

# Macroeconomic Impacts of the Covid-19 Pandemic in Some European Union Countries: A Counterfactual Analysis

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# I. Introduction

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- ❑ **The outbreak of SARS-CoV-2, also known as Covid-19**
  - ❑ Was **declared a pandemic** by the World Health Organization (WHO) on **March 11, 2020** after being initially reported in December 2019 in Wuhan following its rapid widespread
  
- ❑ **Economic impacts of the Covid-19 pandemic**
  - ❑ Although it might seem **too early** to **talk about** the **economics of the Covid-19 pandemic**, the “**Corononomics**” as termed by Eichengreen (2020)
  
  - ❑ It **remains pertinent** to **analyze** its **macroeconomic impacts** due to the **damage caused** by the direct and indirect economic effects **across countries**, namely in the European Union (EU)

# I. Introduction

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## □ The Covid-19 pandemic

- **Forced** the European countries to **lock down borders**, preventing **normal flows of goods, capital and services**
- **Moreover**, **businesses and production shut down temporarily**, causing enormous endogenous **negative shocks** on both **supply and demand**, with potential devastating effects for the economies
- **In addition** to dire **health consequences**, the pandemic is a massive and far-reaching **economic cost burden** for all EU countries, leading many into **recession** and possibly economic **depression**

# I. Introduction

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## □ The aim of this research

- Is to **analyze** the **macroeconomic impacts** of the **Covid-19 pandemic** in the **European Union** (27 countries) and, particularly, in four of its economies – **Germany, Spain, Italy** and **Portugal**

## □ For this purpose,

- A **counterfactual analysis** was **conducted** based on an **ARIMA forecasting model** through which
  - The **behavior** of a **set of macroeconomic variables** (**Gross Domestic Product, public debt, inflation rate, public deficit, and unemployment rate**) is **examined** in
  - The **context of the Covid-19 pandemic** against a **hypothetical scenario without pandemic**

# I. Introduction

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- ❑ **There are three main reasons for choosing these countries**
  - ❑ i) Number of **confirmed cases** of the disease in the first three waves of the Covid-19 pandemic;
    - ❑ We think that **Spain** and **Italy** are **two good examples** of the situation
  - ❑ ii) Highest **vaccination rate** of their population, and
    - ❑ **Portugal** is the **best explanatory example** of that reason
  - ❑ iii) **Fiscal space to react** to the pandemic
    - ❑ **Germany fits perfectly well** into this last argument
- ❑ Naturally, the **EU-27** is a **benchmark**, aimed to carry out a **comparative analysis** of the **macroeconomic impacts** of the Covid-19 pandemic for the **EU as a whole**

# I. Introduction

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## ❑ Methodology

- ❑ The **counterfactual analysis** is developed from an **ARIMA (Autoregressive Integrated Moving Average)** forecasting model
- ❑ This model allows us to **predict**, with a **high degree of exactitude**, the **expected values** of the variables for the **years 2020, 2021 and 2022**, based on a **linear combination of past values**

## ❑ Results...

- ❑ With some exceptions, the **results** point to a **better performance** of **all the variables** in the **four EU countries** and in the **EU-27** had the **Covid-19 pandemic not existed**
- ❑ In a **counterfactual scenario without the pandemic**, all **countries** would have **achieved higher product levels**, also showing significantly **lower levels of public debt, inflation, public deficit** and **unemployment**

# I. Introduction

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- ❑ **Originality and contribution to the literature**
  - ❑ To the best of our knowledge, a **counterfactual analysis** based on **autoregressive methods** and focused on **macroeconomic variables** has **never been carried out before** for such a **large sample of EU countries** that included simultaneously an analysis of the **EU-27**
  - ❑ We believe that this study is an **important contribution** to the **literature** on the subject, namely from the **prospective point of view** of the **economic policies** to be adopted in a pandemic and non-pandemic context, since both scenarios are considered in our study

# I. Introduction

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- ❑ This seminar is structured as follow
  - ❑ In **section 2** we briefly **examine** the general **context** of the **Covid-19 pandemic** in the **EU countries**
  - ❑ In **section 3**, we **describe** the **data** and **present a preliminary analysis** of the **behavior of the variables**
  - ❑ In **section 4**, we **develop** the **counterfactual analysis** of the macroeconomic effects of the Covid-19 pandemic, **presenting** the **methodology** and the **main results** of the empirical study
  - ❑ Finally, in **section 5**, we present the **main conclusions** of this study



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# The Covid-19 Pandemic in the European Union Countries

## II. The Covid-19 Pandemic in the EU Countries

### □ Number of cases and deaths

		EU-27	Germany	Spain	Italy	Portugal
Total of cases	2020	15853348	1783390	2015318	2209100	432358
	2021	37314081	5228298	3913084	3419735	853760
Cases per million people	2020	35441	21444	42578	37040	41993
	2021	83417	62865	82672	57338	82922
Total of deaths	2020	402834	43952	54914	79360	7226
	2021	493209	66844	34212	57815	11177
Deaths per million people	2020	901	528	1160	1331	702
	2021	1103	804	723	969	1086

Source: European Centre for Disease Prevention and Control and author's own calculations.

- In **2020**, **Italy**, **Portugal** and **Spain** recorded the **highest number of cases** per million inhabitants
- In **2021**, the **number of cases increased** in all countries
  - The **number of deaths** per million of inhabitants **decreased** in **Italy** and **Spain**, countries where mortality Covid-19 was the worst in 2020
  - On the other hand, in **Germany**, **Portugal** and the **EU-27** the **number of deaths** per million inhabitants **increased**

## II. The Covid-19 Pandemic in the EU Countries

### □ Health care expenditure

- The **treatment** and **control** of the **disease** represents a **burden on national health systems**

- Note: At the time this paper was written there were **no data available on the pandemic period** that followed

	EU-27	Germany	Spain	Italy	Portugal
Health care expenditure (% of GDP)	9.92	11.70	9.13	8.67	9.53
Health care expenditure (euro per inhabitant)	3102.05	4855.33	2411.68	2599.22	1982.5

Source: Eurostat.

- In **2019**, **Germany health care expenditure**, as a % of GDP and per inhabitant, are **higher than in EU-27**
- The two **countries** that were **most affected** by the **first wave** of the pandemic, **Italy** and **Spain**, recorded the **lowest expenditure as a % of GDP**
- **Portugal** is the country with the **lowest expenditure per inhabitant**

## II. The Covid-19 Pandemic in the EU Countries

### □ Vaccination process (2021)

- The EU member states implemented a **common strategy** to **approve** and **buy Covid-19 vaccines**

		EU-27	Germany	Spain	Italy	Portugal
Total doses	Week 12	71,636,748	13,248,382	7,695,843	9,570,850	1,738,445
	Week 26	386,076,404	78,181,753	44,517,117	53,751,404	9,318,147
	Week 40	576,827,903	109,239,051	70,992,542	85,705,664	16,174,152
	Week 52	741,793,966	149,863,127	79,590,105	110,001,548	19,679,347
Uptake of at least one dose (%)	Week 12	11.3	11.2	10.7	11.0	11.9
	Week 26	52.6	57.3	56.5	58.5	56.6
	Week 40	68.0	68.7	80.0	76.2	87.5
	Week 52	72.8	74.2	84.1	80.5	90.4
Uptake full vaccination (%)	Week 12	4.7	4.8	5.6	5.0	4.9
	Week 26	35.7	39.2	40.4	33.7	36.8
	Week 40	63.2	65.3	73.3	69.3	80.5
	Week 52	68.5	71.2	75.2	74.3	82.6

Source: European Centre for Disease Prevention and Control.

