Influential Article Review - How Pandemics Cause Economic Meltdown: The 1918 Flu

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This paper examines healthcare and economics. We present insights from a highly influential paper. Here are the highlights from this paper: Do non-pharmaceutical interventions (NPIs) aimed at reducing mortality during a pandemic necessarily have adverse economic effects? We use variation in the timing and intensity of NPIs across U.S. cities during the 1918 Flu Pandemic to examine their economic impact. While the pandemic itself was associated with economic disruptions in the short run, we find these disruptions were similar across cities with strict and lenient NPIs. In the medium run, we find suggestive evidence that, if anything, NPIs are associated with better economic outcomes. Our findings indicate that NPIs can reduce disease transmission without necessarily further depressing economic activity. For our overseas readers, we then present the insights from this paper in Spanish, French, Portuguese, and German.

Keywords: 1918 Flu Pandemic, non-pharmaceutical interventions (NPI), real economy

SUMMARY

- This paper examines the impact of non-pharmaceutical interventions during the 1918 Flu
- We find that while NPIs flattened the curve of disease transmission, they were not associated with worse economic performance during or after the pandemic. Instead, our findings suggest that the main source of economic disruption was the pandemic itself.
- There are several important caveats to keep in mind with our analysis. First, our sample is limited to only 43 cities.
- NPIs affected the economy with the limited data available for 1918, but we offer some potential channels. The direct effect of NPIs such as theater closures and public gathering bans is contractionary, as these policies necessarily restrict economic activity. However, the pandemic itself can be highly disruptive for the economy. Many activities that NPIs restrict would likely not have occurred even in the absence of NPIs. To avoid contracting the virus, households cut back on consumption and labor supply , while businesses reduce investment in response to labor shortages, lower demand, and increased uncertainty. As a result, the counterfactual without NPIs would still involve a downturn.

- Moreover, NPIs may have indirect economic benefits by addressing the root of the economic disruption—the pandemic itself— in a coordinated fashion. Mitigating the pandemic can prevent an ultimately worse economic downturn. For example, Bodenstein et al. present a two-sector model where NPIs mitigate the decline in output by flattening the curve, even without significantly reducing cumulative infection. In their model, production in the sector essential to the economy is less disrupted when illness and the risk of contracting a virus at a given point in time is lower, leading to a smaller overall decline in output.
- Despite these important differences, ongoing research finds that NPIs implemented in 2020 have reduced disease transmission without leading to substantial further economic disruptions , and countries that implemented NPIs in the earlier stages of the COVID-19 pandemic have better short term economic outcomes.

HIGHLY INFLUENTIAL ARTICLE

We used the following article as a basis of our evaluation:

Correia, S., Luck, S., & Verner, E. (june 5, 2020). Pandemics Depress the Economy, Public Health Interventions Do Not: Evidence from the 1918 Flu. *SSRN Electronic Journal*.

This is the link to the publisher's website:
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3561560

INTRODUCTION

Do non-pharmaceutical interventions (NPIs) such as social distancing have economic costs, or can public health measures intended to contain the spread of a pandemic also reduce its economic severity? The outbreak of the COVID-19 pandemic has sparked urgent questions about the impact of pandemics and the associated public health responses on the real economy. In this paper, we examine the economic effects of non-pharmaceutical interventions during the largest influenza pandemic in U.S. history, the 1918 Flu Pandemic.

In our empirical analysis, we exploit variation in the speed and intensity of the implementation of NPIs across U.S. cities during the fall of 1918. NPIs implemented in 1918—although less extensive—resemble policies used to reduce the spread of COVID19, including school, theater, and church closures, public gathering bans, quarantine of suspected cases, and restricted business hours.

We start by studying the impact of NPIs on mortality. Consistent with existing evidence from the epidemiology literature (Markel et al., 2007; Hatchett et al., 2007), we find that NPIs achieved substantial reductions in peak mortality, of about 45%, thereby flattening the infection curve. We also find evidence that cities that intervened both early and aggressively experienced a modest reduction in cumulative excess mortality of about 20%. Thus, NPIs were successful in slowing the rate of disease transmission and, to a lesser extent, cumulative infection rates, potentially by mitigating epidemic overshoot (Bootsma and Ferguson, 2007).

Our main analysis examines the impact of NPIs on economic activity in U.S. cities in the short and medium-run. In theory, the economic effects of NPIs could be either positive or negative. All else equal, NPIs constrain social interactions and thus economic activity that relies on such interactions. However, economic activity in a pandemic is also reduced in absence of such measures, as households reduce consumption and labor supply to lower the risk of becoming infected, and firms cut investment in response to increased uncertainty. Moreover, while the direct effect of NPIs is to lower economic activity, they also mitigate the impact of the original shock: the pandemic itself. By containing the pandemic, NPIs can thus also mitigate the pandemic-related economic disruptions.

