

# VoxEU: Re-evaluating the benefits of non-pharmaceutical interventions during the 1918 pandemic

Lockdown measures such as school closures and social distancing lowered the fatality rate during the peak of the 1918 pandemic in the US. Nonetheless, they are also associated with a significant rise in the death rate in subsequent years, possibly through reducing herd immunity, [writes Guillaume Chapelle for VoxEU](#)



Source: Shutterstock

## Past history suggests exit strategy should account for herd immunity

Past pandemics such as the 1918 influenza offer an interesting opportunity to evaluate the potential impact of pandemics on economic activity and the effect of non-pharmaceutical interventions such as school closures and social distancing on the spread of the disease and on economic activity.

In the US, the 1918 influenza was probably spread by troops returning from Europe in the autumn of 1918. The epidemiological literature shows that all large cities implemented some kind of non-pharmaceutical intervention, such as quarantines, social distancing, or school closures. However, the degree and the speed of the responses varied even within regions.

For example, New York responded rapidly to the pandemic and managed to flatten the epidemic curve through strictly enforced isolation and quarantine. According to Markel et al. (2007), this allowed the city to experience the lowest death rate on the East Coast. In contrast, Pittsburgh took action later, which resulted in the highest excess mortality burden in the sample studied.

Epidemiological studies of the 1918 pandemic mostly focus on the capacity of non-pharmaceutical interventions to lower the death rate during the peak of the epidemic, i.e. to 'flatten the epidemic curve'. In a recent paper (Chapelle 2020), I examine the medium-run impact of non-pharmaceutical interventions on the 1918 pandemic, looking at their consequences once the main wave was over.

Using an event study, I compared how death rates evolved from 1910 through 1924 in cities that implemented non-pharmaceutical interventions for longer versus shorter periods.

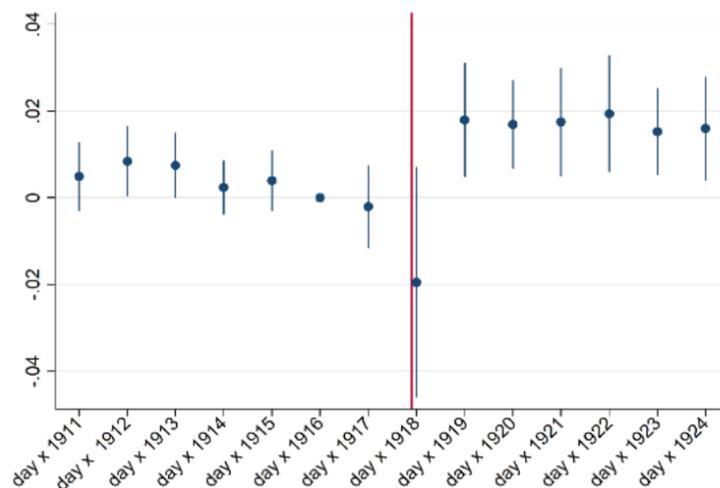
Figure 1 summarises the main result. Cities that implemented longer non-pharmaceutical interventions in 1918 had no significant variation from their pre-1918 annual death rate and managed to decrease their death rate in 1918 compared with cities that adopted shorter non-pharmaceutical interventions. However, they also ended with relatively higher mortality levels in the subsequent years.

Robustness checks reject the possibility that the phenomenon might be explained by changes in the demographic structure or the mortality in 1918. Furthermore, they tend to support the hypothesis that non-pharmaceutical interventions lower the herd immunity, thus making the population more susceptible to ensuing strains of influenza. Indeed, the subsequent influenza epidemics, with the exception of avian influenza, have been caused by descendants of the 1918 virus.

The estimated number of deaths after five years caused by longer non-pharmaceutical interventions is greater than the estimated number of lives saved in 1918. These results suggest that optimal policy responses should account for herd immunity and include an exit strategy that can compensate for the lower herd immunity.

## Figure 1 - Event study: Estimates of the aggregate impact of non-pharmaceutical intervention implementation duration on death rates

**Figure 1** Event study: Estimates of the aggregate impact of non-pharmaceutical intervention implementation duration on death rates



Source: Source: G. Chapelle (2020)

## Draconian lock-down measures might have prevented herd immunity

Caution must be exercised in inferring any causal links between economic activity and non-pharmaceutical interventions in US cities, as discussed in Correa et al. (2020), for two main reasons.

First, the manufacturing sector in cities that had high mortality rates and longer non-pharmaceutical interventions in 1918 had historically different economic dynamics, making any causal inferences hard to establish. This finding was later confirmed by Lilley et al. (2020).

Second, given the negative effect of the 1918 non-pharmaceutical interventions on the mortality rate in subsequent years, such interventions did not preserve human capital in the medium run. This casts doubts on the channels likely to explain the positive relationship between health policy and economic growth.