- As expected, over time, **Covid-19 vaccination rates grew**
- **Portugal** achieved the **highest record** in terms of the proportion of the population with **at least one dose** of the vaccine and the proportion of the population **fully vaccinated** (in spite of the low rate of health expenditure per inhabitant)
- **Spain** has the **second-best record**, followed by Italy and Germany
- The **EU-27** has the **worst vaccination record**

## II. The Covid-19 Pandemic in the EU Countries

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- ❑ **Policy reactions to fight to Covid-19 pandemic**
  - ❑ The **first reactions** and **spending decisions** to **fight against the Covid-19 pandemic** and to **support households** and **companies** were essentially **taken by countries**
  - ❑ **However**, on April 9, 2020, the **EU established an instrument (€540 billion)** providing **temporary support** to mitigate **unemployment risks** in an emergency (SURE) to help workers, businesses and member states
    - ❑ They also agreed, on July 21, 2020, on a i) **€750 billion recovery effort** to help the EU tackle the crisis caused by the pandemic and, ii) a 2021-2027 **long-term EU budget of €1,074.3 billion** to support investment in the digital and green transitions and resilience
  - ❑ The **European Central Bank** initiated, in March 2020, the **pandemic emergency purchase program (PEPP)**, totaling **€1,850 billion**, with the aim to **lower borrowing costs** and **increase lending** in the euro area

## II. The Covid-19 Pandemic in the EU Countries

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### ❑ Policy reactions to fight to Covid-19 pandemic

- ❑ In addition to the above measures, the **growing number of infected people** also led to the combination of **other policy measures (lockdown, quarantine, testing)** to “flatten the curve”

### ❑ The Covid-19 pandemic crisis

- ❑ Generated **disruptions** in **economic activity**, **output loss** and **unemployment** which are important to assess
- ❑ However, this is a **new type of shock**
  - ❑ Therefore, **comparing** its macroeconomic adverse effects **with other past crises** can lead to **misleading outcomes**
- ❑ In the **following sections** we proceed to the **counterfactual analysis** in order to **capture the impact** of the **outbreak** and to **predict** the **macroeconomic effects of the pandemic...**

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# Data and Preliminary Analysis

### III. Data and Preliminary Analysis

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#### □ The data used in this study

- Was **collected** during the months of **November** and **December 2021** from **AMECO** online macroeconomic database
- We used **time series** data for **five macroeconomic variables**: Gross Domestic Product (GDP), public debt, inflation rate, public deficit, and unemployment rate

Variable	Description
GDP	Gross Domestic Product at constant market prices, Mrd EURO (OVGD)
Debt	Gross Public Debt as a percentage of GDP (UDGG/OVGD)
Inf_CPIH	Inflation rate by Harmonized Consumer Price Index (ZCPIH)
Deficit	Public Deficit as a percentage of GDP (UBLG/OVGD)
U	Unemployment rate, total (percentage of civilian labor force) (ZUTN)

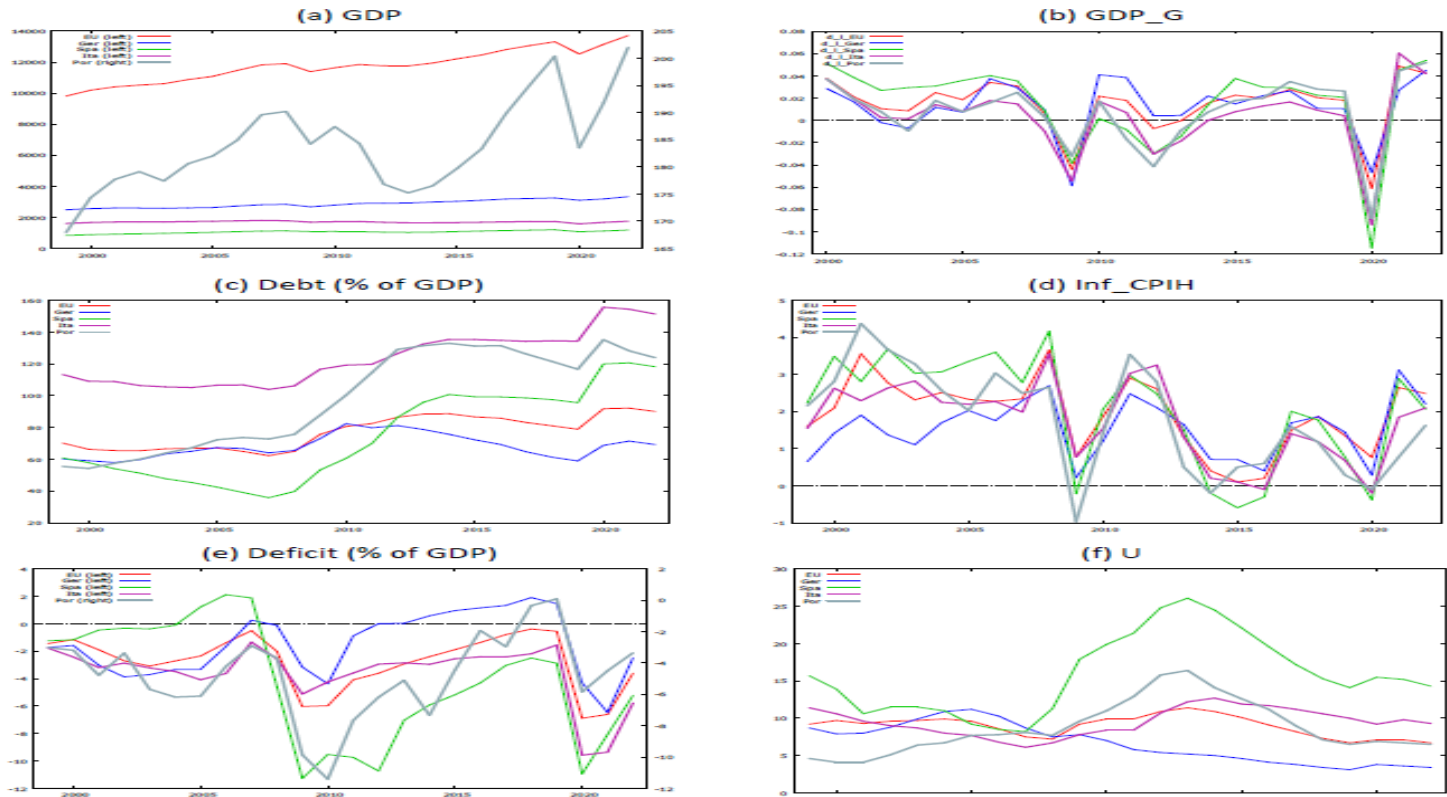
Source: AMECO.