To study the short-term impact of NPIs on local economic activity, we construct a city-level index of business disruptions at a monthly frequency based on a contemporary trade journal. Our index implies that

the pandemic itself is associated with an increase in business disruptions in the fall of 1918. The increase in business disruptions is supported by narrative evidence from contemporary newspapers, which report significant declines in output and sales across a wide range of industries due to labor shortages and falling demand. However, when we compare cities with strict and lenient NPIs, we find that the increase in business disruptions in the fall and winter of 1918 was quantitatively similar across the two sets of cities. Our findings thus indicate that NPIs did not clearly exacerbate the economic downturn during the pandemic.

Further, we examine the economic impact of NPIs in the medium run. We find no evidence that cities that intervened earlier and more aggressively perform worse in the years after the pandemic, measured by local manufacturing employment and output and the size of the local banking sector. At a minimum, our estimates reject that cities with stricter NPIs experienced a large decline in employment and output in the years following the pandemic, relative to cities with lenient NPIs. If anything, high NPI cities experience a relative increase in economic activity from 1919 onwards. Altogether, our findings suggest that, while pandemics are associated with economic disruptions, NPIs may reduce disease transmission without exacerbating the pandemic-induced downturn.

Our findings are subject to the concern that policy responses are endogenous and may be driven by factors related to future economic outcomes. This concern is somewhat mitigated by the insight that cities that experienced outbreaks at later dates tended to implement NPIs sooner within their outbreak, as they learned from the experiences of cities affected earlier (Hatchett et al., 2007). Thus, as the flu moved from east to west, cities located further west were faster in implementing NPIs. Importantly, we also show that our results are robust to controlling for time-varying shocks correlated with characteristics that differ between western and eastern cities, such as the exposure to agriculture, past population growth, density, and proxies for the quality of local institutions.

We emphasize caution when generalizing these results to the current COVID-19 outbreak. The 1918 Flu Pandemic was significantly deadlier than what current estimates suggest for COVID-19, especially for working-age individuals. Thus, the economic merits of NPIs may have been greater in 1918. NPIs implemented in 1918 were also less extensive than those used during the COVID-19 outbreak. Moreover, the structure of the U.S. economy and society has evolved substantially over a century. Nevertheless, our results suggest that it is not a foregone conclusion that there is a trade-off between reducing disease transmission and stabilizing economic activity in a pandemic.

The rest of the paper is structured as follows. Section 2 discusses the historical background on the 1918 Flu Pandemic and non-pharmaceutical interventions. Section 3 describes our dataset. Sections 4 present our results, and Section 5 offers a discussion and concluding remarks.

CONCLUSION

This paper examines the impact of non-pharmaceutical interventions during the 1918 Flu Pandemic on mortality and economic activity. We find that while NPIs flattened the curve of disease transmission, they were not associated with worse economic performance during or after the pandemic. Instead, our findings suggest that the main source of economic disruption was the pandemic itself.

There are several important caveats to keep in mind with our analysis. First, our sample is limited to only 43 cities. Second, we cannot carefully examine pre-trends for manufacturing outcomes in the years 1915, 1916, or 1917, as the data is not available at an annual frequency. Third, the economic environment toward the end of 1918 was unusual due to the end of WWI. Fourth, our cross-regional analysis does not allow us to capture aggregate equilibrium effects of NPIs.

With these caveats in mind, our findings nonetheless raise the question: Why might NPIs not be economically harmful during a pandemic, and possibly even beneficial in the medium-term? It is challenging to shed light on the exact mechanisms through which NPIs affected the economy with the limited data available for 1918, but we offer some potential channels. The direct effect of NPIs such as theater closures and public gathering bans is contractionary, as these policies necessarily restrict economic activity. However, the pandemic itself can be highly disruptive for the economy. Many activities that NPIs restrict would likely not have occurred even in the absence of NPIs. To avoid contracting the virus,

households cut back on consumption and labor supply (see, e.g., Eichenbaum et al., 2020), while businesses reduce investment in response to labor shortages, lower demand, and increased uncertainty. As a result, the counterfactual without NPIs would still involve a downturn.

Moreover, NPIs may have indirect economic benefits by addressing the root of the economic disruption—the pandemic itself— in a coordinated fashion. Mitigating the pandemic can prevent an ultimately worse economic downturn. For example, Bodenstein et al. (2020) present a two-sector model where NPIs mitigate the decline in output by flattening the curve, even without significantly reducing cumulative infection. In their model, production in the sector essential to the economy is less disrupted when illness and the risk of contracting a virus at a given point in time is lower, leading to a smaller overall decline in output. Further, by reducing cumulative infection rates, NPIs may have medium-term economic benefits by directly reducing illness and mortality and by reducing the costs associated with increased morbidity.