My findings tend to support the intuitions of Toda (2020a,b) that draconian non-pharmaceutical interventions might be suboptimal because they prevent the building of herd immunity, and of Benmelech and Frydman (2020) that large US cities recovered rapidly from the 1918 influenza pandemic.

This does not mean that epidemics do not have any economic consequences. Several papers have used other data and contexts to document the negative impact of the 1918 pandemic at the aggregate level (Barro et al. 2020a) or at the local level (Dahl et al. 2020).

## But Covid-19 is a different story

It would be difficult to draw any inferences for the predicted impact of non-pharmaceutical interventions on the Covid-19 crisis, not least because the magnitude and scale of the interventions from the two pandemics are different.

Today, non-pharmaceutical interventions are mainly implemented on a national or state scale, rather than at the city level. Moreover, pharmaceutical technologies were less developed in 1918 than today, and the capacity to produce a new vaccine within a reasonable time was much lower a century ago.

Covid-19 and the 1918 influenza are two different viruses, and evidence on the immune response after contracting Covid-19 remains scarce. We can hope that the development of a treatment or a vaccine will limit the spread of the disease in the next years (Bethune and Korinek 2020).

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### Author

**Amrita Naik Nimbalkar**

Junior Economist, Global Macro  
[amrita.naik.nimbalkar@ing.com](mailto:amrita.naik.nimbalkar@ing.com)

**Mateusz Sutowicz**

Senior Economist, Poland  
[mateusz.sutowicz@ing.pl](mailto:mateusz.sutowicz@ing.pl)

**Alissa Lefebre**

Economist  
[alissa.lefebvre@ing.com](mailto:alissa.lefebvre@ing.com)

**Deepali Bhargava**

Regional Head of Research, Asia-Pacific  
[Deepali.Bhargava@ing.com](mailto:Deepali.Bhargava@ing.com)

**Ruben Dewitte**

Economist  
+32495364780  
[ruben.dewitte@ing.com](mailto:ruben.dewitte@ing.com)

**Kinga Havasi**

Economic research trainee  
[kinga.havasi@ing.com](mailto:kinga.havasi@ing.com)

**Marten van Garderen**

Consumer Economist, Netherlands  
[marten.van.garderen@ing.com](mailto:marten.van.garderen@ing.com)

**David Havrlant**  
Chief Economist, Czech Republic  
420 770 321 486  
[david.havrlant@ing.com](mailto:david.havrlant@ing.com)

**Sander Burgers**  
Senior Economist, Dutch Housing  
[sander.burgers@ing.com](mailto:sander.burgers@ing.com)

**Lynn Song**  
Chief Economist, Greater China  
[lynn.song@asia.ing.com](mailto:lynn.song@asia.ing.com)

**Michiel Tukker**  
Senior European Rates Strategist  
[michiel.tukker@ing.com](mailto:michiel.tukker@ing.com)

**Michal Rubaszek**  
Senior Economist, Poland  
[michal.rubaszek@ing.pl](mailto:michal.rubaszek@ing.pl)

**This is a test author**

**Stefan Posea**  
Economist, Romania  
[tiberiu-stefan.posea@ing.com](mailto:tiberiu-stefan.posea@ing.com)

**Marine Leleux**  
Sector Strategist, Financials  
[marine.leleux2@ing.com](mailto:marine.leleux2@ing.com)

**Jesse Norcross**  
Senior Sector Strategist, Real Estate  
[jesse.norcross@ing.com](mailto:jesse.norcross@ing.com)

**Teise Stellema**  
Research Assistant, Energy Transition  
[teise.stellema@ing.com](mailto:teise.stellema@ing.com)

**Diederik Stadig**  
Sector Economist, TMT & Healthcare  
[diederik.stadig@ing.com](mailto:diederik.stadig@ing.com)

**Diogo Gouveia**

Sector Economist

[diogo.duarte.vieira.de.gouveia@ing.com](mailto:diogo.duarte.vieira.de.gouveia@ing.com)

**Marine Leleux**

Sector Strategist, Financials

[marine.leleux2@ing.com](mailto:marine.leleux2@ing.com)

**Ewa Manthey**

Commodities Strategist

[ewa.manthey@ing.com](mailto:ewa.manthey@ing.com)

**ING Analysts**

**James Wilson**

EM Sovereign Strategist

[James.wilson@ing.com](mailto:James.wilson@ing.com)

**Sophie Smith**

Digital Editor

[sophie.smith@ing.com](mailto:sophie.smith@ing.com)

**Frantisek Taborsky**

EMEA FX & FI Strategist

[frantisek.taborsky@ing.com](mailto:frantisek.taborsky@ing.com)

**Adam Antoniak**

Senior Economist, Poland

[adam.antoniak@ing.pl](mailto:adam.antoniak@ing.pl)

