“Economic consequences of pandemic. Lessons from the past?”

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Abstract:

Quali sono le conseguenze economiche di una pandemia? In che modo le grandi pandemie influenzano l'attività economica a breve, medio e lungo termine? Alcuni recenti lavori accademici sostengono che le grandi crisi possono avere effetti duraturi sui risultati economici. Studiamo quindi le conseguenze economiche della pandemia di influenza spagnola del 1918, la prima cosiddetta epidemia internazionale. Grazie agli scarsi dati raccolti all'epoca, saremo in grado di formulare ipotesi sulle future conseguenze economiche a breve, medio e lungo termine causate dal nuovo virus mortale "il coronavirus", noto anche come "COVID-19", e di adottare misure adeguate in merito.
Introduction:

In 1918 the world discovers and is struck by the Spanish flu. Estimates made after the pandemic suggest that about 500 million people worldwide were infected with the virus between 1918 and 1920. Of these 500 million infected people, 10 to 20% died during this period. Unfortunately, the majority of those who died from Spanish flu were young people between 15 and 40 years of age, healthy patients with no particular history. These people were generally those who had the income to make up the family household budget.

Little is known about the medium- and long-term economic effects of the Spanish flu pandemic and more generally of global pandemics. The information we can find on the pandemic is short and infrequent, but also the information found focuses mainly on the short-term economic effects. As a result, national and international data on these effects are scarce and we have to rely on data at regional or local levels.

We are studying the economic effects of the Spanish flu pandemic in the short, medium and long term. The Spanish flu of 1918 appeared in a short period of time and thus gives us a good idea of the effects on economic results following an economic shock. For example, this pandemic represents a significant shock to the labour supply. Thus, since the Spanish flu was very violent, from the point of view of mortality but also because of its unexpected arrival, it is very interesting to evaluate the economic consequences.

The study of these economic effects could give an insight into the effects of future global pandemics, such as COVID-19, which could then give elements of answers regarding possible economic results as well as to establish political strategies appropriate to the events.
I - Spanish Flu Context

I.1 Origins:

Just after the First World War, Europe and the world are facing a new scourge. Between February 1918 and April 1919, it is estimated that the so-called "Spanish" flu pandemic reached half the world's population and killed between 20 and 50 million people.

A major demographic and medical challenge and a model for research into communicable diseases, the influenza pandemic of the winter of 1918-1919 sets a precedent for the spread of pandemics and is an important source of lessons to be learned at a time when new threats are emerging. The Spanish flu is probably the most virulent pandemic in human history, having affected almost a third of the world's population on all continents, and it is believed to have had the same impact as the Black Death.

Although described as Spanish, this flu (causing bacterial superinfection) does not originate from the Iberian Peninsula. It is just admitted that the epidemic was identified early in Spain, free of military censorship on this sensitive subject.

However, the origin of this pandemic is uncertain and mysterious.

In the spring of 1918, a first wave of a flu epidemic, contagious but not very virulent, preceded the great fatal pandemic of the autumn. The disease appeared simultaneously in North America, Europe and Asia. In the United States, it particularly affects soldiers in garrison. In Europe, there is no indication that the first cases are Spanish. Some now speak of an outbreak of the disease in the United States and then its rapid spread to the rest of the world through troop transports.

The geographical origin of the pandemic was initially difficult to establish, as several hypotheses were put forward, and then became clearer thanks to the work of English researchers.

The most commonly accepted origin, in particular by the Pasteur Institute, is Asia, more precisely the region of Guangzhou in China. Although it is not based on any undeniable proof, this hypothesis is based on two actual observations: an epidemic of benign but highly contagious influenza was indeed raging in China in the spring of 1918. And this region, through its interaction between human, avian and swine populations, has always been the main source of influenza epidemics.
Another hypothesis of geographical origin is evoked thanks to the research reports of Michael Worobey, Guan-Zhu Han and Andrew Rambaut, validated by Neil M. Ferguson of Imperial College London, locates the first strains between 1889 and 1900, on young Americans who had developed antibodies, invalidating the thesis of an epidemic which would have been imported from Canton in 1918. According to Professor Berche, Professor of Microbiology at the Necker Hospital (Paris), "Poor sanitary conditions, weakened populations and large gatherings. » "It is believed that the Spanish flu first appeared in Kansas where it contaminated young American soldiers, who were gathered for three months in military training camps, at a rate of 50,000 to 70,000 individuals, before crossing the country and sailing to Europe".