More specific historical details also shed light on why NPIs in 1918 did not worsen the economic downturn. NPIs implemented in 1918 were milder than the measures adopted in some countries during COVID-19. More severe measures such as closures of business likely increase the cost of NPIs. School closures were less costly in 1918, as female labor force participation was lower. Estimates suggest that 1918 Flu was more deadly than COVID-19, especially for prime-age workers, which also suggests more severe economic impacts of the 1918 Flu and greater medium-run benefits of NPIs. The 1918 H1N1 virus also had a shorter incubation period than COVID-19, which facilitated identifying and isolating suspected cases. As a result, we stress the limits of external validity of lessons from the 1918 Flu Pandemic.

Despite these important differences, ongoing research finds that NPIs implemented in 2020 have reduced disease transmission without leading to substantial further economic disruptions (see, e.g., Andersen et al., 2020; Lin and Meissner, 2020), and countries that implemented NPIs in the earlier stages of the COVID-19 pandemic have better short term economic outcomes (see, e.g., Demirgüç-Kunt et al., 2020). We look forward to future research that disentangles the net impact, direct costs, and indirect benefits of NPIs implemented during COVID-19 in both the short and medium run.
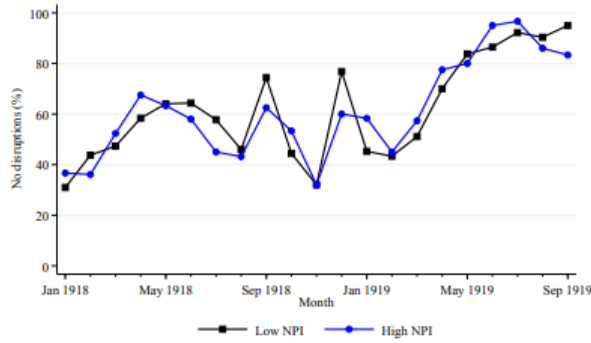
APPENDIX

FIGURE 1
**NON-PHARMACEUTICAL INTERVENTIONS AND SHORT-RUN ECONOMIC
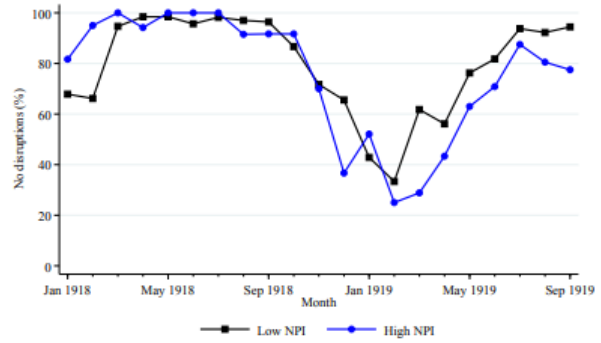DISRUPTIONS**
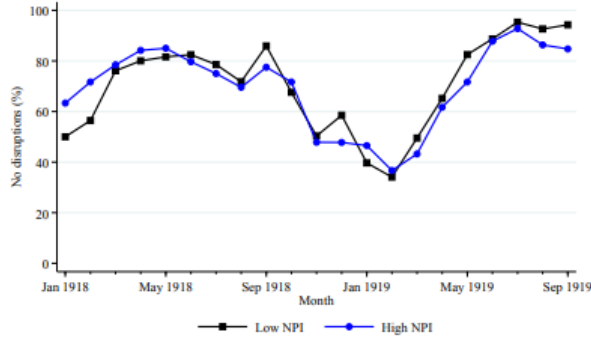
(a) Combined index (wholesale, retail, and manufacturing)
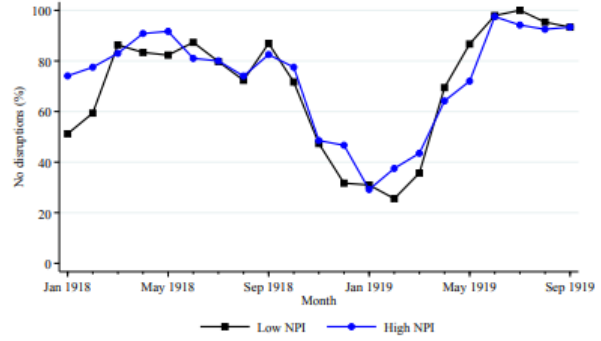
(b) Wholesale

