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*Research article*

# The economic impact of the SARS-COV-2 (COVID-19) pandemic in Spain

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**Abstract:** Background: The COVID-19 pandemic has hit the Spanish economy hard. The result is an unprecedented economic and social crisis due to uncertainty about the remedy, and due to the socio-economic effects on people's lives. Methods: We performed a retrospective analysis of the macro-economic impact of COVID-19 in 2020, using the principal indicators of the Spanish economic and productive model. National statistics were examined in the search for impacts or anomalies occurring since the beginning of the pandemic. To estimate the strength of the impact on each of the indicators analysed, we used Bayesian structural time series. Results: In 2020, the cumulative impact on the Gross Domestic Product was of -11.41% [95% credible interval: -13.46; -9.29]. The indicator for Business Turnover fell by -9.37% [-12.71; -6.07]. The reduction in business activity was related to the sharp fall in demand. The Spanish employment market was strongly affected; our estimates showed a cumulative increase of 11.9% [4.27; 19.45] in the rate of unemployment during 2020. The autonomous communities which are economically the most heavily dependent on the services sector were those which recorded the worst indicators. Conclusions: Our estimates portray a dramatic situation in our country, and show all too clearly the fragility of a productive system which has to make the behavioural changes that are necessary to confront the COVID-19 pandemic.

**Keywords:** Economic impact; uncertainty; COVID-19, productive system, Spain

## 1. Introduction

On 5th January, 2020, the World Health Organization (WHO) published its first technical report about a new coronavirus, the SARS-CoV-2 [1]. Twenty-five days later, the WHO declared that the pandemic, called COVID-19, which had been caused by this coronavirus constituted a public health emergency of international importance [2]. We prepared this article one year after the official recognition of the existence of the SARS-CoV-2, and the progression of COVID-19 still seems endless. New contagions and losses of human life are still continuing day after day.

It is worrying to observe that Spain appears among the group of countries in the European Union with the worst management of the pandemic, and that it is also showing the worst economic indicators. The big differences among countries suggest that there is a relationship between the health crisis and the economic impact − see Figure 1.

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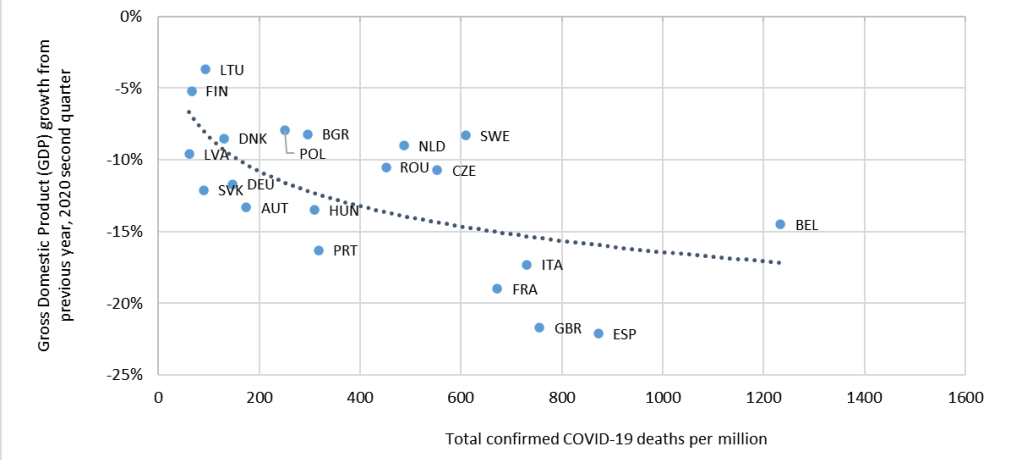
Figure 1. Impact of COVID-19 on health and economic growth in European countries.




Source: Own preparation, based on OECD statistics and John Hopkins University CSSE COVID-19 data.

The In Spain, COVID-19 is having an impact at the heart of a national health system that was not prepared for it, due to insufficient financing following the cutbacks of the previous economic crisis [3] and also due to serious structural imbalances [4]. In 2018, Spain assigned about 2,445 euros per capita, adjusted for purchasing power, to spending on health, which was 12% less than the average amount in the European Union [5]. With the aim of containing transmission through the community, the main strategies used against the successive epidemic waves of COVID-19 were: initial confinement, social distancing or self-isolation, restrictions on movement, and restrictions and barriers in many economic sectors, especially hotels and catering.

