind equation (3) is that uncertainty induced by e.g. income risk results in a heightened expected consumption growth, i.e. the consumption in period t is delayed into the future increasing the growth in period t+1. The decisive parameter is the degree of prudence ρ measuring the precautionary saving motive.

This can be summarized in a regression framework with error terms being combined as $\epsilon_i$:

$$\text{avg}(GC)_i=\frac{1}{\xi}\left(\frac{r_i-\delta}{1+r_i}\right)+\frac{\rho}{2}\text{avg}(GC^2)_i+\epsilon_i. \quad (5)$$

As expected consumption risk is not detectable, Dynan (1993) replaces expected values with their realized equivalents. This transformation results in a forecast error term (also called expectation error term) XY representing the delta between expected and realized consumption growth squared, rendering the OLS estimator to be biased and inconsistent (Bertola et al., 2005). Dynan (1993) tackles this endogeneity problem by applying the instrumental variables method introducing instruments (z), that are uncorrelated to the error term and only influence g2 and providing a consistent IV estimator. In her household panel data set, she uses instruments such as occupation and education with the results, however, to be proven low in power (Christelis, 2016). Bertola et al. (2005) apply a similar strategy to Dynan with the novelty of using subjective income risk as an instrument. "Subjective income risk is indeed the ideal instrument in this setting (Manski (2003) argues forcefully in favour of using subjective expectation data in the estimation of structural models of individual behaviour). Its orthogonality to the expectation errors defined above is soundly justified in that income uncertainty, like all information available at the beginning of the observation period, should not affect consumption growth after controlling for the latter's conditional volatility, which is a sufficient statistic for the relevant risk in the absence of liquidity constraints."[2]

This theory section follows Bertola et al.'s approach (2005) in instrumenting realized consumption growth variability with subjective variance of income growth as lagged values. The author argues that past consumption risk is not affecting current consumption growth in any other way then through current consumption risk. This exclusion restriction addresses the endogeneity problem. The data set used for realized consumption growth and realized consumption growth squared is the aggregate private household expenditures from Eurostat per country *c* in the time 2019q1 to 2020q4.

The simplified regression framework used is the following with β being ρ/2

$g_{c,\,t+1} = \alpha + \beta\, g^2_{c,\,t+1} + \gamma' Z_{c,\,t} + \epsilon_{c,\,t+1}$ (6)

[2] Bertola, G., Guiso, L., & Pistaferri, L. (2005). Uncertainty and consumer durables adjustment. The Review of Economic Studies, 72(4), 973-1007.

The data is unadjusted private household consumption by durability across European countries translated in growth rates. Due to the exclusion restriction, instrument Z is not correlated to the error term and consumption risk should be positively correlated to lagged consumption.

The effect of total consumption growth squared (consumption risk) on consumption growth is estimated at -1.78 and with a *p*-value of 0.061 strongly significant. The IV regression results show a in the first stage regression a positive correlation between consumption risk and lagged consumption risk with a coefficient of 0.366. and a *p*- value of 0.025. However, the *F*- statistic is below the rule-of-thumb 10 with 5.11. (Christelis, 2016)

In a second IV regression, subjective income growth is introduced as instrument Z in line with Bertola et al.'s approach (2005). It is constructed using the publicly available survey data from the European Commission's Joint Harmonised EU Programme of Business and Consumer Surveys (EU BCS). Within the household survey, monthly questions are asked on their personal expectations for the next 12 months (positive, negative, no change, don't know). For the construction of the instrument z of subjective income risk, the author uses the following question:

**Q1** How has the financial situation of your household changed over the last 12 months? It has...

| | |
|---|---|
| + + | got a lot better |
| + | got a little better |
| = | stayed the same |
| − | got a little worse |
| − − | got a lot worse |
| N | don't know. |

The instrument Z essentially represents the dispersion of this survey answer. Calculation method is explained in more detail in the main part. The author argues that this question is highly dependent on potential income risk in the future and hence can be used as a proxy for it. For the consumption growth and g2 lead values are constructed. Subjective income risk as instrument Z is not correlated to the error term. Furthermore, g2 and income risk should be positively correlated.

The results from the IV regression show the effect of consumption risk on consumption growth to be -0.66, however with a p- value of 0.456 being insignificant. An inverse relationship between consumption risk and consumption growth could allude to the heightened uncertainty during COVID resulting in a negatively affected consumption growth.

## 2. Testing the CD Romer's basic model of utility

In the following, the paper considers another model of consumer decision making. Romer's (1988) theoretic model predicts diminishing consumption when introducing heightened uncertainty temporarily. In this basic model, the author depicts in her working paper the consumer's expected lifetime utility of two different scenarios of (1) buying the durable good in period 0 and (2) not buying the durable good in period 0 in a world of infinite lifetime and a choice between two types of good: a perishable (food) and durable (car) good. The model has only two periods, period 0 and period 1, with "lifetime wealth, W, is equal to the present discounted value of future income, $Y_t$." Uncertainty is temporarily induced by concealing the lifetime wealth in period 0, until revealing it in period 1. The level of uncertainty is expressed as $\sigma^2$. Furthermore, the durable product is irreversible in nature.

The utility is quadratic in this model for both products and is written as follows:

$$U_t = x_t - \frac{1}{2}ax_t^2 + q_t - \frac{1}{2}bq_t^2 . \quad (7$$

Romer (1988) distinguishes in her model between two scenarios that guide the decision of buying or not buying the durable product as extracted from her NBER working paper below (full derivation in Appendix). She argues that if the difference between the utility of buying the durable good and the utility of not buying the car is positive than the consumer forgoes the consumption of the durable good until the temporarily induced uncertainty is removed by revealing wealth in period 1.