A final hypothesis is deduced in view of the early and fatal cases of respiratory infections reported as early as 1916-1917 in the British camp of Étaples in the Pas-de-Calais (France) - where the British set up the largest hospital complex of all time - and in Aldershot in the United Kingdom, could be at the origin of the epidemic. The Étaples camp in particular concentrated "all the ingredients that could encourage the emergence of an influenza pandemic: overcrowding, pigs living near geese, ducks, chickens and horses, and gas (some mutagens) used in large quantities."

Over the years, scientific work has been published, refining the geographical origin of the virus, and seemingly validating the United States scientifically: the Oxford Academy report, published in the magazine Evolution, Medicine, and Public Health, volume 2019, examines the theses that had been evoked until then (United States, France and China), and refutes China's argument that the writings of the time were based solely on symptomatic data, and not on science, since microbiology in 1918 was poorly developed. The report therefore validates a documented probable origin in Kansas.

Loring Miner, a physician in rural Kansas, encountered cases in the early weeks of 1918. Miner, alerted by the death rate, sent a report to the health authorities. A few weeks later, one of the first epidemic outbreaks was reported to have broken out, towards the military base of Fort Riley in the northeast of the state. The epidemic would then have spread to both North America and Europe when the American expeditionary force landed in Bordeaux in April 1918.

With regard to the biological origin of the Spanish flu, many researchers have attempted to isolate the transmissible agent responsible for the flu. Bacillus of small size for some (Hæmophilus influenzae, according to Pfeiffer in 1891), various and varied bacteria, alone or associated for others (diplococcus according to soubrane, spirochete, according to verbizier), the transmissible agent remains invisible. This lack of consensus brings back the miasmas
theories developed in the unhealthy air of "epidemic outbreaks", then multiplied by bad weather conditions. The discoveries made at the end of the 19th century therefore did not allow the doctor of 1918 to know, and therefore to treat effectively, human influenza. Under the influence of microbiological theories, and in the memory of the 1889 epidemic, it was then estimated that "the disease is highly contagious, and that its transmission is certainly interhuman", without going further in its explanations.

One of the last hypotheses on the evolution of the virus appeared in the Proceedings of the American Academy of Sciences (PNAS), which led to the birth of a new strain particularly lethal to young adults, a population traditionally spared. According to the work of Michael Worobey, professor of biology at the University of Arizona, the virus responsible for Spanish flu was born from the combination of a human strain (H1), originating from the seasonal H1N8 flu, in circulation between 1900 and 1917, with avian genes of type N1. Thus was born, in 1917 or 1918, an H1N1 strain, a distant ancestor of the variant that shook the world in 2009.

I.2 Pandemic Development:

Although influenza has been around for millennia, its virulence and global spread are in many ways a function of modern times. Urbanization, mass migration, global transport and trade, and overpopulation are accelerating the spread of pandemics, which ignore national boundaries, class, economic status and even age. The 1918 pandemic, for example, was exceptionally fatal in the 20-40 age group. Like many other diseases, influenza pandemics hit the poor hardest. At the same time, they disrupt the economy and basic social functions such as schools and other mass gatherings.

The first case was officially recorded on March 4, 1918 in the Funston military camp in Fort Riley, Kansas. Patient zero was believed to have been one Albert Gitchell, a farmer called up for service, who was contaminated by one of his birds, himself contaminated by a wild bird. The disease spreads there, and by April it appears in a British cantonment in Rouen. The epidemic spreads rapidly, through Allied troop movements, first to Great Britain, then to the United States, and finally to Italy and Germany, reaching its peak in June 1918.

These countries were at war and censored information about the disease in order not to affect the morale of the population. Therefore, when in May 1918 the flu reached Spain, the Spanish press was the first to describe its effects. For this reason, the epidemic was often referred to in Europe as the "Spanish flu", except in Spain, where it was nicknamed the "Neapolitan Soldier".

In July 1918, Europe considered the epidemic to be practically over, although it had affected a large number of people, especially in the armies, but it was not serious, was short-lived, and
had classic symptoms that were not very alarming. Simultaneously with these international epidemics, other smaller outbreaks were observed in India and New Zealand in July and in South Africa in August. It is not yet known whether it is a single strain or different strains, but all of them cause only mild symptoms.

However, in September 1918, this epidemic became fatal. From 14 September 1918, in the Boston area of the United States, this viral wave was characterized by a mortality rate 10 to 30 times higher than seasonal influenza epidemics, with a mortality rate of 2.5 to 3% of the sick. Because of its contagiousness, it spreads wherever patients travel unaware of the danger. By the third week of September in the Northeastern United States and most major cities in the East, a significant and abnormal increase in the number of fatal cases begins. At the same time, Europe is facing the same fears, as the virus is likely to be brought into the territory by allied troops.