(c) Retail

(d) Manufacturing

This figure plots the average across high and low NPI cities of an indicator variable for whether the Bradstreet Trade conditions suggest "disruptions" in specific sectors. High NPI cities are defined as cities with above median NPI Intensity and NPI Speed.
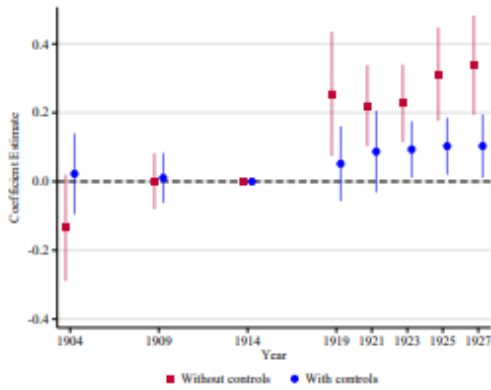
FIGURE 2
NON-PHARMACEUTICAL INTERVENTIONS IN FALL 1918 AND MEDIUM-RUN ECONOMIC OUTCOMES.
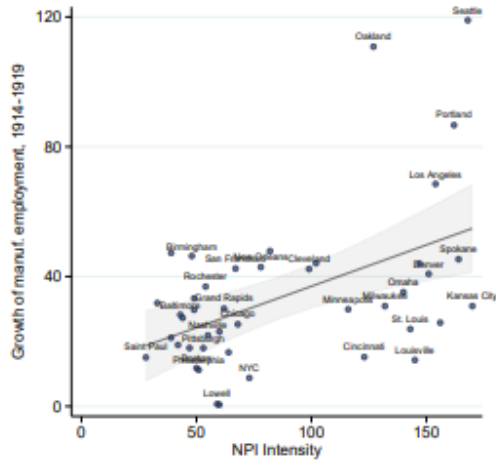
(a) *NPI Intensity* and log manufacturing employment growth 1914 to 1919.
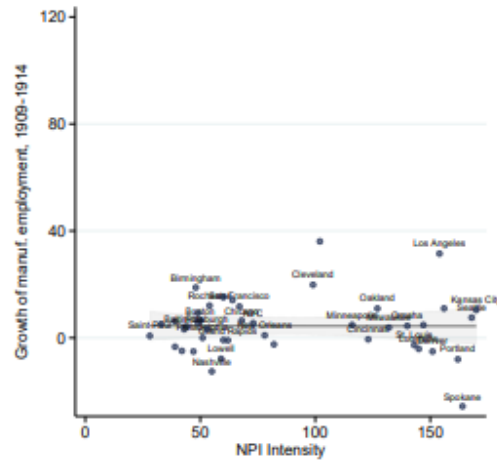
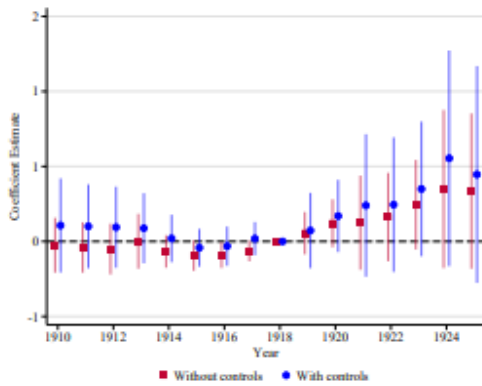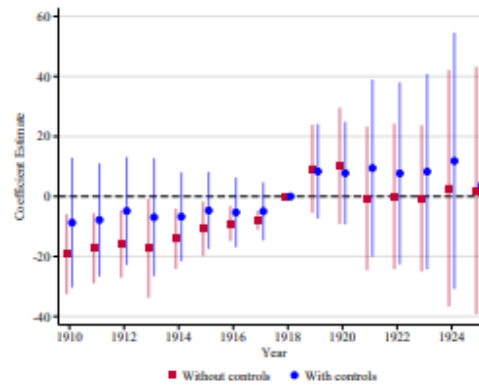(b) *NPI Intensity* and log manufacturing employment growth 1909 to 1914.

(c) *NPI Intensity* and log manufacturing employment.
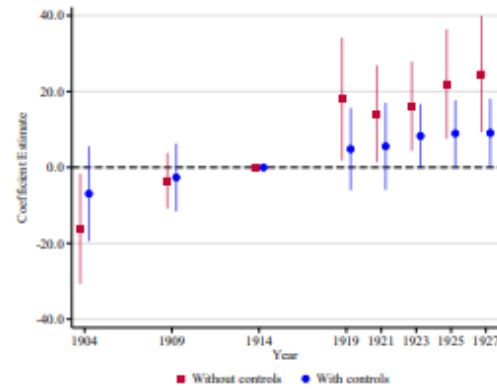
(d) *High NPI* and log manufacturing employment.

(e) *NPI Intensity* and log National Bank Assets.

(f) *High NPI* and log National Bank Assets.

Panel (c) through (f) show results from estimating Equation (3) for various outcomes with and without controls. 95% confidence bands.