**Min Joo Kang**

Senior Economist, South Korea and Japan

[min.joo.kang@asia.ing.com](mailto:min.joo.kang@asia.ing.com)

**Coco Zhang**

ESG Research

[coco.zhang@ing.com](mailto:coco.zhang@ing.com)

**Jan Frederik Slijkerman**

Senior Sector Strategist, TMT

[jan.frederik.slijkerman@ing.com](mailto:jan.frederik.slijkerman@ing.com)

**Katinka Jongkind**

Senior Economist, Services and Leisure

[Katinka.Jongkind@ing.com](mailto:Katinka.Jongkind@ing.com)

**Marina Le Blanc**

Sector Strategist, Financials

[Marina.Le.Blanc@ing.com](mailto:Marina.Le.Blanc@ing.com)

**Samuel Abettan**

Junior Economist

[samuel.abettan@ing.com](mailto:samuel.abettan@ing.com)

**Franziska Biehl**

Senior Economist, Germany

[Franziska.Marie.Biehl@ing.de](mailto:Franziska.Marie.Biehl@ing.de)

**Rebecca Byrne**

Senior Editor and Supervisory Analyst

[rebecca.byrne@ing.com](mailto:rebecca.byrne@ing.com)

**Mirjam Bani**

Sector Economist, Commercial Real Estate & Public Sector (Netherlands)

[mirjam.bani@ing.com](mailto:mirjam.bani@ing.com)

**Timothy Rahill**

Credit Strategist

[timothy.rahill@ing.com](mailto:timothy.rahill@ing.com)

**Leszek Kasek**

Senior Economist, Poland

[leszek.kasek@ing.pl](mailto:leszek.kasek@ing.pl)

**Oleksiy Soroka, CFA**

Senior High Yield Credit Strategist

[oleksiy.soroka@ing.com](mailto:oleksiy.soroka@ing.com)

**Antoine Bouvet**

Head of European Rates Strategy

[antoine.bouvet@ing.com](mailto:antoine.bouvet@ing.com)

**Jeroen van den Broek**

Global Head of Sector Research

[jeroen.van.den.broek@ing.com](mailto:jeroen.van.den.broek@ing.com)

**Edse Dantuma**

Senior Sector Economist, Industry and Healthcare

[edse.dantuma@ing.com](mailto:edse.dantuma@ing.com)

**Francesco Pesole**

FX Strategist

[francesco.pesole@ing.com](mailto:francesco.pesole@ing.com)

**Rico Luman**

Senior Sector Economist, Transport and Logistics

[Rico.Luman@ing.com](mailto:Rico.Luman@ing.com)

**Jurjen Witteveen**

Sector Economist

[jurjen.witteveen@ing.com](mailto:jurjen.witteveen@ing.com)

**Dmitry Dolgin**

Chief Economist, CIS

[dmitry.dolgin@ing.de](mailto:dmitry.dolgin@ing.de)

**Nicholas Mapa**

Senior Economist, Philippines

[nicholas.antonio.mapa@asia.ing.com](mailto:nicholas.antonio.mapa@asia.ing.com)

**Egor Fedorov**

Senior Credit Analyst

[egor.fedorov@ing.com](mailto:egor.fedorov@ing.com)

**Sebastian Franke**

Consumer Economist

[sebastian.franke@ing.de](mailto:sebastian.franke@ing.de)

**Gerben Hieminga**

Senior Sector Economist, Energy

[gerben.hieminga@ing.com](mailto:gerben.hieminga@ing.com)

**Nadège Tillier**

Head of Corporates Sector Strategy

[nadege.tillier@ing.com](mailto:nadege.tillier@ing.com)

**Charlotte de Montpellier**

Senior Economist, France and Switzerland

[charlotte.de.montpellier@ing.com](mailto:charlotte.de.montpellier@ing.com)

**Laura Straeter**

Behavioural Scientist

+31(0)611172684

[laura.Straeter@ing.com](mailto:laura.Straeter@ing.com)

**Valentin Tataru**

Chief Economist, Romania

[valentin.tataru@ing.com](mailto:valentin.tataru@ing.com)

**James Smith**

Developed Markets Economist, UK

[james.smith@ing.com](mailto:james.smith@ing.com)

**Suvi Platerink Kosonen**

Senior Sector Strategist, Financials  
[suvi.platerink-kosonen@ing.com](mailto:suvi.platerink-kosonen@ing.com)

**Thijs Geijer**

Senior Sector Economist, Food & Agri  
[thijs.geijer@ing.com](mailto:thijs.geijer@ing.com)

**Maurice van Sante**

Senior Economist Construction & Team Lead Sectors  
[maurice.van.sante@ing.com](mailto:maurice.van.sante@ing.com)