Successive rebounds in the rate of contagion have prevented us from returning to normality, and have resulted in a worrying deceleration in many sectors of our economy. None of the economic operators knows how serious the next wave of infections will be, or how quickly the vaccinations or other treatments will be completed. In this atmosphere of uncertainty, aggregate demand and demand for investment are declining drastically [6]. Moreover, the spread of the consequences of the pandemic to countries throughout the world is resulting in restrictions on movements between countries, with a direct effect on tourism, the main driver of our economy.

In an attempt to understand how to ensure that our citizens remain healthy and maintain economic activity as far as possible, this article tackles the question of measuring the impact of COVID-19 on the main indicators in the Spanish economic and production model – a type of economy that is characterised by the weight of its services sector, especially tourism, and by its large trade deficit.

## 2. Materials and Methods

### *2.1 Data*

We analysed the trend in indicators in four important macro-economic aggregates: Production, Supply, Demand, and Employment Market. The basic units for evaluation were the economic sector, the national total and the results by autonomous community (AC). The data relate to quarterly or monthly time series, depending on the indicator.

The data come from national statistics compiled by the National Statistics Institute (INE in Spanish), the Independent Authority for Fiscal Responsibility (AIReF in Spanish), and the Ministry of Social Security.

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The indicators selected were:

I. Production

- Gross domestic product volume index (GDP). Quarterly data by ACs, seasonally and calendar adjusted. Time series from the first quarter of 2000 to the fourth quarter of 2020.
- Industrial Production Index (IPI). Monthly data by ACs (base 2015). Time series from January 2002 to December 2020.

II. Supply

- Number of companies registered for Social Security. Monthly data by ACs and economic sectors (agriculture, industry, and services). Time series from January 2003 to December 2020.

III. Demand

- Business Turnover Index (BTI). Monthly data by ACs (base 2015). Time series from January 2005 to December 2020.

IV. Employment Market

- Unemployment rate, percentage of unemployed workers in the total labour force. Quarterly data by ACs and economic sector (agriculture, industry, and services). Data from the Economically Active Population survey (EPA in Spanish). Time series from the first quarter of 2008 to the fourth quarter of 2020.

The above-mentioned indicators are part of the Spanish national accounting system, their purpose being to reflect, in a composite and quantitative manner, the main features of economic activity in a specific period, nationally, regionally and by sector [7].

*2.2 Statistical analysis*

To estimate the economic impact of COVID-19 we performed a modelling, by means of the Bayesian Structural Time Series (BSTS) [8], of each of the proposed indicators, using the information available in each indicator during the period before the beginning of the state of alert in Spain in March, 2020. The BSTS model provides a dynamic forecast influenced by the trend prior to the beginning of the pandemic, and by the previous values.

In our BSTS model, the behaviour of the variable of interest is explained by starting with the equation

$$y_t = \mu_t + \tau_t + \varepsilon_t$$

The first and second state components, $\mu_t$ and $\tau_t$, are the trend at time $t$ and the seasonal component, respectively. Our model assumes a local linear trend in which the expected increase in $\mu$ between t and t+1($\delta$) presents a random walk pattern.

$$\mu_t = \mu_{t-1} + \delta_t + \upsilon_t$$
$$\delta_t = \delta_{t-1} + \nu_t$$

The seasonal component is represented by the state component $\tau_t$, which can be interpreted via a set of 12 dummy variables (4 dummy variables in quarterly time series) with dynamic coefficients constrained to have zero expectation over a year.

$$\tau_t = -\sum_{s=1}^{12-1} \tau_{t-s} + w_t$$

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The error terms $\varepsilon_t$ and $\eta_t = (\upsilon_t, \nu_t, w_t)$ follow independent Gaussian random noises, $N(0,\sigma_*^2)$. The model is estimated in a Bayesian framework specifying the prior distributions of the unknown parameters $\theta$: $\{\sigma_\varepsilon^2, \sigma_\upsilon^2, \sigma_\nu^2, \sigma_w^2\}$. The Gibbs sampling is used to simulate the parameters of the model and the posterior predictive distribution over the counterfactual time series, given the observed pre–pandemic activity. Once converged, each Gibbs sampling trajectory may be iterated forward using the estimated state variables and parameters to construct the counterfactual time series.

The actual response is compared with the counterfactual time series. Subtracting this counterfactual time series from the observed response during the pandemic period yields a semiparametric Bayesian posterior distribution for the impact effect. Finally, we can use the samples from the posterior distribution to report the relative cumulative effect caused by the pandemic, including the Bayesian credible interval (CI). We implemented our analysis in R using the Causal Impact package [9].