- The sample covers the **period from 1999** (the official launch of the European single currency) **to 2022**
  - This means that the **values** of the series of variables for the years **2021** and **2022** are **AMECO's forecast values**



### III. Data and Preliminary Analysis

#### □ Macroeconomic behavior (1999-2022)



- The graphical analysis of the series allows us to see that the **Covid-19 pandemic** had a **very negative effect** on the **macroeconomic behavior** of the **four EU countries**, as well as of the **EU-27**

### III. Data and Preliminary Analysis

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- ❑ Due to the pandemic shock, EU economies experienced
  - ❑ **Negative growth rates** in their **product**, reversing the good performance they were registering once the international financial crisis of 2011-13 was over
    - ❑ In 2020, the **GDP of Spain fell more than 10%**, followed by **Italy** and **Portugal**, with **negative growth rates** of around **9%** and **8.5%**, respectively
    - ❑ The **Germany** economy is no exception, showing a **4.6% reduction in its product**, slightly below the **EU-27 rate**, with a **drop of the GDP** of approximately **6%**
      - ❑ GDP decline is largely explained by the **temporary production shut down**, the successive **confinements of the population**, and the **disruptions** observed in **international value chains** to which the pandemic gave rise

### III. Data and Preliminary Analysis

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- ❑ As a direct consequence of GDP decline
  - ❑ The **unemployment** and the **inflation rates** also **performed worse**
    - ❑ With the surprising **exception of Italy**, which managed to keep up the **downward trend** in the **unemployment rate** since 2014, the immediate effects of the **pandemic caused unemployment to rise** in the other countries
      - ❑ Standing out negatively, we can mention the performance of the **Spanish economy** with the **unemployment rate approaching 16%**
    - ❑ Regarding the **inflation rate**, at **first** it can be said that there was a **deflationary trend**, mainly explained by the negative demand shock. However, more **recently**, there may be a **pressure for rising prices**
      - ❑ This is a result of the **scarcity of raw materials** and the **growing demand for equipment** and **consumer goods** directly related to the economic and political action taken to **fight against the Covid-19 pandemic**

### III. Data and Preliminary Analysis

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- ❑ Finally, with regard to public finances
  - ❑ Both **public deficit** and **public debt** registered a significant **deterioration** in their performance, once again as an **immediate consequence** of the **political actions** to **overcome the pandemic**
  - ❑ It was observed a very strong **increase in the Spanish public deficit**, which rapidly **rose from -2.9% in 2019 to -11% in 2020**, as well as in the **Italian economy**, which sees its public deficit **increase significantly, from -1.5% in 2019 to -9.6% in 2020**
  - ❑ The **public debt** of all countries **also deteriorated** significantly: **Spain** from **95.5% to 120%**; **Italy** from **134.3% to 155.6%**, **Portugal**, from **116.6% to 135.2%** of GDP
  - ❑ In 2019, **Germany** was the only country whose public debt was below 60% of GDP, but after the Covid-19 pandemic this variable **increased to 68.7% of GDP**

### III. Data and Preliminary Analysis

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- ❑ The forecasts of the European Commission's Directorate General for Economic and Financial Affairs expected that
  - ❑ This **situation be reversed in 2022**, despite the possibility of the 2022 values being considerably higher than before the pandemic
  - ❑ In this context, our **preliminary analysis suggest** that once the pandemic has passed
    - ❑ European public **decision-makers** must **proceed** with **economic policies** that **promote** the **balance of public accounts**, benefiting from the exceptional **financial aid package** created within the scope of **institutional solidarity** recently achieved by the EU within the framework of the so-called **Recovery and Resilience Plan**
    - ❑ Without **balanced public accounts**, Europe will have trouble fostering economic growth capable of reversing future shocks of this nature
  - ❑ The **counterfactual analysis** that follows will certainly **help us** to better **understand** the **need to conduct this** type of **policies**

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# Counterfactual Analysis

# IV. Counterfactual Analysis

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## □ Counterfactual Analysis

- The **question** that arises is **how to measure** the macroeconomic impacts of **something** (in our case the **Covid-19 pandemic**) that now hypothetically **we assume has not occurred**, when **in reality it did happen**
  - We do this by **forecasting the values** of the variables **for 2020, 2021 and 2022** had the **pandemic not taken place**
  - Then, we **compare its dynamics** with the **actual behavior** of the variables in the pandemic context
- In this context, the **relevant period** of data analysis to **develop our counterfactual research** will be from **1999 to 2019**

## IV. Counterfactual Analysis

### □ Descriptive statistics of the variables (1999-2019)

	Mean	Median	Min.	Max.	Std. Dv.	C.V.	Skn.	Exc. K.
<b>EU</b>								
GDP	11567	11757	9812.4	13313	939.17	0.0811	-0.0132	-0.6451
GDP_G	0.0152	0.0192	-0.0439	0.0379	0.0177	1.1625	-1.9188	4.3500
Debt	75.105	75.659	62.197	88.596	9.4950	0.1264	0.1022	-1.6514
Inf_CPIH	1.9215	2.0950	0.1001	3.6613	0.9937	0.5171	-0.2446	-0.5585
Deficit	-2.3434	-2.0082	-6.0311	-0.3805	1.5826	0.6753	-1.0096	0.4981
U	9.2333	9.6000	6.7000	11.400	1.2615	0.1366	-0.4386	-0.4844
<b>Ger</b>								
GDP	2823.9	2805.9	2483.3	3245.0	233.06	0.0825	0.3608	-1.0523
GDP_G	0.0133	0.0132	-0.0586	0.0409	0.0215	1.6147	-1.7429	4.2789
Debt	67.893	65.521	57.938	82.382	7.8806	0.1160	0.5315	-1.0044
Inf_CPIH	1.4942	1.6495	0.2188	2.6966	0.6798	0.4549	-0.2118	-0.7567
Deficit	-1.0955	-0.8798	-4.3792	1.9122	2.0396	1.8617	-0.1423	-1.4122
U	7.0048	7.5000	3.1000	11.200	2.5268	0.3607	0.0423	-1.1916
<b>Spa</b>								
GDP	1040.7	1070.2	831.60	1193.8	95.044	0.0913	-0.5708	-0.3287
GDP_G	0.0180	0.0280	-0.0384	0.0512	0.0243	1.3488	-0.9997	0.0226
Debt	68.117	60.520	35.769	100.70	24.343	0.3573	0.2307	-1.5962
Inf_CPIH	2.1180	2.4768	-0.5964	4.1714	1.4518	0.6854	-0.6502	-0.7851
Deficit	-3.5771	-2.8769	-11.278	2.1219	4.1644	1.1642	-0.4968	-0.9009
U	15.919	15.300	8.2000	26.100	5.6561	0.3553	0.3353	-1.1302
<b>Ita</b>								
GDP	1700.8	1699.4	1599.7	1795.1	47.722	0.0280	0.0395	-0.2257
GDP_G	0.0038	0.0079	-0.0542	0.0371	0.0198	5.1687	-1.3652	2.1321
Debt	118.77	116.60	103.90	135.37	12.637	0.1063	0.2450	-1.6512
Inf_CPIH	1.7884	1.9860	-0.1000	3.5510	1.0542	0.5894	-0.2238	-0.9203
Deficit	-2.9223	-2.8660	-5.1227	-1.3376	0.91190	0.3120	-0.4309	0.1096
U	9.5333	9.6000	6.1000	12.700	1.9635	0.2059	-0.0870	-1.1710
<b>Por</b>								
GDP	182.69	182.00	167.90	200.40	7.5992	0.0415	0.4325	0.0178
GDP_G	0.0088	0.0165	-0.0415	0.0374	0.0211	2.3912	-0.9282	0.1419
Debt	94.053	87.799	54.206	132.93	30.497	0.3242	0.0717	-1.6868
Inf_CPIH	1.9193	2.1521	-0.9698	4.3716	1.4122	0.7357	-0.2910	-0.7880
Deficit	-4.7753	-4.4519	-11.414	0.0932	2.8196	0.5904	-0.5075	0.1527
U	8.9762	7.8000	4.1000	16.400	3.7047	0.4127	0.5621	-0.7152