$$U_{Don't} = \mu - \frac{a}{2}\frac{r}{2+r}\mu^2 - \frac{a}{4}r\sigma^2 + V_0 , \quad (8)$$

$$U_{Do} = \mu - \left(\frac{1}{2}a + \frac{1}{2}a\alpha\right)\left(\frac{r\mu}{2(1+r)}\right)^2 - \left[\frac{\frac{1}{2}ar}{1+\left(\frac{1}{1+r}\right)^{N-1}}\right]\left[\left(\mu - (1+\alpha)\frac{r\mu}{2(1+r)}\right)^2 + \sigma^2\right] . \quad (9)$$

$$\Delta U = U_{Don't} - U_{Do} = -V_0 - \frac{a}{4}\frac{\mu^2 r^2}{(2+r)(1+r)} + \frac{a}{4}\sigma^2\frac{\left[1-\left(\frac{1}{1+r}\right)^{N-1}\right]}{\left[1+\left(\frac{1}{1+r}\right)^{N-1}\right]} . \quad (10)$$

Following the rationale of the model to the hypothesis at hand, it can be argued that with induced income uncertainty, the utility of not purchasing durable goods is higher and hence, people delay this purchase until certainty is reinstated. This basic model is conditioned to underlying assumptions that as such are not true to the real economic world. As the model states that for all consumers it is equally costly to forgo or not to forgo the investment, this would result in a full stop of durable purchases in case of uncertainty (Romer, 1988). Hence, she evokes this unrealistic outcome by introducing heterogeneity to the fact that there are varying levels to $v_0$, representing the utility from a fully depreciated durable product.

Furthermore, she extends the basic model assuming resalability of products by introducing "heterogeneity of income across consumers" (Romer, 1988). As resale markets are imperfect, there is still a decisive effect of uncertainty on durable goods. She notes that imperfection of resale markets varies across durable goods. For goods, in which resale is close to ideal, the effect of uncertainty will be similar as to non-durable goods and hence, aggregate demand for those products will shrink less than for other durable goods, for which markets are strongly imperfect.

Another extension touches upon the longevity of the product and introduces the concept of semi-durable.

| Europe excl. UK and CH | | 2019Q1 | 2019Q2 | 2019Q3 | 2019Q4 | 2020Q1 | 2020Q2 | 2020Q3 | 2020Q4 | 2021Q1 |
|---|---|---|---|---|---|---|---|---|---|---|
| Share Durables | [% of total] | 9.0% | 9.0% | 8.4% | 9.1% | 8.6% | 8.7% | 9.7% | 10.3% | 9.4% |
| Share NOT Durables | [% of total] | 91.0% | 91.0% | 91.6% | 90.9% | 91.4% | 91.3% | 90.3% | 89.7% | 90.6% |
| Total growth | [% vs prior quarter] | | 3.3% | 2.7% | 0.7% | -8.4% | -11.5% | 15.8% | -2.1% | -4.7% |
| Durables growth | [% vs prior quarter] | | 2.4% | -3.7% | 8.5% | -13.3% | -9.9% | 28.2% | 4.4% | -12.7% |
| NOT Durables growth | [% vs prior quarter] | | 3.4% | 3.3% | 0.0% | -7.9% | -11.6% | 14.6% | -2.8% | -3.8% |
| Change in share Durables | [% difference vs. prior quarter] | | -0.1% | -0.6% | 0.6% | -0.5% | 0.2% | 0.9% | 0.6% | -0.9% |
| Change in share NOT Durables | [% difference vs. prior quarter] | | 0.1% | 0.6% | -0.6% | 0.5% | -0.2% | -0.9% | -0.6% | 0.9% |

Table 1. Private household consumption expenditures across Europe

In the following, Romer's predictions are empirically examined with the private consumption data as well as the uncertainty data between 2019q1 and 2020q4. Data source is as previously stated the European Commission database. As the split by durability is not available for each European countries, the numbers are solely referring to the 22 European countries providing the split.

Table 1 shows the quarterly private household consumption across Europe excluding the United Kingdom and Switzerland between 2019 quarter1 until 2020 quarter 4 split into durables and everything not durables (referred to in the following as “NOT Durable”).

Looking at quarterly private household consumption between 2019q1 and 2020q4, durable goods have declined with the outbreak of the Coronavirus recording a negative growth for 2020q1, q2 and q4. Quarter 3 is growing by 15.8%. Considering the magnitude of the lock-down measures, consumption expenditures seem to have recovered quickly.

Analysis of the uncertainty measure as a survey-based measure, the quarterly numbers show heightened overall uncertainty regarding the consumer survey. Zooming in, especially question 4 on the general economic development forward looking and 7 on the unemployment expectations in the next 12 months are exposed to higher uncertainty. (Example Germany, France, Sweden) The underlying survey data is monthly represented as quarterly. Due to the timing of the survey, lagged values are more representative when comparing to the real consumption in the respective quarter.

| EA | Financial situation n12m | General economic situation n12m | Price trends over n12m | Unemployment expectations over n12m | Major purchases over n12m | Savings over n12m | Rescaled mean |
|---|---|---|---|---|---|---|---|
| 2019Q1 | 90 | 96 | 109 | 102 | 97 | 109 | 102 |
| 2019Q2 | 94 | 98 | 109 | 102 | 98 | 109 | 103 |
| 2019Q3 | 96 | 98 | 108 | 100 | 98 | 109 | 103 |
| 2019Q4 | 96 | 98 | 107 | 99 | 98 | 109 | 102 |
| 2020Q1 | 97 | 99 | 107 | 100 | 97 | 109 | 103 |
| 2020Q2 | 100 | 105 | 108 | 114 | 99 | 109 | 111 |
| 2020Q3 | 95 | 114 | 110 | 110 | 98 | 109 | 112 |
| 2020Q4 | 94 | 111 | 110 | 109 | 98 | 109 | 110 |
| 2021Q1 | 94 | 116 | 110 | 111 | 97 | 109 | 112 |
| 2021Q2 | 92 | 119 | 108 | 111 | 96 | 109 | 112 |

Table 2. Uncertainty Indicator for various forward-looking survey questions across Europe

Following one of Romer’s predictions, consumption for non-durables should increase while semi-durables should shrink less than durables. This cannot be supported by the data. In fact, data shows a decline in non-durables by a greater amount than durables. While durables decline in 2020q1 by -8.8% for the focus countries, non-durables shrank by -20.8% and semi-durables by -14.7%. This development is contrary to the predictions of the basic model that Romer empirically tested for the Great Depression. This effect can be explained by the lock-down effect in March, in which countries shut down their economies in efforts to contain the virus. Although uncertainty is induced into the economies, private consumption for durables seems not to be as negatively impacted as semi-durables and non-durables.