In only 15 days the whole North American continent is affected.

It is then that the epidemic really takes on considerable proportions. Indeed, if it was already present in all these territories, the number of infected people was not yet very high. And it is only after its spread that the number of contaminated people explodes. Thus it was the month of October 1918 that saw the most fatal cases in the United States: a mortality rate of nearly 5% among the sick. The American state, as well as the population, suddenly became aware of the importance of this epidemic. The same pattern was applied in Europe and then to the rest of the world.
The United States is brutally overwhelmed by this new epidemic. Many American cities are paralysed by the large number of sick people, as well as by the large number of people refusing to go to work. While American doctors, helpless, without any information or help, are coping with this epidemic as best they can, one in four nurses is dying. While this epidemic, at its peak of power in the United States, is causing chaos, disarray and death, Europe is counting its first deaths in the ranks of the allied military. With its arrival in Europe, this virus became international, which already heralds its originality.

Following the same evolution as in the United States, the disease, starting in the North-East of France, soon conquered all the Allied trenches as well as French territory and, due to the movement of British troops, reached Great Britain.

Around 15 October, the epidemic reached considerable proportions in France and then in England. Spain, Italy, Germany and all the neighbouring countries were one to two weeks behind schedule, and the first people to die were counted in Spain, Italy, Germany and all the neighbouring countries. From there, Europe being at the time the colonizing centre of the world, ships, with seamen with flu on board, set sail for Africa, South America, India and China, as well as for Oceania, these sailors peddling to these lands, which were still spared at the time, an epidemic which, in fact, became a pandemic.

At the end of October and the beginning of November, first in France and Great Britain, then in the whole of Europe during the month of November 1918, the epidemic became as serious as in the United States. Max C. Starkloff, a physician from the city of St. Louis (Missouri, USA), set up one of the first cases of social distancing in modern medicine, ordering the limitation of the number of people who could gather and closing schools. As a result, St. Louis has one of the lowest mortality rates in the United States (less than 60 per 100,000, six weeks after the first cases were reported).
Note: the figure shows the mortality rate Philadelphia and St. Louis and their differences in pandemic management.

However, European populations, weakened by four years of war and shortages, suffer losses, even worse than those in the United States, in proportion to their population. Entire cities are paralyzed, both by the disease and by fear of it. In the United States, the epidemic is finally losing its strength after two months of shock: September, the month of the spread, and October, the month of the deaths.

In Europe, for France and Great Britain, after a spread in October, it is mainly November, due to overwhelmed health infrastructures, that sees the greatest waves of mortality. For the other European countries, the propagation period is from mid-October to mid-November, and the peak mortality period is from mid-November to mid-December. War censorship limits the media coverage of the pandemic, with newspapers announcing that a new epidemic was mainly affecting Spain, a neutral country freely publishing information about the epidemic, while it is already wreaking havoc in France.

Among the European trading posts and colonies, only Australia is able to apply a rigorous quarantine. For the others, the epidemic is inevitable: the Europeans who disembark bring the virus with them. From the beginning of November 1918, the virus spreads very quickly throughout Africa, Latin America, India, China and Oceania. The percentage of infected people in the local population varies between 30 and 80%, with 1 to 20% of cases being fatal. The epidemic waves, here again, last about two months over a region. The pandemic was therefore stopped by early January 1919, with a peak in mortality in December 1918.
After two months of lull, from December 1918 to January 1919, the year 1919 strangely saw a significant increase in the number of cases. This third "wave" was less serious, however, as the individuals affected in the first two waves now had immunity and could therefore neither be contaminated nor peddle the virus. This return of the pandemic triggered epidemic outbreaks around the world, particularly in regions that had been spared until then, such as Australia, where it was not reabsorbed until August 1919. Some countries were still affected in 1919 and 1920; the last case was reported in New Caledonia in July 1921.

In a little over a year, the pandemic finally claimed more victims worldwide than during the First World War between August 1914 and November 1918.

**1.3 Today’s analysis of the great influence:**

This pandemic has raised awareness of the international nature of the threat of epidemics and diseases, and the imperatives of hygiene and a surveillance network to deal with them. The epidemic was a catalyst for pushing for the creation of an international organization dedicated to global health.

The Hygiene Committee of the League of Nations (LCN), the forerunner of WHO, was created as a result of this epidemic.

Already in 1907, the "International Office of Public Hygiene" (IOPH) was established in Paris, with a permanent secretariat and a "standing committee" that organized several conferences. But in 1918-1919, the United States objected to the OIHP coming under the control of the newly created League of Nations (League of Nations), to which it did not accede - the US Congress decided against this accession in the name of isolationism.