TABLE 1

NON-PHARMACEUTICAL INTERVENTIONS, PEAK MORTALITY, AND CUMULATIVE MORTALITY

Panel A: Peak Mortality									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
NPI Intensity$_c$	-0.62			-0.55			-0.45		
	(0.11)			(0.16)			(0.19)		
NPI Speed$_c$		-1.00			-0.55			-0.42	
		(0.96)			(1.13)			(0.87)	
High NPI$_c$			-56.8			-52.6			-44.2
			(11.5)			(14.6)			(17.4)
R^2	.33	.025	.32	.4	.22	.43	.45	.34	.47
Effect size (%)	-55.4	-22.8	-57.6	-49.3	-12.5	-53.3	-40.5	-9.7	-44.8
Panel B: Cumulative Excess Mortality									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
NPI Intensity$_c$	-1.03			-1.28			-0.62		
	(0.37)			(0.46)			(0.42)		
NPI Speed$_c$		-3.20			-2.82			-2.21	
		(2.61)			(3.37)			(1.82)	
High NPI$_c$			-140.8			-163.2			-109.3
			(35.0)			(40.5)			(42.3)
R^2	.12	.033	.26	.24	.12	.37	.52	.5	.6
Effect size (%)	-18	-14.2	-27.9	-22.4	-12.5	-32.3	-10.9	-9.8	-21.6
N	43	43	43	43	43	43	43	43	43
Baseline Controls				Yes	Yes	Yes	Yes	Yes	Yes
Lagged Mort. Control							Yes	Yes	Yes

Notes: This table presents city-level regressions of peak mortality (panel A) and cumulative excess mortality (panel B). Mortality refers to influenza and pneumonia mortality. Data on peak and cumulative mortality and NPIs are from Markel et al. (2007). Peak mortality is the weekly excess death rate per 100,000 in the first peak of the fall 1918 pandemic. Cumulative excess mortality is the total excess death rate from September 8, 1918 to February 22, 1919. "Baseline Controls" are city log 1900 and 1910 population, city 1914 manufacturing employment to 1910 population, city public health spending per capita, city density, and state 1910 agriculture employment share. "Lagged Mort. Control" is the city-level influenza and pneumonia mortality in 1917. "Effect size" for NPI Intensity, NPI Speed, and High NPI variables are calculated as 100 $\hat{\beta}$ NPI Intensity/Y, 100 $\hat{\beta}$ DaysToPeak/Y, and 100 $\hat{\beta}$/Y, respectively. Here NPI Intensity = 88, DaysToPeak = 22.4, and Y is the mean of the dependent variable. DaysToPeak is the number of days between the acceleration and the peak of deaths rates. Robust standard errors in parentheses.

TABLE 2

NON-PHARMACEUTICAL INTERVENTIONS AND SHORT-TERM ECONOMIC DISRUPTIONS IN BRADSTREET'S TRADE CONDITIONS

	Combined: W+R+M	Wholesale Trade	Retail Trade	Manufacturing
Panel A: NPI Intensity Measure				
	(1)	(2)	(3)	(4)
$NPI\ Intensity_c \times Post_t$	-0.088	-0.12	-0.030	-0.12
	(0.065)	(0.13)	(0.15)	(0.12)
R^2 (Within)	.0097	.0074	.00036	.012
N	344	343	342	340
Panel B: NPI Speed Measure				
	(1)	(2)	(3)	(4)
$NPI\ Speed_c \times Post_t$	-0.11	-0.64	0.097	0.12
	(0.45)	(0.61)	(0.94)	(0.33)
R^2 (Within)	.00052	.0069	.00013	.00041
N	344	343	342	340
Panel C: High NPI Measure				
	(1)	(2)	(3)	(4)
$High\ NPI_c \times Post_t$	-3.86	-6.69	7.65	-15.3
	(7.78)	(13.4)	(14.5)	(10.2)
R^2 (Within)	.0028	.0033	.0035	.028
N	344	343	342	340
No of cities	25	25	25	25
City and Time FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

Notes: This table presents estimates of equation (2). The dependent variables are monthly city-level indexes of economic disruptions that take a value of 100 for "No disruptions" and 0 for "Disruptions" (see Appendix D for details). Controls interacted with Post are log 1900 and 1910 city population, 1910 city density, 1917 health spending per capita, manufacturing employment in 1914 to 1910 population, 1910 state agriculture employment share, and 1917 influenza and pneumonia mortality. Standard errors are clustered at the city level

TABLE 3

NON-PHARMACEUTICAL INTERVENTIONS AND LOCAL MANUFACTURING EMPLOYMENT, OUTPUT, AND BANK ASSETS

Panel A: Manufacturing Employment						
	(1)	(2)	(3)	(4)	(5)	(6)
NPI Intensity$_c$ × Post$_t$	0.317	0.080				
	(0.081)	(0.038)				
NPI Speed$_c$ × Post$_t$			0.753	0.381		
			(0.402)	(0.258)		
High NPI$_c$ × Post$_t$					25.757	10.879
					(8.201)	(4.834)
R² (Within)	.19	.45	.03	.45	.14	.46
N	344	344	344	344	344	344
No of Cities	43	43	43	43	43	43