**DATA**

The underlying data is sourced from two different data bases. Firstly, the aggregate consumption data and GDP per capita data is sourced from the European Commission as well as the survey data. Secondly, the COVID data stems from "our world in data" ("owid"). All data is expressed in quarterly terms and provided for 29 European countries.

The following lays out the details of the data as well as the specifics and limitation tied to this data.

**1. Private household consumption and average level of income**

The dependent variable, growth in private household consumption, is calculated from the European commission database ("eurostat"), that reports across 27 European countries on a national quarterly level. To match the country data of other variables, Norway, Iceland, the UK and Turkey are excluded from the analysis. The base is final consumption expenditure of households as unadjusted data (not seasonally and not calendar adjusted) at current prices. For this data, the growth rate is generated for the period of 2019q1 to 2020q4. This data varies across time and space and is split into the degree of durability being either total consumption, durables or not durables (everything except durables). As semi-durables and services are only reported for selected countries, this split is not available in the data range. To have a broad European country range, the data is restricted to this split in durability. This real output measure is representing the change in consumption behavior on a topline level, in addition to providing details on durables. This is a decisive subgroup for the analysis as during the COVID health crisis, durables recovered quickly and spiked in the third quarter of 2020.

In addition to this, the average level of income as expressed in the GDP per capita is extracted from the eurostat database, providing a normalized measure serving as a control variable to account for the country differences. In essence, this is to correct for the alleged "catch-up" effect theory stating that economies ultimately result in convergence with respect to per capita income. This is derived from the observation that poorer countries grow faster than richer countries. This measure is included in the analysis as the level of income varying across time and country, as well as the change in income (growth rate of GDP per capita) to isolate the real change. The more the household's actual income grows in a certain period, the more the household will consume. As a proxy for income growth, the author uses growth in GDP per capita.

GDP per capita potentially grows more for countries with a lower level of income but if growth in gdp per capita is included in the equation, that explains growth in consumption. Thus, in that scenario the level of GDP per capita is not necessary to be entered as an additional control variable. In case the aim is to measure differences in growth of consumption resulting from different levels of development of different nations, then the growth in GDP per capita in the equation can be substituted with the level of GDP per capita.

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| g_totalcns~n | 208 | .0019642 | .1231302 | -.3516932 | .6462923 |
| g_durables | 208 | .0127497 | .1500441 | -.5364308 | .6229802 |
| g_notdurab~s | 208 | .0013387 | .1248637 | -.3676845 | .6833238 |
| uncertaint~4 | 208 | 98.93731 | 14.8601 | 0 | 130.13 |
| uncertaint~7 | 208 | 100.9638 | 15.54256 | 0 | 132.64 |
| g_uncertai~4 | 207 | .0060523 | .1177658 | -1 | .4052447 |
| g_uncertai~7 | 207 | .0062908 | .1251985 | -1 | .4871608 |
| newcovidca~s | 208 | 48.04207 | 115.3807 | 0 | 650.46 |
| g_newcovid~s | 78 | 5.98624 | 10.52939 | -.6726395 | 61.61398 |
| gdpperca~q_n | 208 | 129600.7 | 201084.7 | 3026.7 | 891790 |
| g_gdpperca~n | 208 | .0070682 | .0909457 | -.3207176 | .2593456 |
| expectfinsit | 208 | -1.357692 | 28.90878 | -108.5 | 40.4 |

Table 3: Descriptive Statistics of computed variables

## 2. Covid Measure as a Proxy for Uncertainty

The COVID data set is sourced from „our world in data" ("owid" SOURCE) and the two variables used as proxies for uncertainty in the data analysis are "new confirmed cases" of COVID-19 and "new confirmed deaths" of COVID-19 for the respective European countries. Both variables are 7-day smoothed data and normalized to account for the size of the country. While for various data analyses the preferred choice is the use of raw data, using 7-day smoothed data in the context of COVID carries crucial benefits. Firstly, when using raw data, the noise of the data impedes the detection of trends and may result in misreading the data. Secondly, during the COVID pandemic, the data is constantly subject to states' data corrections. When using raw data, the graphically depicted numbers can cause misleading interpretations of new cases and new deaths. Smoothing the data will reduce the spikes, making the data more accurate.

The incidence data is adjusted to quarterly numbers to match the dependent variable and remaining variables. In the regression analysis, the growth rate of the incidence is generated as an additional variable for the "new covid cases" to show the isolated change in the rate.

Both variables are used as a proxy for uncertainty when regressing consumption over uncertainty.

## 3. Household Survey Data

The data used to compute this measure is sourced from "The Joint Harmonised EU Programme of Business and Consumer Surveys" ("EU BCS") under the management of the Directorate-General for Economic and Financial Affairs ("DG ECFIN"). This is publicly available information owned by the European Commission and found in the Economic databases. Data is provided for 30 countries with historical data to the UK as well as for candidate countries, for the purpose of our analysis, 27 countries are included.

Six surveys are conducted across various sectors and households including questions with monthly and quarterly frequency. The following data analysis focuses on the household side to construct a consumer uncertainty proxy. The nominal sample size for the consumer survey amounts to around 32 000 consumers, out of which the effective sample size of surveyed households is around 23 000. (Detailed sample size per country and survey in the Appendix 4)

There are two distinct data structures available for the computed measures in the data analysis. In general, all data available in the database is macro data aggregated at country level. Microdata, i.e., survey answers by household, are not publicly available. All data is mainly qualitative data. The survey dispersions are calculated based on the detailed percentage split by answer, aggregated at country level. The other available data is aggregated as "balances", i.e., the difference between positive and negative answers. The answer scheme of the consumer survey consists of mainly 6 options: "got/get a lot better" (++), "got/get a little better" (+), "stayed/stay the same" (=), "got/get a little worse" (-), "got/get a lot worse" (--), "don't know" (N). (EU BCS User guide, 2020)

### 3.1 Survey Dispersion as a Proxy for Uncertainty

One strand of research has focused on constructing measures for survey to approximate uncertainty. Seminal work has been produced by Bachmann et al. (2013) creating an uncertainty measure that is calculated based on dispersion of forward-looking survey answers using micro data from the IFO institute (SOURCE). Dispersions in the context of uncertainty are not a novel concept and has been used when looking at the stock market performance. In the conquest to find a measure that is more closely related to the real economy rather than wall street, dispersion, hence, can be used when looking at survey results by managers and households representing the real economy.