In the inter-war period, however, the Organization continued its work, and in 1926 adopted an International Health Convention containing for the first time provisions on smallpox and typhus. Until the Second World War, two separate international health organizations coexisted in Europe, the OIHP and the Hygiene Organization of the League of Nations. On the American continent, the Pan American Health Organization is trying to establish continental health governance.

Finally, it was not until the end of the Second World War and the creation of the UN in 1945 that a specialized agency in charge of health, the WHO, was created and based in Geneva in 1948. Its mission was to lead the world's population to the "highest attainable standard of health".
In the wake of the devastation of the Spanish flu, the world came together to develop unprecedented scientific collaborations to deal with future pandemics. In 1947, the WHO Interim Committee of the United Nations created a global influenza program to monitor changes in the virus. In 1952, the Global Influenza Surveillance Network was officially launched, with 26 collaborating laboratories around the world. Now renamed the Global Influenza Surveillance and Response System (GISRS), the network includes 153 institutions in 114 countries. The sharing of viruses and data between different nations is an essential tool in global efforts against seasonal and pandemic influenza.

During the Spanish flu, some barrier actions were implemented: hand washing, banning spitting in the street, banning gatherings, shelter-in-place, masking, quarantine, closing schools, banning religious services, closing public entertainment, banning shopping.

30 However, regulations on barrier gestures varied across regions and countries. In the United States, for example, Seattle protected itself more than Philadelphia, while in San Francisco a controversy arose over the requirement to wear masks, culminating in the Anti-Mask League, which succeeded in having the requirement lifted in February 1919, during the second wave of infections in the city.

Another example: in France, a country mired in the First World War since 1914, with fighting on part of its territory, no general measures were taken by the authorities until August 1918. The first coercive decisions were taken in the autumn of 1918. The State then published circulars inviting prefects to take hygienic measures against the spread of the epidemic: closing schools and theatres, avoiding gatherings, disinfecting transport, etc. The State also issued a number of circulars to the authorities to prevent the spread of the epidemic. How these measures are implemented in practice is left to the initiative of prefects and municipalities. It seems difficult to order general measures when the circulation of the virus is poorly defined: "The authorities did not have an exact picture of the geography of the epidemic. ». Moreover, any general measure risks becoming a sign of weakness towards the enemy. Local decisions are more discreet. Physical distancing instructions also exist, but they are applied in hospitals and are not recommended to the general population.

Scientific repercussions were generated, no doubt due to the military priority of the time, and despite the virulence of this global pandemic, no in-depth scientific study was undertaken. Only a few isolated doctors, such as Loring Miner (de), wrote small treatises outlining the symptoms, statistics of contamination or mortality rates. The few samples that were preserved (e.g. in solid paraffin) are now degraded and unusable.
As no strain could be preserved, no study could be made on the origin of its contagiousness and virulence, both of which remained unexplained until 1950, when researcher Johan Hultin discovered tissue containing traces of the virus on the bodies of Inuit buried in Alaskan permafrost.

The 1918-1919 pandemic was essentially characterized by three facts:

A high proportion of infected population, estimated at 500 million or 27% of the world population of 1.8 to 1.9 billion people in 1918. This is explained by the fact that it was a new type of influenza virus to which the population had no immunity;

An unusually high induced mortality rate (it is often not the flu that kills directly) for an influenza virus, in an estimated range of 2 to 10% of infected people. Between 20 and 50 million people, according to the Pasteur Institute site, and up to 100 million according to some recent reassessments, died from it.

An unusual mortality curve, with a peak in the 20-40 year age group, particularly around the age of 30. For Prof. Worobey and his colleagues, the unexpected vulnerability of young adults can be explained not by the characteristics of the virus, but by the history of the victims. The individuals who were between 20 and 40 years of age at the end of the First World War were born in the 1880s and 1890s. At that time, the seasonal influenza virus in circulation was the H3N8 type. This generation was therefore not immune to the "H1" viruses.

An article in the Lancet in 2006, by researchers who studied the death records of 27 countries, shows that mortality due to this influenza varies by a factor of 30 depending on the region, correlated to the average economic income per capita: a 10% increase in average income per capita corresponds to a 10% decrease in mortality (linear inversely proportional correlation). The link between the mortality of this epidemic and poverty is thus established.

More specifically, during these different waves, there were 549,000 deaths in the United States, the first country to be affected. In Europe, a total of 2,300,000 deaths occurred in 14 countries. In the warring countries, however, the pandemic, which occurred in societies that had been devastated for four years, was less deadly than the war, which cost the lives of 18,600,000 people in total, including civilian victims, the vast majority of them in Europe. The Spanish flu hit countries that had little or no involvement in the conflict more heavily. In the world as a whole, influenza caused more deaths than in the First World War.