## IV. Counterfactual Analysis

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### ❑ Forecasting of data

- ❑ The **forecasting of data** will be done using an **ARIMA (Autoregressive Integrated Moving Average) model** for each variable
- ❑ The **choice of this forecasting model** stems from the fact that it is a **powerful tool** when the **intention is to forecast based** on the **past values** of the variables
  - ❑ In other words, **forecasts based** on the **autoregressive (AR) method** are a **linear combination of past values**
- ❑ An **order regression  $p$** , or **AR ( $p$ )**, can be written as follows:

$$y_t = c + \varphi_1 y_{t-1} + \varphi_2 y_{t-2} + \dots + \varphi_p y_{t-p} + \varepsilon_t, \quad (1)$$

- ❑  $\varepsilon_t$  is a white noise

## IV. Counterfactual Analysis

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### ❑ Forecasting of data

- ❑ The second component of the ARIMA model is called the **Moving Average process of order  $q$** , or **MA ( $q$ )**, which take the form:

$$y_t = c + \varepsilon_t + \theta_1\varepsilon_{t-1} + \theta_2\varepsilon_{t-2} + \dots + \theta_q\varepsilon_{t-q} \quad (2)$$

- ❑ The **combination** of the **autoregressive process** and the **moving average process** gives rise to the **new process named ARIMA**
- ❑ The **component “I”**, which stands for **integrated**, is the **number of differentiations ( $d$ )** that the model needs for the **variables to be stationary**
- ❑ In this context, **forecasting through the ARIMA ( $p,d,q$ ) process** requires that we began by studding the **stationarity feature of the variables...**

## IV. Counterfactual Analysis

□ In order to study the stationarity of variables we applied

- The **ADF unit root test**, whose H0 is the existence of a unit root, and the **KPSS stationary test**, with H0 of series being stationary

	ADF				KPSS			
	Level		First Difference		Level		First Difference	
	C	T	C	NC	C	T	C	T
EU								
GDP	-0.517	-1.822	-3.587**	-2.581**	0.766***	0.098	0.119	0.119
GDP_G	-3.689**	-3.538*	---	---	0.135	0.119	---	---
Debt	-1.813	-1.858	-2.332	-2.321**	0.583**	0.102	0.147	0.147*
Inf_CPIH	-2.495	-4.09***	---	---	0.438*	0.082	---	---
Deficit	-2.942**	-2.892	---	---	0.142	0.135*	---	---
U	-2.787*	-2.577	---	---	0.104	0.093	---	---
Ger								
GDP	2.057	-2.395	-4.57***	0.415	0.781***	0.145*	0.115	0.059
GDP_G	-4.71***	-3.675**	---	---	0.080	0.058	---	---
Debt	-1.835	-5.72***	---	---	0.285	0.164**	---	---
Inf_CPIH	-3.83***	-7.97***	---	---	0.109	0.094	---	---
Deficit	1.877	24.270	14.587	1.285	0.589**	0.091	0.098	0.060
Δ_Deficit	---	---	-2.711*	-2.88***	---	---	0.067	0.063
U	-0.120	-11.1***	---	---	0.655**	0.131*	---	---
Spa								
GDP	-2.128	-2.335	-2.085	-1.825*	0.621**	0.129*	0.180	0.135*
GDP_G	-2.149	-1.930	-4.02***	-4.14***	0.224	0.141*	0.150	0.071
Debt	-1.657	-6.86***	---	---	0.587**	0.148*	---	---
Inf_CPIH	-2.366	-16.7***	---	---	0.538**	0.079	---	---
Deficit	-1.941	18.751	15.572	-2.98***	0.304	0.118	0.117	0.093
U	-2.023	-3.320*	---	---	0.373*	0.107	---	---
Ita								
GDP	-4.31***	-3.373*	---	---	0.125	0.129*	---	---
GDP_G	-3.633**	-3.451*	---	---	0.211	0.145*	---	---
Debt	-1.542	-51.4***	---	---	0.667**	0.143*	---	---
Inf_CPIH	-2.380	-3.603*	---	---	0.469*	0.096	---	---
Deficit	-3.173**	0.235	---	---	0.194	0.150*	---	---
U	-2.972**	-1.178	---	---	0.282	0.145*	---	---
Por								
GDP	-2.574*	-2.159	---	---	0.357	0.098	---	---
GDP_G	-2.833*	-2.785	---	---	0.149	0.149*	---	---
Debt	-2.063	-5.10***	---	---	0.713***	0.102	---	---
Inf_CPIH	-1.042	-4.62***	---	---	0.558**	0.051	---	---
Deficit	-1.544	-1.628	-3.84***	-3.93***	0.182	0.162**	0.215	0.058
U	-2.300	-1.699	-1.880	-1.927*	0.418*	0.145*	0.284	0.126*