Panel B: Manufacturing Output						
	(1)	(2)	(3)	(4)	(5)	(6)
NPI Intensity$_c$ × Post$_t$	0.213	0.029				
	(0.088)	(0.063)				
NPI Speed$_c$ × Post$_t$			0.714	0.371		
			(0.397)	(0.390)		
High NPI$_c$ × Post$_t$					20.503	9.497
					(9.009)	(7.472)
R² (Within)	.066	.25	.021	.25	.071	.26
N	344	344	344	344	344	344
No of Cities	43	43	43	43	43	43

Panel C: National Bank Assets						
	(1)	(2)	(3)	(4)	(5)	(6)
NPI Intensity$_c$ × Post$_t$	0.246	0.265				
	(0.129)	(0.149)				
NPI Speed$_c$ × Post$_t$			1.124	1.125		
			(0.611)	(0.619)		
High NPI$_c$ × Post$_t$					15.657	14.228
					(10.973)	(9.281)
R² (Within)	.026	.083	.034	.089	.021	.075
N	683	683	683	683	683	683
No of Cities	43	43	43	43	43	43
City and Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes	No	Yes

Notes: This table reports results from estimating a regression of the form:

$$Y_{ct} = \alpha_c + \tau_t + \beta \times NPI_{c1918} \times Post_t + \gamma \times X_t \times Post_t + e_{ct}$$
,

where NPI$_c$ is either High NPI, NPI Speed or NPI Intensity; Post=1 from 1919 onwards; X$_s$ contains the 1910 state-level agriculture employment share, city-level 1914 manufacturing to 1910 population, city-level 1910 and 1900 log population, 1910 city density, per capita city health spending, and city-level mortality in 1917. The dependent variable is average manufacturing employment for Panel A and output for Panel B, using data from the 1904, 1909, 1914, 1919, 1921, 1923, 1925, and 1927 census. In Panel C, the dependent variable is total assets of national banks per city, using data at annual frequency from 1910 to 1925. Further, columns 2, 4, and 6 of Panel C also control for city-level subscriptions to the third Liberty Loan (May 1918) normalized by total national bank assets as of August 1918, and Federal Reserve District fixed effects. Standard errors clustered at the city level in parentheses.
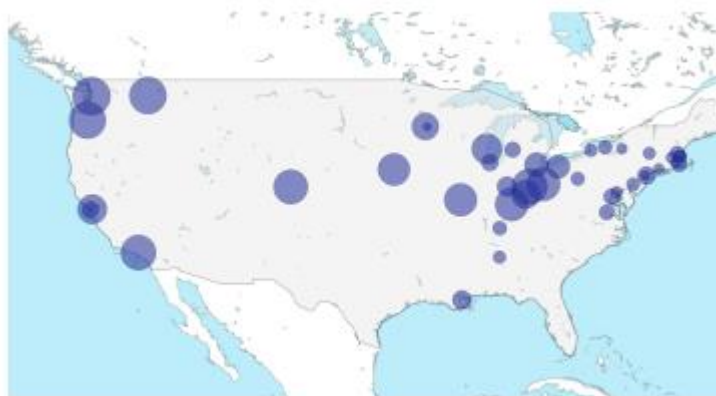
FIGURE A1

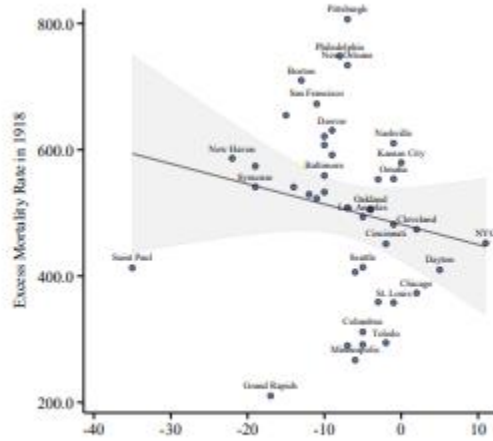**U.S. MORTALITY RATE FROM INFLUENZA AND PNEUMONIA, 1911-1920. SOURCE: CDC MORTALITY STATISTICS**

Source: CDC Mortality Statistics.

FIGURE A2
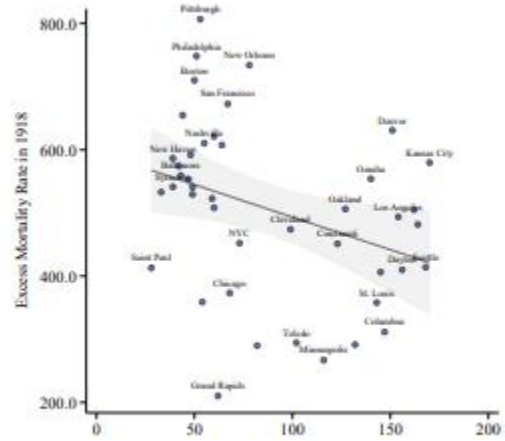**SAMPLE OF 43 CITIES WITH NPIS IN FALL 1918**

Radius is scaled by NPI Intensity

FIGURE A3
**NON-PHARMACEUTICAL INTERVENTIONS AND CITY-LEVEL EXCESS MORTALITY**

(a) Excess mortality and speed of NPIs.