After more than 50 million deaths from war and influenza, the pandemic ended definitively in the early summer of 1919. In fact, it split into a specifically swine and a specifically human
lineage and then became a seasonal flu in a much less virulent form, evolving in waves every year until today (the father H1N1 virus being spotted until 1957, The current human influenza viruses are all derived from the 1918 virus from combinations, mutations or assortments.
II - In depth economics effects:

If the pandemic is severe, the economic impact is likely to be significant, although the forecasts imply a high degree of uncertainty. This section will highlight the short-, medium- and long-term economic effects that a pandemic may have, using the example of the Spanish flu we presented above.

II.1 Short-term and mid-term effects:

This section of the report highlights some of the economic effects of the 1918 influenza pandemic. As mentioned earlier, the biggest drawback of studying the economic effects of the 1918 influenza is the lack of economic data. Some academic studies have examined the economic effects of the pandemic using available data, and these studies are discussed below. However, given the general lack of economic data, the print media remains a source of information on some of the economic effects of the 1918 pandemic. Newspapers from the towns of Little Rock and Memphis in the Eighth District of the Federal Reserve (US), which were printed in the fall of 1918, were researched for information on the effects of the influenza pandemic in those towns. By gathering anecdotal information from each city, a relatively good picture of the overall effects of the pandemic can be obtained.

Through headlines and summaries of articles in two newspapers in the cities of the Eighth District of the Federal Reserve: The Arkansas Gazette (Little Rock) and The Commercial Appeal (Memphis), we have information on the news at that time. Articles about the closure of churches, schools and theaters, as well as questionable flu remedies and treatments, also appeared frequently. The many articles that appeared in the fall of 1918 that dealt with the economic impact of the flu are below.


- Merchants in Little Rock say their business has declined 40 percent. Others estimate the decrease at 70 percent.
- The retail grocery business has been reduced by one-third.
- One department store, which has a business of $15,000 daily ($200,265 in 2006 dollars), is not doing more than half that.
- Bed rest is emphasized in the treatment of influenza. As a result, there has been an increase in demand for beds, mattresses and springs.
Little Rock businesses are losing $10,000 a day on average ($133,500 in 2006 dollars). This is actual loss, not a decrease in business that may be covered by an increase in sales when the quarantine order is over. Certain items cannot be sold later.

The only business in Little Rock in which there has been an increase in activity is the drug store.


Physicians report they are kept too busy combating the disease to report the number of their patients and have little time to devote to other matters.

Industrial plants are running under a great handicap. Many of them were already short of help because of the draft.

Out of a total of about 400 men used in the transportation department of the Memphis Street Railway, 124 men were incapacitated yesterday. This curtailed service.

The Cumberland Telephone Co. reported more than a hundred operators absent from their posts. The telephone company asked that unnecessary calls be eliminated. “Tennessee Mines May Shut Down.” The Commercial Appeal, Oct. 18, 1918, page 12.

Fifty percent decrease in production reported by coal mine operators.

Mines throughout east Tennessee and southern Kentucky are on the verge of closing down owing to the epidemic that is raging through the mining camps.

Coalfield, Tenn., with a population of 500, has “only 2 percent of well people.”

What are the channels through which the epidemic affects local economic activity? Influenza epidemics probably have significant effects on the supply and demand side of the economy (Eichenbaum et al., 2020).

A research paper examines the immediate effect of influenza deaths on manufacturing wages in US cities and states for the period 1914-1919. The testable hypothesis of this paper is that influenza deaths had a direct impact on U.S. city and state manufacturing wages during and immediately after the 1918 influenza. The hypothesis is based on a simple economic model of the labour market: A decrease in the supply of workers in the manufacturing sector resulting from influenza deaths would have had the initial effect of reducing the supply of labour in the manufacturing sector, increasing the marginal product of labour and capital per worker, and thus increasing real wages. A more severe influenza epidemic depresses labour supply through self-isolation measures in response to an increased risk of contracting the virus, restrictions on mobility, illness and increased mortality.
In the short term, the immobility of labour in cities and states has probably prevented the equalization of wages across states, and it is unlikely that a substitution of capital for relatively more expensive labour has occurred. In addition, the pandemic is also causing a disruption of ordinary economic activity. For example, efforts to limit crowds reduce the number of employees operating equipment in a manufacturing facility and even the closure of some commercial establishments. Supply-side effects are expected to result in reduced activity in all local economic sectors, including tradable sectors such as manufacturing.