## IV. Counterfactual Analysis

### □ Unit Root and Stationary Tests

	ADF				KPSS			
	Level		First Difference		Level		First Difference	
	C	T	C	NC	C	T	C	T
<b>EU</b>								
GDP	-0.517	-1.822	-3.587**	-2.581**	0.766***	0.098	0.119	0.119
GDP_G	-3.689**	-3.538*	---	---	0.135	0.119	---	---
Debt	-1.813	-1.858	-2.332	-2.321**	0.583**	0.102	0.147	0.147*
Inf_CPIH	-2.495	-4.09***	---	---	0.438*	0.082	---	---
Deficit	-2.942**	-2.892	---	---	0.142	0.135*	---	---
U	-2.787*	-2.577	---	---	0.104	0.093	---	---
<b>Ger</b>								
GDP	2.057	-2.395	-4.57***	0.415	0.781***	0.145*	0.115	0.059
GDP_G	-4.71***	-3.675**	---	---	0.080	0.058	---	---
Debt	-1.835	-5.72***	---	---	0.285	0.164**	---	---
Inf_CPIH	-3.83***	-7.97***	---	---	0.109	0.094	---	---
Deficit	1.877	24.270	14.587	1.285	0.589**	0.091	0.098	0.060
Δ_Deficit	---	---	-2.711*	-2.88***	---	---	0.067	0.063
U	-0.120	-11.1***	---	---	0.655**	0.131*	---	---
<b>Spa</b>								
GDP	-2.128	-2.335	-2.085	-1.825*	0.621**	0.129*	0.180	0.135*
GDP_G	-2.149	-1.930	-4.02***	-4.14***	0.224	0.141*	0.150	0.071
Debt	-1.657	-6.86***	---	---	0.587**	0.148*	---	---
Inf_CPIH	-2.366	-16.7***	---	---	0.538**	0.079	---	---
Deficit	-1.941	18.751	15.572	-2.98***	0.304	0.118	0.117	0.093
U	-2.023	-3.320*	---	---	0.373*	0.107	---	---
<b>Ita</b>								
GDP	-4.31***	-3.373*	---	---	0.125	0.129*	---	---
GDP_G	-3.633**	-3.451*	---	---	0.211	0.145*	---	---
Debt	-1.542	-51.4***	---	---	0.667**	0.143*	---	---
Inf_CPIH	-2.380	-3.603*	---	---	0.469*	0.096	---	---
Deficit	-3.173**	0.235	---	---	0.194	0.150*	---	---
U	-2.972**	-1.178	---	---	0.282	0.145*	---	---
<b>Por</b>								
GDP	-2.574*	-2.159	---	---	0.357	0.098	---	---
GDP_G	-2.833*	-2.785	---	---	0.149	0.149*	---	---
Debt	-2.063	-5.10***	---	---	0.713***	0.102	---	---
Inf_CPIH	-1.042	-4.62***	---	---	0.558**	0.051	---	---
Deficit	-1.544	-1.628	-3.84***	-3.93***	0.182	0.162**	0.215	0.058
U	-2.300	-1.699	-1.880	-1.927*	0.418*	0.145*	0.284	0.126*

- As can be observed, **depending on the country** and the **variable** in question, the **results** in terms of **stationarity analysis** are **very diverse**, and it is **not possible** to **identify similar behavioral patterns** between countries or variables



## IV. Counterfactual Analysis

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### □ Unit Root and Stationary Tests

- The **exception** is the **inflation rate** that, in **all countries**, is **I(0)**
- There is a **predominance of I(0) variables** and it is also possible to identify **several cases** in which the **order of integration** of the variables **is equal to one** or even **equal to two**
  - This is the case, for **example**, of **Germany's public deficit**, that is **I(2)**, or the **unemployment rate in Portugal**, with this variable being **I(1)**
- The most **surprising result** is the fact that a country like **Italy**, often **characterized** by some **economic and political instability**, presents **all the variables I(0)**
- Equally **unexpected** is the fact that the **public deficit** in **Germany** is **I(2)**
  - This can be explained by the fact that **Germany oscillated** several times between **budget deficit** and **surplus**, causing persistent fluctuations in the behavior of the series, thus making it **I(2)**

## IV. Counterfactual Analysis

- The next step is to select the most appropriate ARIMA model
  - For this purpose, the **minimum value** of the **Schwarz information criterion** was considered

	ARIMA Model Selection (AR, d, MA)				
	Schwarz information criterion (BIC)				
	EU	Ger	Spa	Ita	Por
GDP	(0,1,0) 271.4071	(0,1,0) 222.2880	(1,1,0) 183.3419	(1,0,1) 214.6939	(2,0,0) 127.0910
GDP_G	(2,0,2) -90.78946	(2,0,2) -87.53355	(2,1,2) -81.28415	(2,0,2) -86.58697	(2,0,2) -84.39305
Debt	(0,1,1) 104.7056	(2,0,0) 118.6196	(2,0,0) 130.2543	(2,0,2) 120.4199	(2,0,0) 131.2994
Inf_CPIH	(1,0,0) 62.25456	(0,0,1) 49.01470	(1,0,0) 77.83393	(1,0,0) 64.66730	(0,0,1) 75.90161
Deficit	(0,0,2) 64.67468	(2,2,1) 73.59247	(0,1,1) 93.67269	(0,0,1) 52.32580	(0,1,0) 92.22704
U	(2,0,1) 48.86576	(2,0,1) 51.10911	(2,0,0) 95.87369	(2,0,1) 53.11702	(1,1,0) 69.18722

Source: Authors, using the research database.

- The minimum value of the Schwarz information criterion pointed to the choice of **different types of ARIMA forecasting models** for each of the **countries** and each of the **variables**

## IV. Counterfactual Analysis

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- ❑ **Effective and Forecast Values of the variables with and without the Covid-19 Pandemic**
  - ❑ Finally, **based on these ARIMA models**, we **forecast the values** of the variables for the **years 2020, 2021 and 2022** (“without the Covid-19 Pandemic” scenario), and then **compare its dynamics** with the **effective behavior** of the variables in the pandemic context (“with the Covid-19 Pandemic”)
    - ❑ The ARIMA models (or ARMA, if the series is  $I(0)$ ) are estimated using the **Kalman filter** (exact maximum likelihood)
    - ❑ The standard errors are based on **Hessian**
    - ❑ The forecast is automatic with **out-of-sample** dynamics