The following measure to approximate uncertainty is used in line with Reuter et. al (2016), which "is an extension of Bachmann et al.'s (2013) dispersion-based uncertainty indicator". As micro-data is not publicly available, Reuter et. al (2016) applies the measure to the aggregated data set that groups all answers and provides shares by answer.

$$DISP_{qt} = \sqrt{fraction^{+}_{qt} + fraction^{-}_{qt} - \left(fraction^{+}_{qt} - fraction^{-}_{qt}\right)^2}$$

As backward-looking survey questions tend not to deliver accurate proxies for future uncertainty (Bloom et al, 2020), the following analysis is limited to forward-looking survey questions and uncertainty measures.

The uncertainty indicator used is solely based on forward-looking questions indicating current levels of uncertainty of economic actors. The response dispersion is calculated for all questions in the household surveys across Europe. To adjust for varying amplitudes in the different answers, the uncertainty indicator is standardized and rescaled to enhance the comparability between questions. For the regression analysis, uncertainty indicators are computed for the following questions addressing the personal perception of the future economic developments that potentially influences the household's personal decision on saving and spending.

These questions indirectly allude to the degree of uncertainty prevailing in households' perceptions of the future. Even if income grows on average expressed as GDP per capita in the respective period, and if the majority of households expect their situation in the future to be as good or even improve, households will limit their consumption if there is uncertainty about the future economic situation. It helps to indicate how certain consumers are of their future income. High answer dispersion about both, future unemployment risk and general economic trend, show disagreement and uncertainty.

**Q4** How do you expect the general economic situation in this country to develop over the next 12 months? It will...

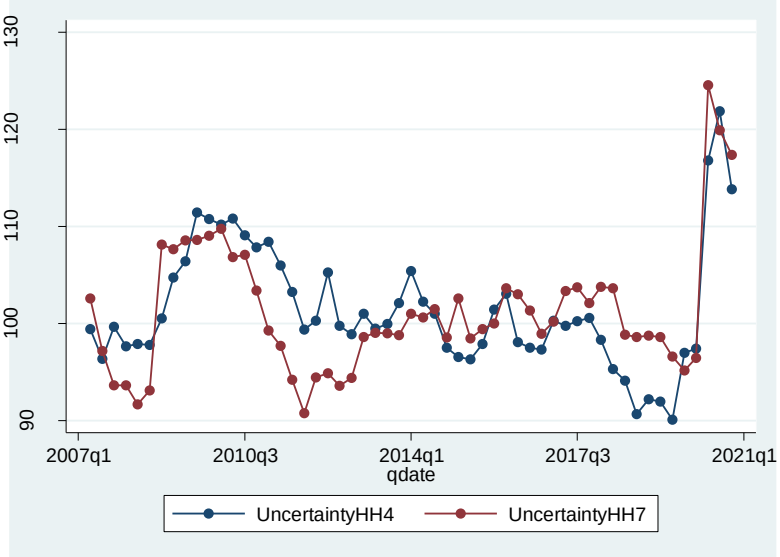
| | |
|---|---|
| ++ | get a lot better |
| + | get a little better |
| = | stay the same |
| − | get a little worse |
| −− | get a lot worse |
| N | don't know. |

**Q7** How do you expect the number of people unemployed in this country to change over the next 12 months? The number will...

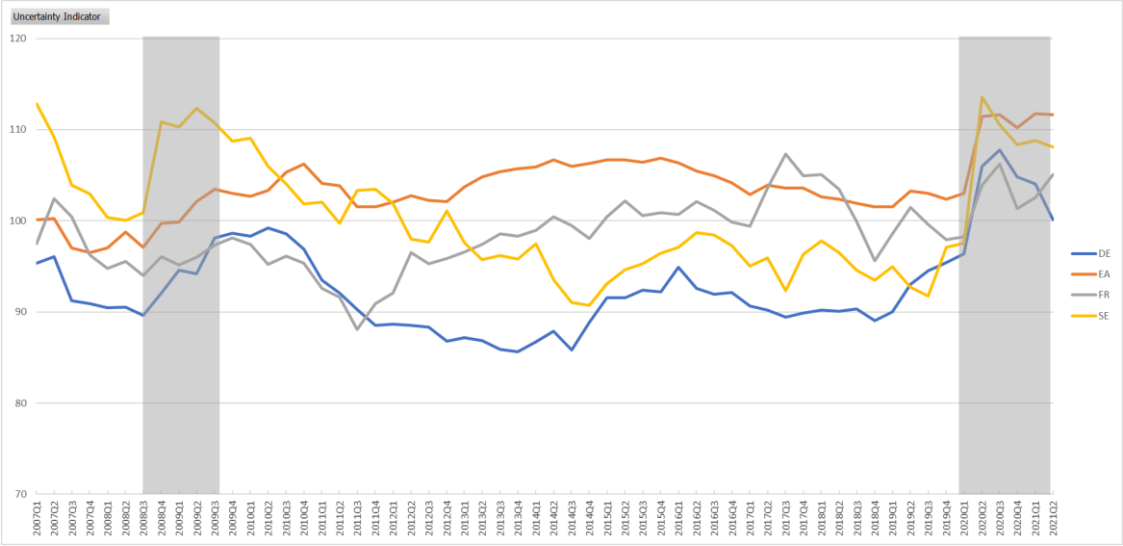
| | |
|---|---|
| ++ | increase sharply |
| + | increase slightly |
| = | remain the same |
| − | fall slightly |
| −− | fall sharply |
| N | don't know. |

While this measure can be a solid proxy for uncertainty, limitations to the interpretation of the results exist. Firstly, high dispersion can occur due to political or economic incidents that are specific to one country, unrelated to the COVID crisis. Secondly, this measure is a subjective measure as it is based on the personal perception of the respective households. Answers can be biased due to a personal situation. Lastly, there are differences in terms of level of uncertainty from country to country. Triggering perceived uncertainty can differ from country to country, as each culture handles uncertainty differently and/or is more accustomed to uncertainty levels than others.