(b) Excess mortality and NPI intensity.

This figure correlates the excess pneumonia and influenza related mortality (24 week excess mortality) with the speed and intensity of NPI implementation during fall 1918. Data are from Markel et al. (2007).
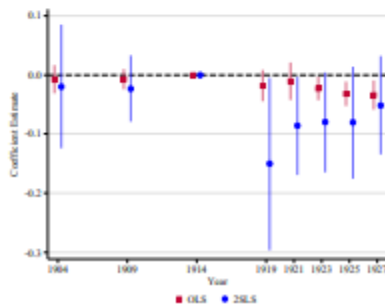
FIGURE A4
EXPOSURE TO THE 1918 FLU PANDEMIC AND MANUFACTURING EMPLOYMENT
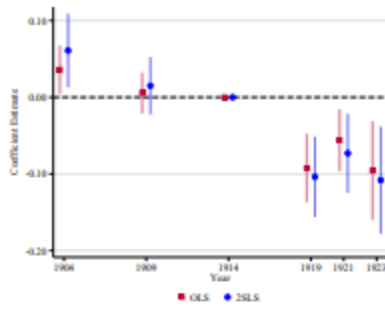
(a) Log manufacturing employment (state-level)
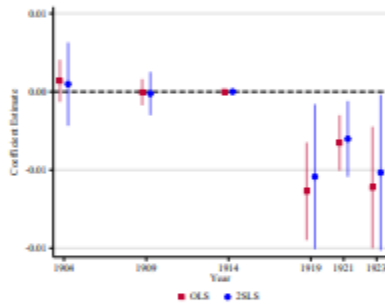
(b) Manufacturing employment to population ratio (state-level)



(c) Manufacturing employment (city-level)

Results from estimating equation (4) at the state and city level when using mortality in 1918 or mortality instrumented by the exposure to military camps as the treatment. 95% confidence bands

FIGURE A5
1918 FLU PANDEMIC DEPRESSED THE ECONOMY, BUT PUBLIC HEALTH INTERVENTIONS DID NOT
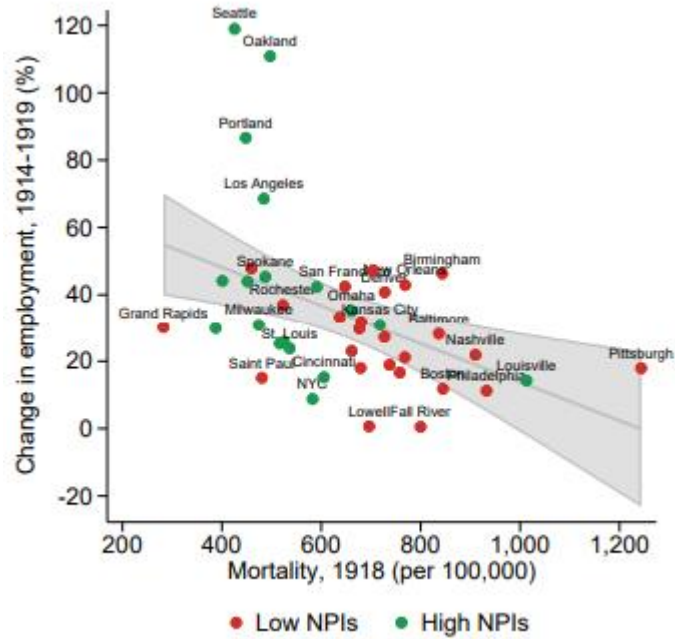
Dots represent city-level 1918 influenza mortality and the change in log manufacturing employment around the 1918 Flu Pandemic. Manufacturing employment is available for 1914 and 1919 from the Census of Manufactures. Green (red) dots are cities with non-pharmaceutical intervention intensity above (below) the median in fall 1918 based on Markel et al. (2007).