## 3. Results

### *3.1 Production*

Figure 2a shows the progression of the time series, with quarterly frequency, of the GDP volume index for the national total. With the beginning of the pandemic, the sharp fall in this index was clearly noticeable. We estimated a cumulative relative impact of the pandemic on the GDP volume index of -11.41% [95% credible interval: -13.46; -9.29] – see Table 1. By AC, those most economically dependent on the services sector, and especially on tourism, were those which showed the greatest fall in GDP. This was the case of the Balearic Islands (-19.61% [-21.65; -17.53]) and the Canary Islands (-14.09% [-16.13; -12.03]). At the other extreme, the ACs recording the lowest fall in GDP were those in which the agrarian sector has the greatest weight, namely Extremadura (-7.45% [-9.46; -5.42]) and Murcia (-8.42% [-10.92; -5.94]).

Table 1. Bayesian structural time series model results for production: relative cumulative effect [95% Bayesian credible interval]

| Community | GDP volume index Pandemic measuring period (1st quarter 2020 to 4th quarter 2020) | | IPI index Pandemic measuring period (March 2020 to December 2020) | |
|---|---|---|---|---|
| Andalusia | -10.73% | [-12.88; -8.55] | -9.63% | [-17.24; -2.02] |
| Aragon | -10.71% | [-13.02; -8.36] | -10.11% | [-17.52; -2.92] |
| Asturias | -10.00% | [-12.22; -7.75] | -15.30% | [-21.52; -9.04] |
| Balearic Islands | -19.61% | [-21.65; -17.53] | -22.36% | [-33.14; -11.71] |
| Canary Islands | -14.09% | [-16.13; -12.03] | -13.17% | [-18.35; -7.96] |
| Cantabria | -9.09% | [-11.09; -7.03] | -8.09% | [-14.23; -2.13] |
| Castile-La Mancha | -8.56% | [-11.19; -5.93] | -8.77% | [-15.14; -2.52] |
| Castile and León | -9.12% | [-10.95; -7.28] | -9.63% | [-18.00; -1.59] |
| Catalonia | -14.07% | [-16.33; -11.82] | -10.32% | [-16.24; -4.49] |
| Valencian C. | -12.49% | [-14.93; -10.03] | -6.76% | [-12.76; -0.82] |
| Extremadura | -7.45% | [-9.46; -5.42] | -0.35% | [-9.36; 8.81] |
| Galicia | -8.81% | [-10.96; -6.62] | -12.48% | [-19.52; -5.75] |
| La Rioja | -10.61% | [-13.05; -8.16] | -13.47% | [-21.05; -6.06] |
| Madrid | -10.39% | [-12.51; -8.23] | -7.35% | [-13.77; -1.04] |

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| | | | | |
|---|---|---|---|---|
| Murcia | -8.42% | [-10.92; -5.94] | -0.31% | ]-8.28; 7.53] |
| Navarre | -10.64% | [-12.94; -8.34] | -14.05% | [-21.31; -7.14] |
| Basque Country | -10.43% | [-12.45; -8.38] | -15.65% | [-23.01; -8.51] |
| Total Spain | -11.41% | [-13.46; -9.29] | -9.92% | [-15.68; -4.26] |

Note: Gross Domestic Product (GDP); Industrial Production Index (IPI).

The COVID-19 crisis has impacted squarely on the country's industrial fabric, causing a sharp fall in the IPI (see Figure 2b). Nationally, the fall was of -9.92% [-15.68; -4.26]. The communities in which the agrarian sector has the greatest weight, Extremadura and Murcia, did not show significant changes in their IPI. The greatest contrast was found in the Balearic Islands (-22.36% [-33.14; -11.71]), the Basque Country (-15.65% [-23.01; -8.51]), and Asturias (15.30% [-21.52; -9.04]).