To address these limitations, the regression analysis includes this measure as a growth rate at a later stage to isolate the real change independent of the absolute level of uncertainty.




Graph 1. Uncertainty indicators for expectations of future general economic activity (4) and future unemployment expectations (7) since 2007 quarter 1.




Graph 2. Uncertainty indicator (average) over time for Germany, Europe (EA), France and Sweden.

### 3.2 Expected Financial Situation as a control variable

Another introduced control variable of the regression analysis is the average expected financial situation of households. People's expectation of their future level of income influences today's growth of consumption. The notion behind this control variable is that real household consumption is influenced by households' expectation to their personal financial situation. This can have an impact on spending and savings decisions in the present if future is uncertain. It is computed using the balances data set of the EU BCS. This measure is not a dispersion of the answer, but the balance of peoples answers to indicate the average trend. The question 2 of the consumer survey is as follows:

**Q2** How do you expect the financial position of your household to change over the next 12 months? It will...

| | |
|---|---|
| + + | get a lot better |
| + | get a little better |
| = | stay the same |
| − | get a little worse |
| − − | get a lot worse |
| N | don't know. |

This scheme is then subject to the following balances calculation: B= (PP+ ½ P) – (½M+ MM), with P denoting positives ("Plus"), and M denoting negative answers ("Minus"). (EU BCS User Guide, 2020)

As for the dispersion, this measure can be limited due to personal biases.

**Method and Main Results**

This paper aims to test the effect of uncertainty during COVID on aggregate household consumption during 2019q1 to 2020q4. This work contributes to existing studies showing existing uncertainty, by examining a cross-county study of European countries. Does the number of COVID cases affect real consumption across Europe? Does the number of covid cases affect households' future income and economic expectation, and, thus, alter consumption behavior?

The first part of the data analysis measures uncertainty as the incidence value of new COVID cases. Real consumption is regressed over the level of incidence and subsequently, the growth rate of incidence using various control variables to address endogeneity. Secondly, total consumption growth is regressed over the respective uncertainty indicator expressed as survey dispersion. Thirdly, the results will be put into comparison with the pre-COVID period prior to 2019 to test for irregularities. Lastly, IV regressions are carried out.

**The Implication of COVID cases on real private household consumption**

The relationship between consumption behavior $y_{ct}$ and uncertainty $x_{ct}$ is expressed in the following equation:

$$g\_consumption_{ct} = \alpha_c + \beta_1 Incidence_{ct} + \beta_2 GDPpercapita_{ct} + \beta_3 ExpectedFinSituationHH_{ct} + u_{ct}$$

| | g_tota~n | newco~es | gdpp~q_n | expect~t |
|---|---|---|---|---|
| g_totalcns~n | 1.0000 | | | |
| newcovidca~s | -0.0544 | 1.0000 | | |
| gdpperca~q_n | -0.0425 | 0.0146 | 1.0000 | |
| expectfinsit | 0.0331 | 0.0046 | 0.1359 | 1.0000 |

Table 4: Correlation analysis

Correlation analysis shows a negative covariance for the relationship between growth in total consumption and incidence of new COVID cases of -0.054. With a heightened number of new COVID cases, consumption suffers.
Regressing total private household expenditures on the incidence value for new COVID cases results in statistically significant results, except for the control variable households' expected financial situation in the next 12 months. For all others, there is a high t-value as well as P value > 95%.
There is an inverse relationship between the level of incidence and the change in total consumption with one unit of change in the level of incidence resulting in a -0.0002 change in consumption growth. Considering the unit of measure this can have a significant impact on the consumption

behavior across all European countries. The coefficient for control variable of the level of income shows a positive value of 1.135 and a high t-value of 17.26, i.e. that with higher level of income there is a higher growth in consumption. Applying this regression for growth in durable consumption, the analysis renders insignificant results.
Altering the variable of new COVID cases to the growth in incidence with the control variables unchanged, results remain statistically significant except for the expected financial situation. A change in the growth of the incidence value impacts growth of total consumption by -0.002. Results show that the number of COVID cases depress total consumption of households.

```
. correlate uncertaintyhh4 newcovidcases
(obs=208)

             | uncert~4 newco~es
-------------+------------------
uncertaint~4 |   1.0000
newcovidca~s |   0.0960   1.0000


. correlate uncertaintyhh7 newcovidcases
(obs=208)

             | uncert~7 newco~es
-------------+------------------
uncertaint~7 |   1.0000
newcovidca~s |   0.1102   1.0000
```

Table 5: Correlation analysis of uncertainty indicator and new covid cases

The correlation analysis between incidence and the uncertainty indicator derives a covariance of 0.096 and 0.1102 for the respective uncertainty indicator. With rising level of COVID incidence the level of uncertainty rises.