## IV. Counterfactual Analysis

### □ Effective and Forecast Values of the variables with and without the Covid-19 Pandemic

	Effective/Forecast Values "With the Covid-19 Pandemic"			Forecast Values "Without the Covid-19 Pandemic"			
	2020	2021 <sup>p</sup>	2022 <sup>p</sup>	2020	2021	2022	
<b>EU</b>							
GDP	12523.3	13150.4	13717.2	13488.0	13663.1	13838.1	↗↗↗
GDP_G	-0.06	0.05	0.04	0.02	0.01	0.01	↗↘↘
Debt	91.8	92.1	90.0	77.5	77.8	78.0	↘↘↘
Inf_CPIH	0.8	2.6	2.5	1.6	1.8	1.8	↗↘↘
Deficit/Surplus	-6.9	-6.6	-3.6	-1.4	-2.1	-2.3	↘↘↘
U	7.1	7.1	6.7	7.4	8.6	9.9	↗↗↗
<b>Ger</b>							
GDP	3096.7	3181.4	3327.5	3283.1	3321.2	3359.3	↗↗↗
GDP_G	-0.05	0.03	0.05	0.00	0.01	0.01	↗↘↘
Debt	68.7	71.4	69.2	58.9	60.2	62.0	↘↘↘
Inf_CPIH	0.3	3.1	2.2	1.5	1.5	1.5	↗↘↘
Deficit/Surplus	-4.3	-6.5	-2.5	1.6	2.5	3.4	↘↘↘
U	3.8	3.6	3.4	3.2	3.5	3.8	↘↘↗
<b>Spa</b>							
GDP	1064.6	1113.8	1175.4	1216.7	1238.7	1260.1	↗↗↗
GDP_G	-0.11	0.05	0.06	0.01	0.02	0.02	↗↘↘
Debt	120.0	120.6	118.2	92.2	87.9	83.3	↘↘↘
Inf_CPIH	-0.4	2.9	2.1	1.5	1.8	1.9	↗↘↘
Deficit/Surplus	-11.0	-8.1	-5.2	-2.5	-2.6	-2.7	↘↘↘
U	15.5	15.2	14.3	13.6	13.7	14.1	↘↘↘
<b>Ita</b>							
GDP	1573.2	1671.1	1742.5	1720.5	1709.8	1703.3	↗↗↘
GDP_G	-0.09	0.06	0.04	0.00	-0.01	-0.01	↗↘↘
Debt	155.6	154.4	151.4	132.3	129.5	126.4	↘↘↘
Inf_CPIH	-0.2	1.8	2.1	1.2	1.5	1.6	↗↘↘
Deficit/Surplus	-9.6	-9.4	-5.8	-2.2	-2.9	-2.9	↘↘↘
U	9.2	9.8	9.3	9.1	8.3	7.6	↘↘↘
<b>Por</b>							
GDP	183.5	191.8	202	200.9	198.6	195.0	↗↗↘
GDP_G	-0.09	0.05	0.05	0.02	-0.01	-0.02	↗↘↘
Debt	135.2	128.2	123.9	111.2	105.6	100.1	↘↘↘
Inf_CPIH	-0.1	0.8	1.6	1.3	1.9	1.9	↗↗↗
Deficit/Surplus	-5.8	-4.5	-3.4	0.2	0.4	0.6	↘↘↘
U	6.9	6.7	6.5	6.1	5.9	5.7	↘↘↘

Source: Authors, using the research database.

Notes: "p" identifies a forecast value by AMECO. Upward ↗ (downward ↘) oriented arrows indicate that, in the hypothetical absence of Covid-19 pandemic, forecast values for the variables would be higher (lower) than the effective/forecast values observed in the pandemic context for the corresponding years.



# IV. Counterfactual Analysis

## □ Evidences...

	Effective/Forecast Values "With the Covid-19 Pandemic"			Forecast Values "Without the Covid-19 Pandemic"			
	2020	2021p	2022p	2020	2021	2022	
<b>EU</b>							
GDP	12523.3	13150.4	13717.2	13488.0	13663.1	13838.1	>>>>
GDP_G	-0.06	0.05	0.04	0.02	0.01	0.01	>>>>
Debt	91.8	92.1	90.0	77.5	77.8	78.0	>>>>
Inf_CPIH	0.8	2.6	2.5	1.6	1.8	1.8	>>>>
Deficit/Surplus	-6.9	-6.6	-3.6	-1.4	-2.1	-2.3	>>>>
U	7.1	7.1	6.7	7.4	8.6	9.9	>>>>
<b>Ger</b>							
GDP	3096.7	3181.4	3327.5	3283.1	3321.2	3359.3	>>>>
GDP_G	-0.05	0.03	0.05	0.00	0.01	0.01	>>>>
Debt	68.7	71.4	69.2	58.9	60.2	62.0	>>>>
Inf_CPIH	0.3	3.1	2.2	1.5	1.5	1.5	>>>>
Deficit/Surplus	-4.3	-6.5	-2.5	1.6	2.5	3.4	>>>>
U	3.8	3.6	3.4	3.2	3.5	3.8	>>>>
<b>Spa</b>							
GDP	1064.6	1113.8	1175.4	1216.7	1238.7	1260.1	>>>>
GDP_G	-0.11	0.05	0.06	0.01	0.02	0.02	>>>>
Debt	120.0	120.6	118.2	92.2	87.9	83.3	>>>>
Inf_CPIH	-0.4	2.9	2.1	1.5	1.8	1.9	>>>>
Deficit/Surplus	-11.0	-8.1	-5.2	-2.5	-2.6	-2.7	>>>>
U	15.5	15.2	14.3	13.6	13.7	14.1	>>>>
<b>Ita</b>							
GDP	1573.2	1671.1	1742.5	1720.5	1709.8	1703.3	>>>>
GDP_G	-0.09	0.06	0.04	0.00	-0.01	-0.01	>>>>
Debt	155.6	154.4	151.4	132.3	129.5	126.4	>>>>
Inf_CPIH	-0.2	1.8	2.1	1.2	1.5	1.6	>>>>
Deficit/Surplus	-9.6	-9.4	-5.8	-2.2	-2.9	-2.9	>>>>
U	9.2	9.8	9.3	9.1	8.3	7.6	>>>>
<b>Por</b>							
GDP	183.5	191.8	202	200.9	198.6	195.0	>>>>
GDP_G	-0.09	0.05	0.05	0.02	-0.01	-0.02	>>>>
Debt	135.2	128.2	123.9	111.2	105.6	100.1	>>>>
Inf_CPIH	-0.1	0.8	1.6	1.3	1.9	1.9	>>>>
Deficit/Surplus	-5.8	-4.5	-3.4	0.2	0.4	0.6	>>>>
U	6.9	6.7	6.5	6.1	5.9	5.7	>>>>

□ i) In general, the **macroeconomic variables** would have **performed significantly better** in the four countries and in the EU-27 had the **Covid-19 pandemic not existed**

□ All countries would have achieved **higher GDP levels**, showing, however, relatively **weaker economic growth rates**