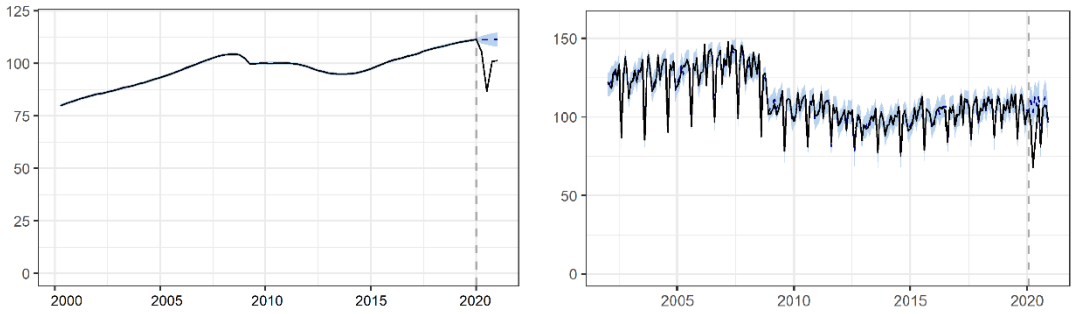
*3.2 Supply*

During the coronavirus crisis, many companies were obliged to stop working. Since March, 2020, many of them have removed themselves from the Social Security register. Cumulatively, between March and December, 2020, COVID-19 caused an estimated reduction of -5.09% [-6.51; -3.67] in the number registered. The destruction of companies was highest in the Balearic Islands and in the Canary Islands: -7% [-8.54; -5.49] and -6.71% [-7.54; -5.9] respectively (see Figure 3a and Table 2).

Figure 2. Impact of Covid-19 crisis on production. Total Spain

a) Gross domestic product volume index — Frequency: Quarterly

b) Industrial Production Index — Frequency: Monthly




*3.3 Demand*

The reduction in business activity is directly related to the strong fall in demand in Spain during the pandemic, in particular during the strict confinement. We estimate that, nationally, the BTI fell by -9.37% [-12.71; -6.07]. Once again, the Balearic Islands and the Canary Islands experienced greater impacts: -16.81% [-20.98; -12.73] and -18.43% [-22.23; -14.6] respectively (see Figure 3b and Table 2).

Table 2. Bayesian structural time series model results for supply and demand: relative cumulative effect [95% Bayesian credible interval]

| Community | Companies registered with SS. Pandemic measuring period (March 2020 to December 2020) | | Business Turnover Index Pandemic measuring period (March 2020 to December 2020) | |
|---|---|---|---|---|
| Andalusia | -5.09% | [-6.51 ; -3.67] | -11.39% | [-15.18 ; -7.71] |

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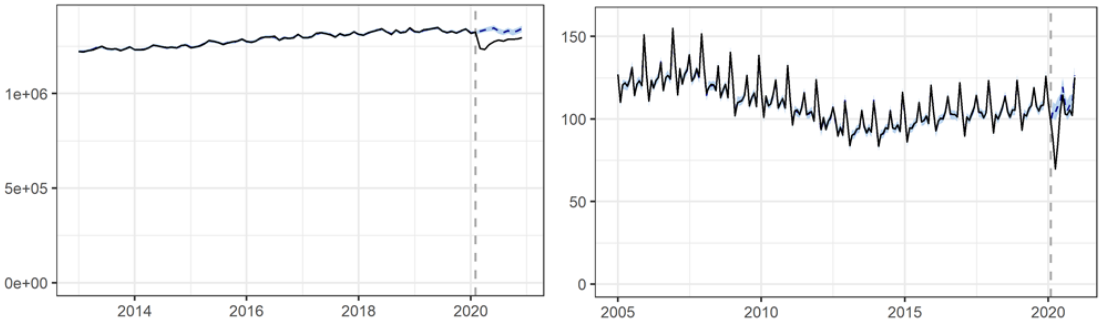
| | | | | |
|---|---|---|---|---|
| Aragon | -3.59% | [-4.05 ; -3.14] | -8.19% | [-12.01 ; -4.37] |
| Asturias | -3.82% | [-4.39 ; -3.24] | -5.34% | [-8.86 ; -1.85] |
| Balearic Islands | -7.00% | [-8.54 ; -5.49] | -16.81% | [-20.98 ; -12.73] |
| Canary Islands | -6.71% | [-7.54 ; -5.9] | -18.43% | [-22.23 ; -14.66] |
| Cantabria | -3.96% | [-4.65 ; -3.28] | -6.81% | [-10.4 ; -3.28] |
| Castile-La Mancha | -4.18% | [-5.32 ; -3.06] | -5.16% | [-9.14 ; -1.23] |
| Castile and León | -4.53% | [-4.97 ; -4.09] | -8.07% | [-11.42 ; -4.74] |
| Catalonia | -4.32% | [-5.04 ; -3.61] | -11.77% | [-15.41 ; -8.18] |
| Valencian C. | -4.59% | [-5.34 ; -3.87] | -7.86% | [-11.95 ; -3.8] |
| Extremadura | -3.92% | [-4.4 ; -3.43] | -8.08% | [-10.84 ; -5.38] |
| Galicia | -4.04% | [-4.85 ; -3.26] | -3.23% | [-6.74 ; 0.24] |
| La Rioja | -4.64% | [-5.66 ; -3.65] | -6.13% | [-10.17 ; -2.18] |
| Madrid | -4.28% | [-5.15 ; -3.43] | -6.49% | [-10.45 ; -2.58] |
| Murcia | -2.71% | [-3.35 ; -2.07] | -9.61% | [-14.03 ; -5.17] |
| Navarre | -2.59% | [-3.05 ; -2.14] | -6.92% | [-10.19 ; -3.67] |
| Basque Country | -2.86% | [-4.03 ; -1.54] | -5.45% | [-8.86 ; -2.12] |
| Total Spain | -5.09% | [-6.51 ; -3.67] | -9.37% | [-12.71 ; -6.07] |