**The Implication of uncertainty indicators on real private household consumption**

$$g\_consumption_{ct} = \alpha_c + \beta_1 UncertaintyIndicator_{ct} + \beta_2 GDPpercapita_{ct} + \beta_3 ExpectedFinSituationHH_{ct} + u_{ct}$$

Applying the OLS regression method with the new independent variable of level of uncertainty, results show statistically significant results for the coefficient of the uncertainty indicator as well as the change in the level of income. While the number of new COVID cases revealed an inverse relationship, the coefficient of the level of uncertainty as measured by survey dispersion is positive amounting to a 0.00055 change on total consumption growth for a change in the level of uncertainty. However, it is important to note, that the P-value is slightly lower than 90% with a t-value of 1.43. The regression is controlled for the change in GDP per capita as well as for the expected financial situation of households. Exchanging the level of uncertainty for the change in the level of uncertainty, results prove to have a higher statistical significance. A change in the growth of uncertainty levels impacts the growth of total consumption by 0.1148 with a t-value of 2.39 and a P-value > 95%. Regressing the growth in durables over the level of uncertainty for the expected general economic situation controlled for change in GDP per capita and expected financial situation, findings are statistically significant, except for the expected financial situation control variable. A change in level of uncertainty results in a 0.00105 change in growth of durables. Hence, results show a positive relationship of both durables and total consumption growth and uncertainty levels. This is contrary to the expectation and prior empirical studies proving an inverse relationship with heightened uncertainty depressing consumption. It can be argued that the COVID health crisis triggered a different crisis response in the households' consumption behavior versus classic crises. The results suggest that even though a heightened level of uncertainty prevailed during COVID, a positive impact on consumption growth is measurable. Total consumption expenditures support this, as the development shows in 2020q1 and q2 a sharp downturn followed by a strong upside in consumption in 2020 q3, which is unlike other crises. Consumption behavior in traditional crises is depressed for a longer period than two quarters. Additionally, the lock-down effect of closing retail shops, service-

provider, and leisure parks might have caused a shift in types of consumption. With gyms closing, households shifted to at home work-outs acquiring fitness gear online. With restaurants being closed, money saved might have shifted towards a different spending point. Overall, the lockdown and social distancing measures altered consumption behavior and ways to interact and consume. With an increased at home time people might have invested in the quality of their home and furniture to increase quality of life. Looking at durable consumption, even though the importance of cars is diminished during lockdowns, the German government fostered increased subsidies for car acquisitions to counteract. In addition, the German government decreased the value-added tax (Mehrwertsteuer) to boost consumption. (Tauber and Van Zandweghe, 2021)

To understand if this positive correlation is characteristic for the COVID crisis, the following regression looks at the period prior to 2019, from 2000q1 to 2018q4. Regressing growth in total consumption over the uncertainty level controlled for GDP per capita and expected financial situation, results show statistically significant values with the coefficient of the uncertainty indicator to be negative. With a heightened level of uncertainty towards future employment, the growth in consumption is impacted by -0.000134 (t-value: -1.79, P-value >90%). Both control variables show statistical significance.
The correlation analysis for that period support the results. These numbers could allude towards the theory that COVID correlation is different to non-COVID times.

```
. correlate g_totalcnsmptn uncertaintyhh4 uncertaintyhh7
(obs=1,976)

             | g_tota~n uncert~4 uncert~7
-------------+---------------------------
g_totalcns~n |   1.0000
uncertaint~4 |  -0.0244   1.0000
uncertaint~7 |  -0.0462   0.8938   1.0000
```

Table 6: correlation analysis for period 2000q1 to 2018q4

Lastly, the author performs an IV regression to address the potential endogeneity problem resulting from the uncertainty indicator. Hence, uncertainty is instrumented by using the number of new COVID cases as the Z-variable controlled for growth in GDP per capita and expected financial situation. With heightened uncertainty regarding the future general economic situation, total consumption growth is impacted by -0.0055, alluding towards a negative relationship.

**Robustness Checks and Extensions**

While using uncertainty indicators as survey dispersion has benefits when gathering household's perception of future expectations, there are certain limitations to its explanatory power. As survey dispersion remains a subjective measure, it can be subject to various sources of biasness. To test the robustness of the introduced methods and results, the impact of uncertainty on consumption is tested using the Economic Policy Uncertainty Index (EPUI) developed by Nicholas Bloom et al., 2016. This proxy measures the level of uncertainty by utilizing a word-count method from Newspapers. The EPU indices are publicly available for 22 countries, for which 10 countries are included in the EU and subject to the following robustness test. Growth in consumption is regressed over EPUI data for Germany as an example country in the period of 2019q1 to 2020q2. Results show a negative coefficient of -0.00069 alluding to an inverse correlation with a heightened EPUI resulting in a decline in consumption growth of private households. Results are significant with the EPUI coefficient having a t-value of -1.98 and a *p*-Value of 0.072. The control variables being GDP per capita and expected financial situation verge on statistical significance. This result is in line with the negative correlation between the incidence of new covid cases and total consumption growth.

In addition to the EPUI, which is a commonly cited measure of uncertainty, the author conducts a robustness test using the stock market volatility as a proxy for uncertainty. The data of the Volatility Index (VIX) is publicly available. The VIX determines the forward-looking fluctuations and volatility, which is calculated based on the S&P 500 index. This uncertainty varies solely over time as it is not a country-specific measure but reflects the stock market as a whole. Regressing growth in total consumption of the VIX using the same control variables as in prior analyses, findings show statistically significant results with a high t-value of -5.71 and a P value of 0.00. The coefficient of the VIX is negative amounting to -0.0013706, hence showing an inverse relationship. With a heightened VIX the growth in total consumption is negatively impacted.

The study can be extended by examining the implications of uncertainty on production and investments. For this, the EU BCS surveys managers, and industries to assess the expected financial situation and their perceptions on future economic developments. An extended analysis could hence study the effect of manger's expectations on future developments on production and investment levels. For this, monthly data is available for the variables and hence can provide additional insights and capture increased fluctuations that might be undermined due to the quarterly aggregations. This extension adds another layer to the empirical results by including other stakeholders of the market, respectively managers.