# IV. Counterfactual Analysis

	Effective/Forecast Values "With the Covid-19 Pandemic"			Forecast Values "Without the Covid-19 Pandemic"			
	2020	2021p	2022p	2020	2021	2022	
<b>EU</b>							
GDP	12523.3	13150.4	13717.2	13488.0	13663.1	13838.1	↗ ↘ ↗ ↘
GDP_G	-0.06	0.05	0.04	0.02	0.01	0.01	↗ ↘ ↗ ↘
Debt	91.8	92.1	90.0	77.5	77.8	78.0	↗ ↘ ↗ ↘
Inf_CPIH	0.8	2.6	2.5	1.6	1.8	1.8	↗ ↘ ↗ ↘
Deficit/Surplus	-6.9	-6.6	-3.6	-1.4	-2.1	-2.3	↗ ↘ ↗ ↘
U	7.1	7.1	6.7	7.4	8.6	9.9	↗ ↘ ↗ ↘
<b>Ger</b>							
GDP	3096.7	3181.4	3327.5	3283.1	3321.2	3359.3	↗ ↘ ↗ ↘
GDP_G	-0.05	0.03	0.05	0.00	0.01	0.01	↗ ↘ ↗ ↘
Debt	68.7	71.4	69.2	58.9	60.2	62.0	↗ ↘ ↗ ↘
Inf_CPIH	0.3	3.1	2.2	1.5	1.5	1.5	↗ ↘ ↗ ↘
Deficit/Surplus	-4.3	-6.5	-2.5	1.6	2.5	3.4	↗ ↘ ↗ ↘
U	3.8	3.6	3.4	3.2	3.5	3.8	↗ ↘ ↗ ↘
<b>Spa</b>							
GDP	1064.6	1113.8	1175.4	1216.7	1238.7	1260.1	↗ ↘ ↗ ↘
GDP_G	-0.11	0.05	0.06	0.01	0.02	0.02	↗ ↘ ↗ ↘
Debt	120.0	120.6	118.2	92.2	87.9	83.3	↗ ↘ ↗ ↘
Inf_CPIH	-0.4	2.9	2.1	1.5	1.8	1.9	↗ ↘ ↗ ↘
Deficit/Surplus	-11.0	-8.1	-5.2	-2.5	-2.6	-2.7	↗ ↘ ↗ ↘
U	15.5	15.2	14.3	13.6	13.7	14.1	↗ ↘ ↗ ↘
<b>Ita</b>							
GDP	1573.2	1671.1	1742.5	1720.5	1709.8	1703.3	↗ ↘ ↗ ↘
GDP_G	-0.09	0.06	0.04	0.00	-0.01	-0.01	↗ ↘ ↗ ↘
Debt	155.6	154.4	151.4	132.3	129.5	126.4	↗ ↘ ↗ ↘
Inf_CPIH	-0.2	1.8	2.1	1.2	1.5	1.6	↗ ↘ ↗ ↘
Deficit/Surplus	-9.6	-9.4	-5.8	-2.2	-2.9	-2.9	↗ ↘ ↗ ↘
U	9.2	9.8	9.3	9.1	8.3	7.6	↗ ↘ ↗ ↘
<b>Por</b>							
GDP	183.5	191.8	202	200.9	198.6	195.0	↗ ↘ ↗ ↘
GDP_G	-0.09	0.05	0.05	0.02	-0.01	-0.02	↗ ↘ ↗ ↘
Debt	135.2	128.2	123.9	111.2	105.6	100.1	↗ ↘ ↗ ↘
Inf_CPIH	-0.1	0.8	1.6	1.3	1.9	1.9	↗ ↘ ↗ ↘
Deficit/Surplus	-5.8	-4.5	-3.4	0.2	0.4	0.6	↗ ↘ ↗ ↘
U	6.9	6.7	6.5	6.1	5.9	5.7	↗ ↘ ↗ ↘

- ii) If the **Covid-19 pandemic had not existed** in a **first moment** (year 2020), the **inflation rate** would have been under **greater upward pressure**, with this dynamic being **reversed** in the **two subsequent years**
  - The **exception** is **Portugal**, whose forecasts point to **consecutive increase in prices** over the three years of our counterfactual analysis

# IV. Counterfactual Analysis

	Effective/Forecast Values "With the Covid-19 Pandemic"			Forecast Values "Without the Covid-19 Pandemic"			
	2020	2021p	2022p	2020	2021	2022	
<b>EU</b>							
GDP	12523.3	13150.4	13717.2	13488.0	13663.1	13838.1	↗ ↘ ↗ ↘ ↗ ↘
GDP_G	-0.06	0.05	0.04	0.02	0.01	0.01	↗ ↘ ↗ ↘ ↗ ↘
Debt	91.8	92.1	90.0	77.5	77.8	78.0	↗ ↘ ↗ ↘ ↗ ↘
Inf_CPIH	0.8	2.6	2.5	1.6	1.8	1.8	↗ ↘ ↗ ↘ ↗ ↘
Deficit/Surplus	-6.9	-6.6	-3.6	-1.4	-2.1	-2.3	↗ ↘ ↗ ↘ ↗ ↘
U	7.1	7.1	6.7	7.4	8.6	9.9	↗ ↘ ↗ ↘ ↗ ↘
<b>Ger</b>							
GDP	3096.7	3181.4	3327.5	3283.1	3321.2	3359.3	↗ ↘ ↗ ↘ ↗ ↘
GDP_G	-0.05	0.03	0.05	0.00	0.01	0.01	↗ ↘ ↗ ↘ ↗ ↘
Debt	68.7	71.4	69.2	58.9	60.2	62.0	↗ ↘ ↗ ↘ ↗ ↘
Inf_CPIH	0.3	3.1	2.2	1.5	1.5	1.5	↗ ↘ ↗ ↘ ↗ ↘
Deficit/Surplus	-4.3	-6.5	-2.5	1.6	2.5	3.4	↗ ↘ ↗ ↘ ↗ ↘
U	3.8	3.6	3.4	3.2	3.5	3.8	↗ ↘ ↗ ↘ ↗ ↘
<b>Spa</b>							
GDP	1064.6	1113.8	1175.4	1216.7	1238.7	1260.1	↗ ↘ ↗ ↘ ↗ ↘
GDP_G	-0.11	0.05	0.06	0.01	0.02	0.02	↗ ↘ ↗ ↘ ↗ ↘
Debt	120.0	120.6	118.2	92.2	87.9	83.3	↗ ↘ ↗ ↘ ↗ ↘
Inf_CPIH	-0.4	2.9	2.1	1.5	1.8	1.9	↗ ↘ ↗ ↘ ↗ ↘
Deficit/Surplus	-11.0	-8.1	-5.2	-2.5	-2.6	-2.7	↗ ↘ ↗ ↘ ↗ ↘
U	15.5	15.2	14.3	13.6	13.7	14.1	↗ ↘ ↗ ↘ ↗ ↘
<b>Ita</b>							
GDP	1573.2	1671.1	1742.5	1720.5	1709.8	1703.3	↗ ↘ ↗ ↘ ↗ ↘
GDP_G	-0.09	0.06	0.04	0.00	-0.01	-0.01	↗ ↘ ↗ ↘ ↗ ↘
Debt	155.6	154.4	151.4	132.3	129.5	126.4	↗ ↘ ↗ ↘ ↗ ↘
Inf_CPIH	-0.2	1.8	2.1	1.2	1.5	1.6	↗ ↘ ↗ ↘ ↗ ↘
Deficit/Surplus	-9.6	-9.4	-5.8	-2.2	-2.9	-2.9	↗ ↘ ↗ ↘ ↗ ↘
U	9.2	9.8	9.3	9.1	8.3	7.6	↗ ↘ ↗ ↘ ↗ ↘
<b>Por</b>							
GDP	183.5	191.8	202	200.9	198.6	195.0	↗ ↘ ↗ ↘ ↗ ↘
GDP_G	-0.09	0.05	0.05	0.02	-0.01	-0.02	↗ ↘ ↗ ↘ ↗ ↘
Debt	135.2	128.2	123.9	111.2	105.6	100.1	↗ ↘ ↗ ↘ ↗ ↘
Inf_CPIH	-0.1	0.8	1.6	1.3	1.9	1.9	↗ ↘ ↗ ↘ ↗ ↘
Deficit/Surplus	-5.8	-4.5	-3.4	0.2	0.4	0.6	↗ ↘ ↗ ↘ ↗ ↘
U	6.9	6.7	6.5	6.1	5.9	5.7	↗ ↘ ↗ ↘ ↗ ↘