Empirical results confirm this hypothesis: the cities and states with the highest influenza mortality experienced the largest increase in manufacturing wage growth between 1914 and 1919. Another study examined state income growth in the decade following the influenza pandemic using a similar methodology. In their manuscript, Almond (2006) argue that states that experienced higher per capita influenza deaths would have experienced higher per capita income growth rates after the pandemic. In essence, states with higher influenza mortality would have had a greater increase in capital per worker, and hence output per worker, and higher incomes after the pandemic. Using estimates of personal income at the state level for the years 1919-1921 and 1930, the authors find a positive and statistically significant relationship between state-level influenza mortality rates and subsequent growth in state per capita income.

The flu epidemic may also reduce demand through various intermediaries. Faced with the increased risk of contracting the virus, households are cutting back on purchases that require interpersonal contact. As a result of reduced future income, supply disruptions will weigh on demand. In addition, increased uncertainty about future income and employment prospects depresses current demand for durable goods. Similarly, increased uncertainty about the future depresses business investment.

The banking system plays a potentially important role in the severity of the decline in demand and production capacity. Since the pandemic itself is temporary, an increase in demand for liquidity is to be expected (Holmström and Tirole, 1998). A healthy banking system can provide this liquidity, reducing the severity of the decline in demand and production. If the shock leads to weaknesses the banking system will be weak and will lead to a contraction of loans. Bank losses can then act as an important amplification mechanism by reducing the supply of credit. A persistent economic downturn can also lead to a decline in loan demand and overall credit.

How did the savings withstand such a shock? In fact, we do not know anything very firm about the economic consequences of the great influenza of 1918-1919. By applying the tools of
econometrics to history (cliometry), economists have measured a decline in Gross Domestic Product (GDP) and consumption (Barro et al., 2020) or social confidence (Aassve et al., 2020).

According to data from 43 countries, representing about 89% of the world population, used by Robert Barro, José Ursúa and Joanna Weng (2020), the Spanish flu killed 39 million people between 1918 and 1920, representing 2% of the then world population.

Looking at the economic dimension of Spanish influenza, Barro and his co-authors note a negative correlation between the mortality rate associated with the epidemic in a given country and the standard of living in that country. This correlation is explained by the fact that the higher the standard of living in a country, the more health services it has (and, more broadly, the more efficiently it is able to organise itself).

Barro and his co-authors then sought to determine the macroeconomic impact of this epidemic. They point out that it is very difficult to measure the exact impact of the Spanish flu, as it is an event immediately following the First World War. Moreover, the fact that the epidemic immediately followed the world conflict must certainly have contributed to the failure of economies to complete their recovery from it.

According to estimates by Barro et alii, the typical country experienced a 6% drop in real GDP per capita and an 8% drop in consumption as a result of the Spanish flu. In addition, the Spanish flu contributed, like the First World War, to fuelling inflation. Not least for this reason, the epidemic led to lower real returns on equities and especially government securities.

Barro and Ursúa (2008) have already discussed what they call rare macroeconomic disasters, i.e. episodes marked by a fall in GDP per capita or consumption of at least 10%. According to this definition, history has been marked by three major macroeconomic disasters since 1870, namely, the Second World War, the Great Depression of the 1930s and the First World War, in descending order of severity. Based on new estimates obtained by Barro et al. by further distinguishing the respective impacts of the world conflict and the pandemic, it appears that the First World War reduced real GDP per capita in the typical country by 8.4%. The Spanish flu did not have an equivalent impact, but would rank fourth if a less strict definition of macroeconomic disaster were adopted.

However, the difficulty of isolating the effects of the influenza from those of the Great War and uncertainties about the reliability of the statistical material used undermine these results. The effects may have varied greatly by location. Overall, governments left the responsibility for action to local authorities. Few cities such as Boston or Philadelphia on the northeast coast of the United States closed their businesses. During this late 1918, the U.S. Federal Reserve (Fed)
mentioned the flu many times in its monthly bulletins, according to data compiled by Reuters. It indicates that theatres, schools, churches - meeting places - were closed in many areas. In Alabama, 30 coal mines were shut down. Elsewhere, cinemas, theatres, restaurants, cafes, urban transport and shops continued to welcome their customers. In France, the municipality of Rouen, for example, preferred to enact disinfection measures (Feltgen, 2007). Nevertheless, companies felt the epidemic because of the extent of absenteeism of their sick employees or because they were requisitioned, particularly funeral homes.