**Conclusion**

The COVID-19 health crisis has re-ignited the increased academic interest in quantifying the level of uncertainty and its impact on real economic activity. While the financial crisis in 2008 has fostered novel impulses to the field of research introducing the Economic Policy Uncertainty Index as a word-count measure (Bloom et al., 2016), survey-based dispersion measures (Bachmann et al., 2013, Jurado et al., 2015) and other approaches, uncertainty during COVID bears new empirical evidence. How do existing uncertainty indicators measure uncertainty during COVID and in how far is real consumption affected? What factors influence consumption and how do future expectation guide consumption behavior? This paper provides a cross-country empirical study of the correlation between COVID-induced uncertainty and households' consumption behavior. This is crucial for key political and economic stakeholders to understand the general economic dynamics. It can provide foundation for decision-making in new fiscal stimulus and understanding what political measures increase the effectiveness of results. With quantifying the dampening effect uncertainty has on consumption, crisis response can be tailored more accurately. In an OLS regression, private household consumption growth is regressed over new covid cases as well as over uncertainty using control variables for the level of income and the average expected financial situation. Characteristic for the COVID crisis is the consumption peak in 2020 q3 recovering from only two quarters of negative consumption growth. Regression analysis results show statistical significance for uncertainty as expressed by the incidence of new COVID cases revealing an inverse relationship with consumption growth across Europe. When substituting the incidence value with the uncertainty indicator as measured by survey dispersion, results provide a positive coefficient and hence a positive relationship to consumption growth. When compared to the pre-COVID period (2000q1-2018q4), this shows a contrary picture. In that period, heightened uncertainty levels negatively impacted consumption growth levels across Europe. This could suggest that both, the COVID crisis and households' response, behave in a unprecedented way and do not compare to non-COVID periods. One could argue that the shift in behavior patterns caused by the Virus and its social distancing measures resulted in (1) a re-allocation of spending to other consumption points, e.g.,

durables and (2) a potential increase through investing in a increased home standard due to the amount of time spent at home. Another factor can be fiscal stimulus measures through tax releases and grants for car acquisitions (German example).

For all these results, it is crucial to point out the limitations of its significance. As uncertainty is a vague concept, all measures to quantify the concept are proxies. While a survey-based measure provides insights on the households' perception of future expectations, it can be subject to other factors and biasness. As the measure is subjective, the households can have different aspects that are not related to COVID or general heightened uncertainty that influence their perception.

Nonetheless, the survey-based measure holds important information for economic stakeholders and proves to have a statistically significant correlation with consumption growth.

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5 Wrong Ways to Do Covid-19 Data Smoothing | by Steve McConnell | Towards Data Science
https://towardsdatascience.com/five-wrong-ways-to-do-covid-19-data-smoothing-1538db6ff182

**APPENDIX**

**Appendix 1:** Full Derivation of the Basic Model of C D Romer (1991)

This basic consumption model has been extracted from her paper and used in the theory part to test the uncertainty hypothesis.

Utility is assumed to be quadratic in the two types of goods. That is,

(1) $$U_t = x_t - \frac{1}{2} a x_t^2 + q_t - \frac{1}{2} b q_t^2 .$$

The consumer is assumed to live forever, so lifetime utility, U, is

(2) $$U = \sum_{t=0}^{\infty} \left(\frac{1}{1+\delta}\right)^t U_t ,$$

Scenario consumers do not buy:

(4) $$x_0 = \frac{r\mu}{2+r} , \text{ and}$$

(5) $$x_1 = q_1 = \frac{(W-x_0)(1+r)r}{2(1+r)} ,$$

(6) $$U_{Don't} = \mu - \frac{a}{2}\frac{r}{2+r}\mu^2 - \frac{a}{4} r\sigma^2 + V_0 .$$

If the consumer <u>does</u> buy a durable in period 0, before the value of lifetime wealth is learned, then

(7) $$x_0 = q_0 = \frac{r\mu}{2(1+r)} , \text{ and}$$

(8) $$x_1 = q_N = \frac{(W - x_0 - \alpha q_0)r}{1 + \left(\frac{1}{1+r}\right)^{N-1}} ,$$

(9) $$U_{Do} = \mu - \left(\frac{1}{2}a + \frac{1}{2}a\alpha\right)\left(\frac{r\mu}{2(1+r)}\right)^2 - \left[\frac{\frac{1}{2} ar}{1 + \left(\frac{1}{1+r}\right)^{N-1}}\right]\left[\left(\mu - (1+\alpha)\frac{r\mu}{2(1+r)}\right)^2 + \sigma^2\right] .$$

Using the expressions for $U_{Don't}$ and $U_{Do}$ and grouping terms in $\mu$ and $\sigma^2$ together, one can show that

$$(10) \qquad \Delta U = U_{Don't} - U_{Do}$$

$$= V_0 - \frac{a}{4}\frac{\mu^2 r^2}{(2+r)(1+r)} + \frac{a}{4}\sigma^2 \frac{\left[1 - \left(\frac{1}{1+r}\right)^{N-1}\right]}{\left[1 + \left(\frac{1}{1+r}\right)^{N-1}\right]} .$$

Full extraction from Romer's Working Paper No. 2639 "The Great Crash and the Onset of the Great Depression" published in the NBER Working Paper Series in June 1988.