Note: Social Security (SS)

Figure 3. Impact of the Covid-19 crisis on supply and demand. Total Spain

a) Number of companies registered for Social Security
Frequency: Monthly

b) Business Turnover Index
Frequency: Monthly




*3.4 The employment market*

The coronavirus crisis has also strongly affected the Spanish employment market. We estimate that during 2020 there was a cumulative increase of 11.9% [4.27; 19.45] in the unemployment rate. The communities with the highest growth in the unemployment rate were the Balearic Islands (58.1% [20.91; 95.26]), Madrid (24.2% [8.73; 39.75]) and Catalonia (20.8% [7.49; 34.12]). See Figure 4a and Table 3.

According to our estimates, the economic sector that has eliminated the largest number of jobs has been the services sector. In that sector, nationally, in 2020 we found a cumulative increase in the unemployment rate of 27.68% [9.96; 45.4]. The Balearic Islands led the destruction, with a cumulative increase of 74.82% [26.93; 122.7]. See Figure 4b and Table 3.

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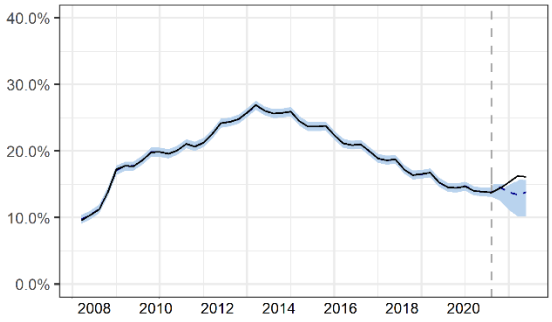
Figure 4. Impact of Covid-19 crisis on the employment market. Total Spain

a) Total unemployment rate
Frequency: Quarterly




b) Services sector unemployment rate
Frequency: Quarterly

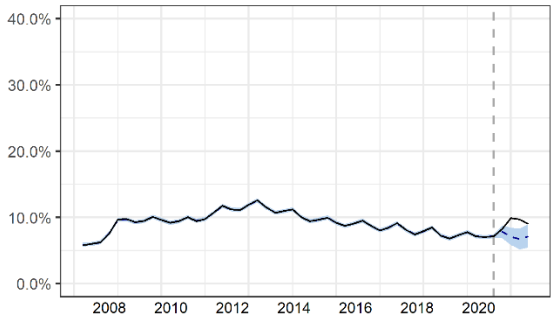



Table 3. Bayesian structural time series model results for the employment market: Relative Cumulative Effect and [95% Bayesian credible interval]

| Community | Total unemployment rates Pandemic measuring period (1st quarter 2020 to 4th quarter 2020) | | Services sector unemployment rates Pandemic measuring period (1st quarter 2020 to 4th quarter 2020) | |
|---|---|---|---|---|
| Andalusia | 6.7% | [2.43 ; 11.05] | 23.11% | [8.32 ; 37.89] |
| Aragon | 15.4% | [5.54 ; 25.25] | 34.03% | [12.25 ; 55.81] |
| Asturias | 4.4% | [1.57 ; 7.17] | 27.52% | [9.91 ; 45.14] |
| Balearic Islands | 58.1% | [20.91 ; 95.26] | 74.82% | [26.93 ; 122.7] |
| Canary Islands | 16.8% | [6.06 ; 27.62] | 39.63% | [14.27 ; 64.99] |
| Cantabria | 10.3% | [3.7 ; 16.84] | 31.73% | [11.42 ; 52.04] |
| Castile-La Mancha | 5.8% | [2.09 ; 9.5] | 1.60% | [-0.58 ; 2.62] |
| Castile and León | 6.0% | [2.17 ; 9.88] | 12.72% | [4.58 ; 20.87] |
| Catalonia | 20.8% | [7.49 ; 34.12] | 44.23% | [15.92 ; 72.53] |
| Valencian C. | 11.8% | [4.23 ; 19.27] | 19.34% | [6.96 ; 31.73] |
| Extremadura | 4.9% | [1.76 ; 8.03] | 7.81% | [2.81 ; 12.8] |
| Galicia | 0.1% | [0.04 ; 0.18] | 7.66% | [2.76 ; 12.56] |
| La Rioja | 8.5% | [3.06 ; 13.95] | 37.38% | [13.46 ; 61.31] |
| Madrid | 24.2% | [8.73 ; 39.75] | 41.69% | [15.01 ; 68.38] |
| Murcia | 3.1% | [1.13 ; 5.15] | 11.26% | [4.05 ; 18.46] |
| Navarre | 10.0% | [3.59 ; 16.34] | 48.25% | [17.37 ; 79.12] |
| Basque Country | 4.8% | [1.72 ; 7.86] | 17.54% | [6.32 ; 28.77] |
| Total Spain | 11.9% | [4.27 ; 19.45] | 27.68% | [9.96 ; 45.4] |