Advertising inserts suggest that the epidemic was not a bad deal for a few opportunists. In October 1918, at the height of the epidemic, advertisements for products presented as remedies for the flu multiplied. The most frequent were pharmaceutical products (cough drops, antiseptics...), soaps but also cinchona drinks "to strengthen the bronchi and chest" or "hygienic underwear against colds". The flu gave rise to speculation on therapeutic products and the appearance of remedies at exorbitant prices. Already a century earlier, the price of camphor had suddenly risen from 5 to 24 francs in some pharmacies during the cholera epidemic of 1832. Finally, in 1918, the health crisis brought to light some false innovations as miracle vaccines that were totally ineffective. Doctors, such as the director of the hospital in Crotone, Italy, took credit for discovering the causes of the disease, while virology only developed later.

In 1919, the number of references to the Spanish flu in the Fed's monthly bulletins dropped sharply, as if the threat had disappeared. The bans imposed on companies to combat the epidemic were in most cases lifted. "Department stores, theatres, etc. are now operating as usual and schools, churches, pavilions, etc. are open again," writes the Fed, which reports that coal mines and the economy are recovering.

Most data suggests that the economic effects of the 1918 influenza pandemic were short-term. Many businesses, particularly in the service and entertainment sectors, suffered double-digit revenue losses. Other businesses specializing in health care products experienced increased revenues. Some academic research suggests that the influenza pandemic of 1918 caused a labour shortage that resulted in an increase in the (at least temporary) wages of workers, although no reasonable argument can be made that this benefit outweighed the costs associated with the enormous loss of life and overall economic activity. The Spanish flu was quickly forgotten. "A pandemic that killed 50 million people worldwide left virtually no economic footprint," says Reuters columnist John Kemp.
II.2 Long term effects:

Work on the economic impact of this pandemic is relatively rare, due to the methodological difficulty of such an exercise: the Spanish influenza epidemic broke out in the immediate aftermath of the First World War, making it difficult to clearly distinguish the impact of the epidemic from that of the conflict. Having sought to overcome this difficulty, Robert Barro et alii (2020) estimate that a country typically experienced a 6% drop in real GDP and an 8% drop in consumption with Spanish flu. The latter thus caused the fourth biggest economic disaster, in terms of importance, in the world economy since 1870, i.e. after the Second World War, the Great Depression of the 1930s and the First World War.

Numerous studies have measured how the 1918 influenza affected future economic growth by reducing the potential for long-term productivity growth.

In a study they have just released, Oscar Jordà, Sanjay Singh and Alan Taylor (2020) sought to determine the impact of pandemics on economic activity over the medium to long term. To do so, they studied rates of return on assets using a database dating back to the fourteenth century, a time window comprising twelve major pandemics in each of which more than 100,000 people died. They use the database constructed by Paul Schmelzing (2020), which covers France, Germany, Italy, the Netherlands, Spain and the United Kingdom.

Note: The Figure shows the European real natural interest rate (in %) from (Jordà and alli 2020)
From this database, Jordà and his co-authors reconstructed the gross interest rate for all these economies weighted by their GDP and then sought to estimate the natural interest rate (see Chart above). The natural interest rate is the level of real returns on safe assets that balances the supply of savings and the demand for investment while stabilising prices [Laubach and Williams, 2003; Woodford, 2003].

Note: The Figure shows Reaction of the European real natural interest rate to a pandemic or war (in % points) (Jordà and alli 2020)

Jordà and his co-authors find that the major pandemics of recent centuries have typically been followed by low returns on assets and that these effects were still evident some 40 years after the end of the pandemic episode (see Chart above). By way of comparison, it appears on the contrary that wars do not have such effects, or even that they tend to stimulate economic activity in the long term. This could be explained by the fact that conflicts result in the destruction of the capital stock, thus leading to large investments to rebuild it, which can stimulate not only demand (by increasing business opportunities) but also supply (by modernizing capital). More scattered evidence also suggests to Jordà et al. that real wages may be higher in the wake of pandemics, which may be explained by the fact that pandemics lead to worker shortages and workers gain bargaining power.
This interest rate response suggests that pandemics are followed by long periods of several decades with low investment opportunities, certainly due to the large amount of capital per capita left to survivors or their greater willingness to save on a precautionary basis. This provides governments with significant scope for borrowing, not only to absorb the immediate shock that the epidemic and containment policies are placing on the economy, but also to finance public investment projects, which are essential for the well-being of future generations.

Another issue is the long-term effect on the health of people in this period in history, which generally has long-term consequences in the form of slower economic growth.