**Appendix 2: Nominal sample sizes per Member State and per survey extracted from the User guide**

| | Industry | Investment | Services | Consumer | Retail trade | Construction |
|---|---|---|---|---|---|---|
| EU | 37 790 | 44 470 | 43 700 | 32 420 | 29 740 | 24 000 |
| EA | 25 360 | 29 440 | 26 970 | 23 900 | 17 200 | 13 110 |
| BE | 990 | 1 160 | 520 | 1 850 | 1 000 | 1 000 |
| BG | 1 420 | 3 480 | 1 230 | 1 000 | 1 230 | 790 |
| CZ | 880 | 870 | 780 | 1 000 | 320 | 590 |
| DK | 500 | 810 | 2 800 | 1 000 | 1 400 | 800 |
| DE | 2 890 | 5 000 | 3 220 | 2 000 | 1 730 | 2 550 |
| EE | 250 | 280 | 770 | 800 | 160 | 150 |
| IE | 1 100 | 1 000 | 2 800 | 1 000 | 1 600 | 600 |
| EL | 940 | 950 | 720 | 1 500 | 490 | 410 |
| ES | 1 760 | 1 860 | 1 000 | 2 000 | 1 100 | 290 |
| FR | 4 200 | 4 000 | 4 500 | 1 700 | 3 000 | 2 500 |
| HR | 800 | 600 | 850 | 1 000 | 500 | 500 |
| IT | 4 800 | 4 800 | 2 400 | 2 000 | 1 400 | 940 |
| CY | 120 | 300 | 260 | 600 | 250 | 120 |
| LV | 880 | 880 | 1 080 | 1 000 | 570 | 300 |
| LT | 750 | 750 | 970 | 1 200 | 720 | 570 |
| LU | 110 | 100 | : | 500 | : | 110 |
| HU | 1 610 | 1 470 | 1 500 | 1 000 | 670 | 1 500 |
| MT | 350 | 350 | 610 | 1 000 | 240 | 210 |
| NL | 2 040 | 4 000 | 3 150 | 1 050 | 730 | 1 300 |
| AT | 900 | 660 | 1 500 | 1 500 | 2 000 | 300 |
| PL | 3 500 | 3 600 | 4 300 | 1 020 | 5 200 | 5 000 |
| PT | 1 100 | 1 350 | 1 440 | 900 | 660 | 700 |
| RO | 2 300 | 2 300 | 2 820 | 1 000 | 2 490 | 1 230 |
| SI | 780 | 770 | 830 | 1 100 | 820 | 350 |
| SK | 720 | 600 | 500 | 1 200 | 520 | 500 |
| FI | 680 | 630 | 700 | 1 000 | 210 | 210 |
| SE | 1 420 | 1 900 | 2 450 | 1 500 | 730 | 480 |
| UK | 2 300 | 2 300 | 1 400 | 2 000 | 570 | 1 200 |
| ME | 140 | 500 | 500 | 1 000 | 220 | 110 |
| MK | 240 | 240 | 200 | 1 000 | 240 | 200 |
| AL | 410 | 400 | 350 | 1 200 | 410 | 220 |
| RS | 1 560 | 1 560 | 1 660 | 960 | 1 670 | 920 |
| TR | 2 230 | 2 230 | 2 050 | 3 800 | 480 | 620 |

Note: ":" = not available/applicable.

*Source: European Commission services*

**Appendix 3: Questions used for the calculation of the uncertainty measure**

The following questions are copied from „The Joint Harmonised EU Programme of Business and Consumer Surveys" User Guide and are basis for the forward-looking uncertainty measure construction:.

**Q2** How do you expect the financial position of your household to change over the next 12 months? It will...

| | |
|---|---|
| + + | get a lot better |
| + | get a little better |
| = | stay the same |
| − | get a little worse |
| − − | get a lot worse |
| N | don't know. |

**Q6** By comparison with the past 12 months, how do you expect that consumer prices will develop in the next 12 months? They will…

| | |
|---|---|
| + + | increase more rapidly |
| + | increase at the same rate |
| = | increase at a slower rate |
| − | stay about the same |
| − − | fall |
| N | don't know. |

**Q4** How do you expect the general economic situation in this country to develop over the next 12 months? It will...

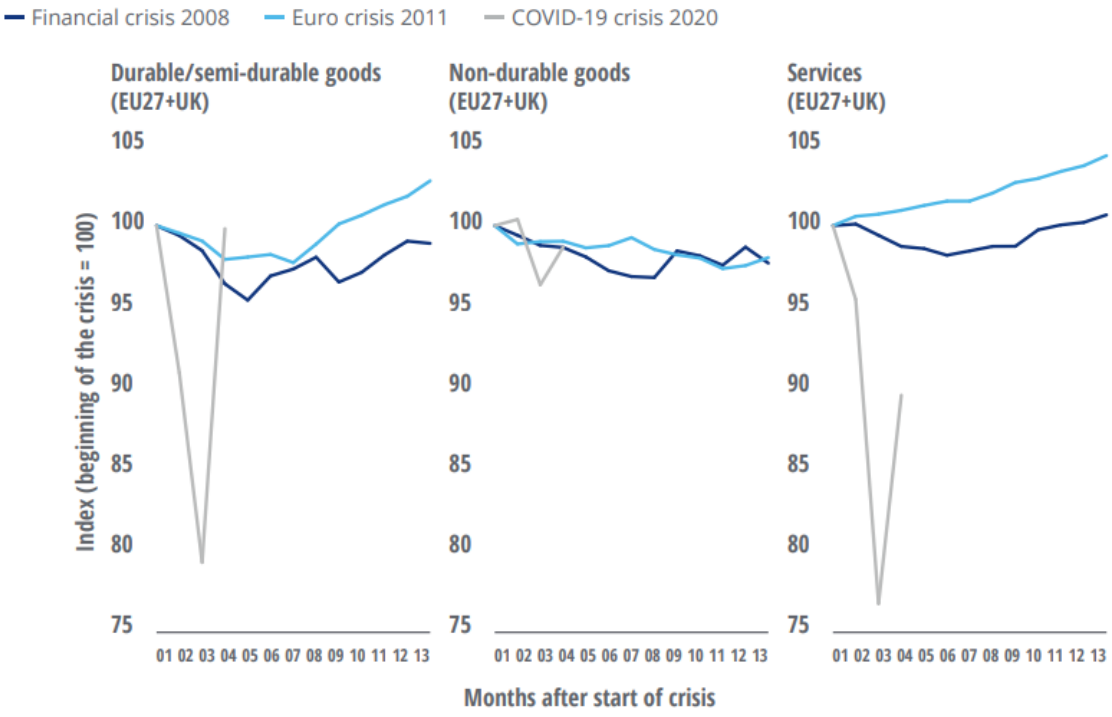
| | |
|---|---|
| + + | get a lot better |
| + | get a little better |
| = | stay the same |
| − | get a little worse |
| − − | get a lot worse |
| N | don't know. |

**Q9** Compared to the past 12 months, do you expect to spend more or less money on major purchases (furniture, electrical/electronic devices, etc.) over the next 12 months? I will spend…

| | |
|---|---|
| + + | much more |
| + | a little more |
| = | about the same |
| − | a little less |
| − − | much less |
| N | don't know. |

FIGURE 2

## Consumer spending patterns 2020




Source: Eurostat, Deloitte analysis.