**Marcel Klok**

Senior Economist, Netherlands  
[marcel.klok@ing.com](mailto:marcel.klok@ing.com)

**Piotr Poplawski**

Senior Economist, Poland  
[piotr.poplawski@ing.pl](mailto:piotr.poplawski@ing.pl)

**Paolo Pizzoli**

Senior Economist, Italy, Greece  
[paolo.pizzoli@ing.com](mailto:paolo.pizzoli@ing.com)

**Marieke Blom**

Chief Economist and Global Head of Research  
[marieke.blom@ing.com](mailto:marieke.blom@ing.com)

**Raoul Leering**

Senior Macro Economist  
[raoul.leering@ing.com](mailto:raoul.leering@ing.com)

**Maarten Leen**

Head of Global IFRS9 ME Scenarios  
[maarten.leen@ing.com](mailto:maarten.leen@ing.com)

**Maureen Schuller**

Head of Financials Sector Strategy  
[Maureen.Schuller@ing.com](mailto:Maureen.Schuller@ing.com)

**Warren Patterson**

Head of Commodities Strategy  
[Warren.Patterson@asia.ing.com](mailto:Warren.Patterson@asia.ing.com)

**Rafal Benecki**

Chief Economist, Poland  
[rafal.benecki@ing.pl](mailto:rafal.benecki@ing.pl)

**Philippe Ledent**

Senior Economist, Belgium, Luxembourg  
[philippe.ledent@ing.com](mailto:philippe.ledent@ing.com)

**Peter Virovacz**

Senior Economist, Hungary  
[peter.virovacz@ing.com](mailto:peter.virovacz@ing.com)

**Inga Fechner**

Senior Economist, Germany, Global Trade  
[inga.fechner@ing.de](mailto:inga.fechner@ing.de)

**Dimitry Fleming**

Senior Data Analyst, Netherlands  
[Dimitry.Fleming@ing.com](mailto:Dimitry.Fleming@ing.com)

**Ciprian Dascalu**

Chief Economist, Romania  
+40 31 406 8990  
[ciprian.dascalu@ing.com](mailto:ciprian.dascalu@ing.com)

**Muhammet Mercan**

Chief Economist, Turkey  
[muhammet.mercan@ingbank.com.tr](mailto:muhammet.mercan@ingbank.com.tr)

**Iris Pang**

Chief Economist, Greater China  
[iris.pang@asia.ing.com](mailto:iris.pang@asia.ing.com)

**Sophie Freeman**

Writer, Group Research  
+44 20 7767 6209  
[Sophie.Freeman@uk.ing.com](mailto:Sophie.Freeman@uk.ing.com)

**Padhraic Garvey, CFA**

Regional Head of Research, Americas  
[padhraic.garvey@ing.com](mailto:padhraic.garvey@ing.com)

**James Knightley**

Chief International Economist, US  
[james.knightley@ing.com](mailto:james.knightley@ing.com)

**Tim Condon**

Asia Chief Economist  
+65 6232-6020

**Martin van Vliet**

Senior Interest Rate Strategist  
+31 20 563 8801

[martin.van.vliet@ing.com](mailto:martin.van.vliet@ing.com)

**Karol Pogorzelski**

Senior Economist, Poland

[Karol.Pogorzelski@ing.pl](mailto:Karol.Pogorzelski@ing.pl)

**Carsten Brzeski**

Global Head of Macro

[carsten.brzeski@ing.de](mailto:carsten.brzeski@ing.de)

**Viraj Patel**

Foreign Exchange Strategist

+44 20 7767 6405

[viraj.patel@ing.com](mailto:viraj.patel@ing.com)

**Owen Thomas**

Global Head of Editorial Content

+44 (0) 207 767 5331

[owen.thomas@ing.com](mailto:owen.thomas@ing.com)

**Bert Colijn**

Chief Economist, Netherlands

[bert.colijn@ing.com](mailto:bert.colijn@ing.com)

**Peter Vanden Houte**

Chief Economist, Belgium, Luxembourg, Eurozone

[peter.vandenhoute@ing.com](mailto:peter.vandenhoute@ing.com)

**Benjamin Schroeder**

Senior Rates Strategist

[benjamin.schroeder@ing.com](mailto:benjamin.schroeder@ing.com)

**Chris Turner**

Global Head of Markets and Regional Head of Research for UK & CEE

[chris.turner@ing.com](mailto:chris.turner@ing.com)

**Gustavo Rangel**

Chief Economist, LATAM

+1 646 424 6464

[gustavo.rangel@ing.com](mailto:gustavo.rangel@ing.com)

**Carlo Cocuzzo**

Economist, Digital Finance

+44 20 7767 5306

[carlo.cocuzzo@ing.com](mailto:carlo.cocuzzo@ing.com)