## 4. Discussion

The economic impact of a pandemic does not happen gradually, nor is there any date for its end. The effects on economic activity depend on the progression of the pandemic, and in particular on the measures taken to contain it [10]. In Spain those measures caused an economic slowdown which resulted in a fall in revenue and a sharp increase in unemployment. The spread of the consequences of the pandemic to countries throughout the

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world resulted in restrictions on movements between countries, with a direct effect on tourism and a reduction in international demand for goods and services.

Changes in the GDP constitute an indicator of obvious importance for measuring economic impacts in any country. We estimate that the adverse impact of the coronavirus pandemic on GDP in Spain in 2020 was of 11.41%. Our estimates are similar to those of BBVA Research [11].

The strict confinement measures between March and May, 2020, resulted in an immediate decrease in demand, as they restricted access to the majority of the establishments selling goods and services, and also because families, faced with such a dismal outlook, reduced their consumption and began to save more. This mechanism, which acts through the demand channel, is one of the three that have been described to explain the impact of the pandemic on the GDP [10]. The other two are the indirect impact via the financial markets, and the fall in the supply of, and demand for, work and employment, which ultimately result in losses of jobs and reduced activity [12].

The ACs in which agriculture has the greatest relative weight in their economies recorded the smallest falls in GDP. Extremadura, Murcia and Castile-La Mancha are ACs in which the agrarian sector has considerable weight, and in which, according to our estimates, the decrease in GDP was less than 9%. The primary sector has provided an essential service in maintaining supplies of food to citizens during COVID-19. This sector has managed to deal with the effects of the pandemic by replacing consumption outside the home with consumption at home [13]. Contrasting with the decline of one of the sectors which the pandemic has hit the hardest – the hotel and catering sector − there has been a significant and sustained growth in general food products, especially fresh products, sold directly to households [12].

At the other end of the scale, the communities whose economies are the most dependent on the services sector, particularly on tourism, are the ones that have suffered the biggest impact on their GDP. We estimate falls of -19.61% and -14.09% in GDP in the Balearic Islands and the Canary Islands respectively. The decline in the sector of tourism weighs heavily on the national GDP, and even more intensely on that of ACs which depend on the arrival of tourists [14]. No tourists arrived in our country in April or May, and it was not until June, with the partial lifting of the restrictions on movements, that the first post-pandemic tourists were received. The summer season closed with a cumulative fall of 87.11% in the number of tourists [15]. Spain is a country whose economy is strongly dependent on tourism, which accounts for 11.8% of the GDP and is responsible for 13.5% of the employment, whereas in the OECD countries tourism represents, on average, 4.4% of the GDP and is connected with 6.9% of the jobs [16].

The COVID-19 crisis has caused an unprecedented fall in the IPI. According to our estimates, it was of -9.92%. During the period of strict confinement, the manufacture of durable consumer goods and capital equipment was affected the most, with respective falls of 69.0% and 57.8% compared with last year's figures [17]. Apart from construction, the most important industrial sub-sectors in our country are the automobile industry and the food and beverage industry. The former is of crucial importance because of both the internal demand and the volumes exported. According to data from the manufacturers' association, compared with 2019, the production of vehicles in Spain declined by 19.6% in 2020 [18]. With regard to the production of the food industry, as well as for consumption by the Spanish (in the home and outside it), it is mainly for tourists and for export.

We estimate that, nationally and between March and December, 2020, the cumulative number of companies registered for Social Security decreased by -5.09% [-6.51; -3.67]. For many companies, the fall in demand resulted in asphyxiation, obliging them either to reduce their offer or to cease trading permanently. Most of the business closures occurred at the beginning of the confinement, in March. The statistics of the Department of Social Security include details about every employer in Spain, including self-employed people who themselves employ other workers.