However, slowdowns in potential economic growth are more damaging than is commonly believed. A country that experiences 2% growth in per capita income per year will see its per capita income more or less double every 36 years. If that growth is reduced to 1.5 per cent, it will take 48 years for income to double. Reductions in average real incomes, relative to what could have been, have negative effects on life expectancy, child mortality and other indicators of human well-being.

For example, a study of pregnant women showed that those exposed to disease negatively affected their children's health prospects.

Almond (2006) wondered whether in utero exposure to influenza had negative economic consequences for individuals later in life. The study was conducted after the author reviewed evidence suggesting that pregnant women who were exposed to influenza in 1918 gave birth to children who had more significant medical problems later in life, such as schizophrenia, diabetes and stroke. The author's hypothesis is that an individual's health endowment is positively related to his or her human capital and productivity, and thus to wages and incomes. Using data from the 1960-1980 decennial census, the author found that cohorts in utero during the 1918 pandemic had lower levels of education, higher rates of physical disability, and lower incomes. Specifically, both men and women showed large and discontinuous reductions in educational attainment if they had been in utero during the pandemic. The children of 21 infected mothers were up to 15 per cent less likely to complete high school. Men's wages were 5-9% lower due to infection".

Research also suggests that the 1918 influenza led to a reduction in human capital for individuals in utero during the pandemic, which affected economic activity decades after the pandemic.
II.3 Final thoughts

With the observations made earlier, we can begin to have elements of a response for a future pandemic or more recently for VIDOC-19. Although each pandemic is different and has different, yet very similar consequences.

Comparison between the current situation and past pandemics is not without risk. At the time, for example, people were not expected to live to a very old age and there was a particular fear of the disappearance of those who were picked in the prime of life, whereas today we are particularly concerned about our seniors.

And our economies are much more complex, more interconnected, more dependent on the service sector and better supported by governments than they were even 100 years ago. But if history were unfortunately to repeat itself, at least we would have the consolation of enjoying lower interest rates for decades to come, the other three conclude. This should be especially pleasing to governments that will need to finance the billions that will be required in economic stimulus packages.

Some companies could see their revenues fall by more than 50%. Others, such as those providing health services and products, may see an increase in business (unless there are full quarantines). A higher percentage of families with life insurance would mitigate the financial effects of the loss of the main breadwinner. However, low-income families are less likely to have insurance coverage than high-income families.

Local quarantines would likely hurt businesses in the short term. Employees would likely be laid off. Even families without influenza contact may experience financial hardship. To prevent spread, quarantines would have to be comprehensive (e.g., no authorized activities outside the home). Partial quarantines (closing schools and churches but not public transportation or restaurants, as has been done in Philadelphia, St. Louis and Washington, DC) would do little to stop the spread of the flu. Then there is the question of whether people today would comply with quarantine orders.

Although not negligible, the damage to long-term growth potential caused by the Spanish flu is relatively however, disproportionate policy responses could negatively affect this long-term economic growth.

The lesson here is that public policy choices have important effects on the long-term costs of reduced supply of goods and services when regulation creates market rigidities.
Policies that create rigidity and limit the range of options available to economic actors, such as adding regulation, affect the ability to return to pre-crisis economic growth. In fact, recovery from economic crises is much faster in countries where economic freedom and institutional flexibility are greater. The literature tells us that economic recovery can be faster if government intervention reduces, rather than increases, regulation and barriers to free trade for individuals and firms. As such, the announcement of relief measures for those most affected could be combined with the easing of certain regulatory barriers.
**Conclusion:**

In conclusion, thanks to this in-depth analysis, we can identify some of the economic highlights of this pandemic.

In the first place, the pandemic being seen as a seasonal flu, minimising it following the conflict of the First World War, it had the effect of accelerating the worldwide spread and dangerousness of the Spanish flu virus due to international transport.

Secondly, when the pandemic was at its height, short-term economic consequences began to take shape in the family homes of the time. Indeed, due to the high mortality rate among people aged between 15 and 40 years old, as the working population no longer brought money into these homes, a financial loss for companies as well as countries was observed.

Finally, when the pandemic stopped, the short-term economic effects dissipated within a few years with the resurgence of work to rebuild countries following the destruction during the conflict of the First World War. The long-term effects, on the other hand, were not evident over a decade, as other military conflicts absorbed the economic consequences that would have been positive or negative. On the other hand, there have been adverse health effects on some people and their descendants who have been contaminated in recent studies.

Finally, despite the severity of the 1918 Spanish Influenza, it was short-lived and had a significant impact not on communities but on individuals themselves.

During a pandemic, such as the one we are currently living with, we will be able to learn about the economic effects explained above so that governments and individuals do not repeat the negative patterns of the past but also take back the measures that worked for these epidemics.
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