- iii) In a **non-pandemic context**, our forecasts point to a **better performance** of **all countries** in terms of **public debt** and **public deficit** during the three years of counterfactual analysis
  - The **budget surpluses** in **Germany** and **Portugal**, in **2020**, **2021** and **2022**, as well as in the **sharp reduction** (over 20 percentage points) in the **Spanish public debt** are a clear indication of that

# IV. Counterfactual Analysis

	Effective/Forecast Values "With the Covid-19 Pandemic"			Forecast Values "Without the Covid-19 Pandemic"			
	2020	2021p	2022p	2020	2021	2022	
<b>EU</b>							
GDP	12523.3	13150.4	13717.2	13488.0	13663.1	13838.1	↗ ↘ ↗ ↘
GDP_G	-0.06	0.05	0.04	0.02	0.01	0.01	↗ ↘ ↗ ↘
Debt	91.8	92.1	90.0	77.5	77.8	78.0	↗ ↘ ↗ ↘
Inf_CPIH	0.8	2.6	2.5	1.6	1.8	1.8	↗ ↘ ↗ ↘
Deficit/Surplus	-6.9	-6.6	-3.6	-1.4	-2.1	-2.3	↗ ↘ ↗ ↘
U	7.1	7.1	6.7	7.4	8.6	9.9	↗ ↘ ↗ ↘
<b>Ger</b>							
GDP	3096.7	3181.4	3327.5	3283.1	3321.2	3359.3	↗ ↘ ↗ ↘
GDP_G	-0.05	0.03	0.05	0.00	0.01	0.01	↗ ↘ ↗ ↘
Debt	68.7	71.4	69.2	58.9	60.2	62.0	↗ ↘ ↗ ↘
Inf_CPIH	0.3	3.1	2.2	1.5	1.5	1.5	↗ ↘ ↗ ↘
Deficit/Surplus	-4.3	-6.5	-2.5	1.6	2.5	3.4	↗ ↘ ↗ ↘
U	3.8	3.6	3.4	3.2	3.5	3.8	↗ ↘ ↗ ↘
<b>Spa</b>							
GDP	1064.6	1113.8	1175.4	1216.7	1238.7	1260.1	↗ ↘ ↗ ↘
GDP_G	-0.11	0.05	0.06	0.01	0.02	0.02	↗ ↘ ↗ ↘
Debt	120.0	120.6	118.2	92.2	87.9	83.3	↗ ↘ ↗ ↘
Inf_CPIH	-0.4	2.9	2.1	1.5	1.8	1.9	↗ ↘ ↗ ↘
Deficit/Surplus	-11.0	-8.1	-5.2	-2.5	-2.6	-2.7	↗ ↘ ↗ ↘
U	15.5	15.2	14.3	13.6	13.7	14.1	↗ ↘ ↗ ↘
<b>Ita</b>							
GDP	1573.2	1671.1	1742.5	1720.5	1709.8	1703.3	↗ ↘ ↗ ↘
GDP_G	-0.09	0.06	0.04	0.00	-0.01	-0.01	↗ ↘ ↗ ↘
Debt	155.6	154.4	151.4	132.3	129.5	126.4	↗ ↘ ↗ ↘
Inf_CPIH	-0.2	1.8	2.1	1.2	1.5	1.6	↗ ↘ ↗ ↘
Deficit/Surplus	-9.6	-9.4	-5.8	-2.2	-2.9	-2.9	↗ ↘ ↗ ↘
U	9.2	9.8	9.3	9.1	8.3	7.6	↗ ↘ ↗ ↘
<b>Por</b>							
GDP	183.5	191.8	202	200.9	198.6	195.0	↗ ↘ ↗ ↘
GDP_G	-0.09	0.05	0.05	0.02	-0.01	-0.02	↗ ↘ ↗ ↘
Debt	135.2	128.2	123.9	111.2	105.6	100.1	↗ ↘ ↗ ↘
Inf_CPIH	-0.1	0.8	1.6	1.3	1.9	1.9	↗ ↘ ↗ ↘
Deficit/Surplus	-5.8	-4.5	-3.4	0.2	0.4	0.6	↗ ↘ ↗ ↘
U	6.9	6.7	6.5	6.1	5.9	5.7	↗ ↘ ↗ ↘

- ❑ iv) In the **absence of the Covid-19 pandemic**, the **labor market** would have **functioned without major disruptions**, with the **unemployment rate** in the EU countries following a **downward trajectory**
  - ❑ The **exceptions** to this better performance forecasts of the unemployment rate are **Germany** and the **EU as a whole**

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# Conclusion

## V. Conclusion

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### □ In this paper

- We have **analyzed** the **macroeconomic impacts** of the **Covid-19 pandemic** in the **EU-27** and, more particularly, in four of its economies (**Germany, Spain, Italy** and **Portugal**)

### □ For this purpose

- A **counterfactual analysis** was **conducted** based on an **ARIMA forecasting model** through which the behavior of the **GDP, public debt, inflation rate, public deficit,** and **unemployment rate** of these economies was examined in the context of the **Covid-19 pandemic against a hypothetical scenario without a pandemic**

### □ It was found that the pandemic crisis was responsible for

- A **slowdown in economic growth,** the general **rise in prices,** a relatively significant **increase in the unemployment rate,** but above all significant **worsening of the public finances** of the European economies

## V. Conclusion

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- ❑ **If the Covid-19 pandemic had not occurred**
  - ❑ All of these **variables would have performed better**, highlighting the **decline in public deficits and public debt**, which would certainly leave **more room for public decision-makers** to pursue more expansionary economic policies when they are actually needed, that is, in periods of economic crisis and recession
  - ❑ In addition to the **thousands of human lives that could have been saved**, the **economic health of the European Union countries would have been relatively better**, which would have certainly resulted in **greater welfare**

# Macroeconomic Impacts of the Covid-19 Pandemic in Some European Union Countries: A Counterfactual Analysis

*Ciclo de Seminários GEE/CPEARI*

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