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When companies remove themselves from the Social Security register, it is because they have dismissed all their employees, so companies whose employees are only temporarily laid off (in Spanish, by an ERTE: temporary employment regulation) are excluded from these statistics. In Northern Spain, in the industrial regions of Navarre and the Basque Country, most of the adjustment to employment was effected by means of ERTEs, so a smaller reduction in the number of companies appears. At the opposite extreme, the Balearic Islands and the Canary Islands had the worst of it, because of their high dependence on tourism.

Payments in arrears and reduced internal demand were the principal causes of the decrease in the production and turnover of Spanish industry during the COVID-19 crisis in 2020. Our results show that the BTI (national) fell by -9.37% [-12.71; -6.07]. The purpose of this index is to measure the monthly changes in demand in businesses other than those in the financial sector.

Private consumption in Spain represents approximately 60% of GDP, so it is directly responsible for a large proportion of the changes in the economy [19]. In situations like the current one, in which foreign trade can take a long time to recover, it is internal demand that must try to redress the slowdown in the economy. Measures such as the ERTEs are trying to soften the fall in families' incomes. Nevertheless, the effect of such policies is still being weakened by great uncertainty about the future, and this results in little confidence about the progress of the economy; data from the Eurobarometer show that the forecasts of more than 50% of Spanish people are pessimistic about the economy and about employment [20].

The characteristics of the Spanish employment market – poor skills, a high proportion of temporary jobs, high unemployment, low salaries (especially in the services sector and among young people) – are the clearest explanation of the vulnerability and inequality that exist in our country. Our estimates show a cumulative increase of 11.9% [4.27; 19.45] in the national unemployment rate during 2020. And it should be noted that the reduction in employment is greater than that shown by these figures because the workers under ERTEs are still regarded as employed people by the EPA survey.

The impact of COVID-19 on the employment market has not been homogeneous throughout the Spanish provinces. Those with less diversified industry and a greater presence in the services sector are those that are suffering the worst results. According to our calculations, the economic sector in which the most employment has been destroyed is the services sector.

In short, our calculations of the impact of COVID-19 in 2020 reveal a dramatic situation for Spain, for two interconnected reasons: the greater impact of the epidemic (incidence and morbi-mortality) [21] and the fragility of a productive system which has to confront the changes in behaviour induced by the pandemic: more prospects of teleworking, increased foreign dependence, basically on income from tourism, and less development of technology of high added value.

## 5. Conclusions

The economic crisis due to COVID-19 is continuing long enough to have lasting effects. We need a correct allocation of resources in order to shorten the recovery period and stimulate economic growth. The availability of funds from the European Union will be crucial. To manage them correctly, we need co-operation among administrations at three levels: the national, the AC and the local. Never have economic policies concentrated so much on health, and never have health policies had such a strong economic impact as now, in these times of COVID-19. The challenge now is to do some "fine tuning", lifting or imposing restrictions on the economy, and succeeding at the same time in keeping the number of contagions below the level that would be critical for our medical resources.

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The data are available on the respective websites:

https://www.airef.es/es/datalab/series-historicas-de-actualizaciones-pib-trimestral-ccaa/

https://www.ine.es/dyngs/INEbase/es/operacion.htm?c=Estadistica_C&cid=1254736145519&menu=resultados&idp=1254735576715#!tabs-1254736194962

https://www.ine.es/dyngs/INEbase/es/operacion.htm?c=Estadistica_C&cid=1254736176863&menu=resultados&idp=1254735576778#!tabs-1254736195018

https://www.ine.es/dyngs/INEbase/es/operacion.htm?c=Estadistica_C&cid=1254736176900&menu=resultados&idp=1254735576799#!tabs-1254736195063

https://expinterweb.mites.gob.es/series/

https://www.ine.es/dynt3/inebase/index.htm?padre=979&capsel=979

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## References

1. World Health Organization. Available online: https://www.who.int/csr/don/05-january-2020-pneumonia-of-unkown-cause-china/es/ (accessed on 16 January 2021)
2. World Health Organization. Available online: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200130-sitrep-10-ncov.pdf?sfvrsn=d0b2e480_2 (accessed on 16 January 2021)
3. López-Valcárcel BG.; Meneu R. El gasto que está triste y azul: Debe preocupar más la salud que el gasto sanitario. *Gaceta Sanitaria* **2012,** 26 (2), 176-177.
4. Sisó-Almirall A. El desafío de la COVID-19 para la atención primaria y comunitaria. Available online: http://www.aes.es/blog/2020/05/27/el-desafio-de-la-covid-19-para-la-atencion-primaria-y-comunitaria/ (accessed on 16 January 2021)
5. OECD. Health at a Glance: Europe 2018. Available online: https://www.oecd-ilibrary.org/social-issues-migration-health/health-at-a-glance-europe-2018/health-expenditure-per-capita_health_glance_eur-2018-29-en;jsessionid=85quQO-GAsLpny1ZgYaxNpWbC.ip-10-240-5-7 (accessed on 16 January 2021)
6. Altig D, Baker S, Barrero JM, Bloom N, Bunn P, Chen S, Davis S.J, Leather J, Meyer B, Mihaylov E, Mizen P, Parker N, Renault T, Smietanka P, Thwaites G (2020). Economic uncertainty before and during the COVID-19 pandemic. *Journal of Public Economics*, **2020**, 191, 1-13.
7. Eurostat Statistic Explained Online Publication. Building the System of National Accounts – basic concepts. Available online: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Building_the_System_of_National_Accounts_-_basic_concepts (accessed on 16 January 2021)
8. Scott S.L., Varian H.R.: Predicting the present with Bayesian Structural Time Series. *International Journal of Mathematical Modelling and Numerical Optimization*, **2014**, 5, 4-23.
9. Brodersen K.H., Gallusser F., Koehler J., Remy N., Scott S.L. Inferring causal impact using Bayesian structural time-series models. *The Annals of Applied Statatistics*, **2015**, 9, 247-274.
10. Carlsson-Szlezak, Philipp, Reeves, M., Swartz, P. Understanding the Economic Shock of Coronavirus. Harvard Business Review. **2020**. Available online: https://hbr.org/2020/03/understanding-the-economic-shock-of-coronavirus (accessed on 16 January 2021)
11. BBVA Research, publicaciones de Análisis Regional España. Available online: https://www.bbvaresearch.com (accessed on 30 January 2021)

 doi:10.20944/preprints202103.0469.v1


12. Boscá J.E., Doménech R., Feri J. El Impacto Macroeconómico del Coronavirus. Fedea Apuntes, **2020**, 02. Available online: https://documentos.fedea.net/pubs/ap/2020/ap2020-02.pdf (accessed on 30 January 2021)
13. Fernández A. The economic performance of Spanish provinces during 2020 and its determinants. Banco de España, Economic Bulletin, Analytical Articles. **2021**, 1.
14. Conesa JC, Fernández G., Kehoe TJ. La crisis económica de COVID-19: Vías de Salvación. Aspectos económicos de la crisis del Covid-19. Coordinadores Felgueroso F, de la Fuente A. y Jansen M. Estudios sobre la Economía Española. FEDEA Boletín de seguimiento **2020**, 6.
15. Instituto Nacional de Estadística (INE), Movimientos turísticos en fronteras. Frontur. Available online: https://www.ine.es/dyngs/INEbase/es/operacion.htm?c=Estadistica_C&cid=1254736176996&menu=ultiDatos&idp=1254735576863 (accessed on 16 January 2021)
16. OECD, The impact of COVID-19 on Education. Insights from Education at a Glance 2020: OECD Indicators, OECD Publishing, Paris. Available online: https://www.oecd.org/education/the-impact-of-covid-19-on-education-insights-education-at-a-glance-2020.pdf (accessed on 16 January 2021)
17. Instituto Nacional de Estadística (INE), Índice de Producción Industrial base 2015. Available online: https://www.ine.es/dyngs/INEbase/es/operacion.htm?c=Estadistica_C&cid=1254736145519&menu=resultados&idp=1254735576715#!tabs-1254736194962 (accessed on 16 January 2021)
18. Asociación Española de Fabricantes de Automóviles y Camiones (Anfac). Informe de Producción y Exportación de vehículos. Available online: https://anfac.com/actualidad/la-produccion-de-espana-se-reduce-un-196-con-227-millones-de-vehiculos-fabricados-en-2020/ (accessed on 16 January 2021)
19. Instituto Nacional de Estadística (INE), Contabilidad Nacional Trimestral (CNTR). Available online: https://www.ine.es/dyngs/INEbase/es/operacion.htm?c=Estadistica_C&cid=1254736164439&menu=resultados&idp=1254735576581 (accessed on 16 January 2021)
20. Eurobarometer european commission. Available online: https://ec.europa.eu/commfrontoffice/publicopinion/index.cfm (accessed on 16 January 2021)
21. Roser M., Ritchie H., Ortiz-Ospina E, Hasell J. Coronavirus Pandemic (COVID-19). Available online: https://ourworldindata.org/coronavirus (accessed on 16 January 2021)