FIGURE A6
NON-PHARMACEUTICAL INTERVENTIONS AND SHORT-TERM ECONOMIC DISRUPTIONS: ROBUSTNESS TO SPLITTING BY ABOVE- AND BELOW-MEDIAN
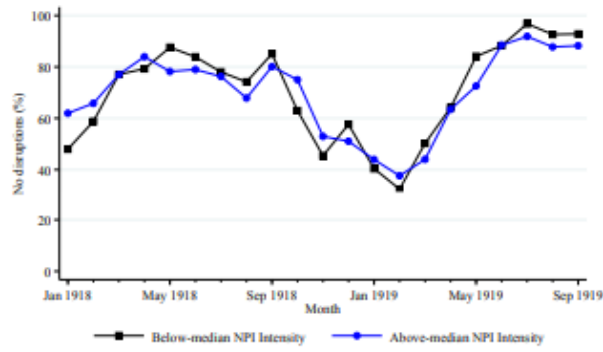
(a) Combined
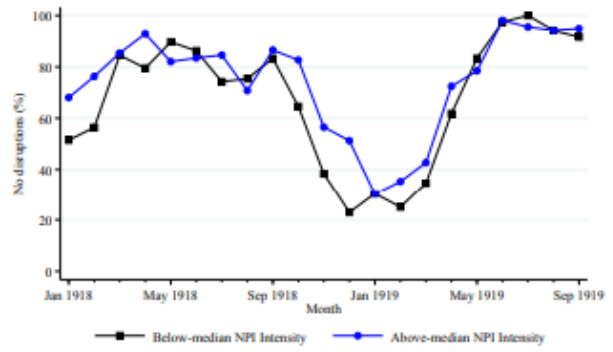
(b) Wholesale
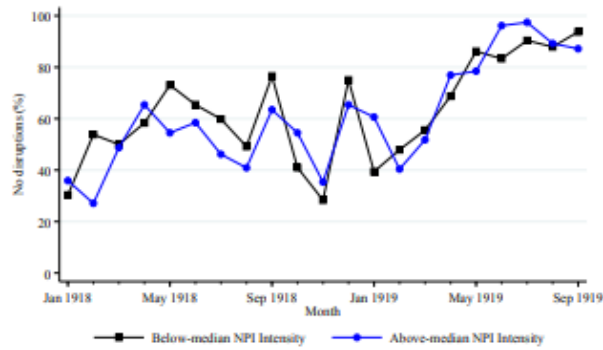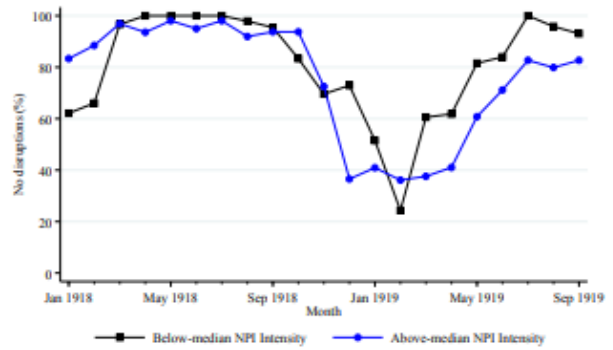
(c) Retail

(d) Manufacturing

NPI Intensity

FIGURE A7
NON-PHARMACEUTICAL INTERVENTIONS AND SHORT-TERM ECONOMIC
DISRUPTIONS: ROBUSTNESS TO A THREE-STEP INDEX OF TRADE CONDITIONS
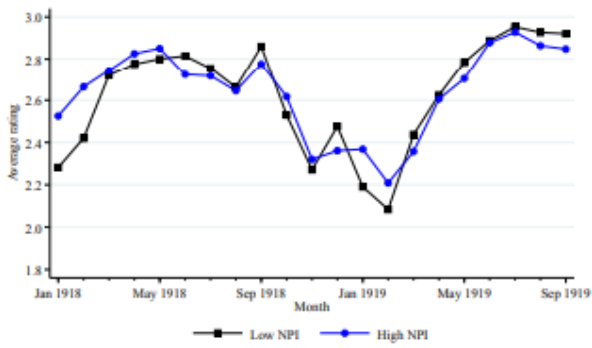
(a) Combined
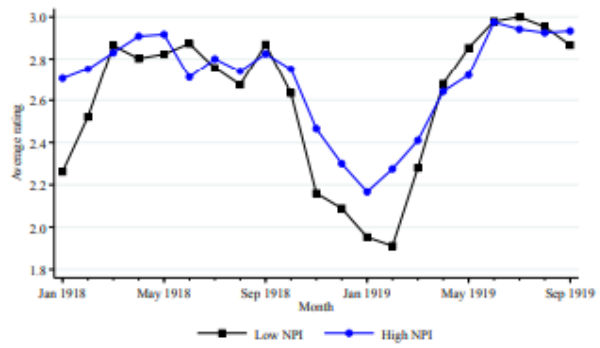
(b) Wholesale
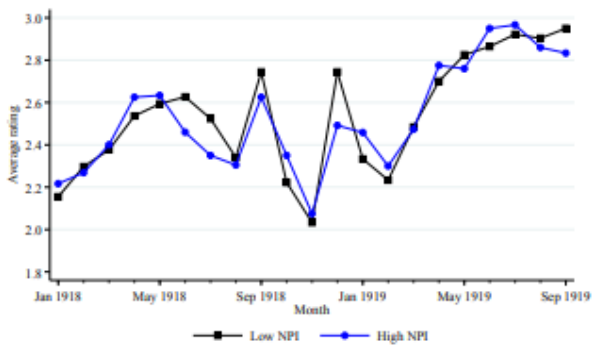
(c) Retail
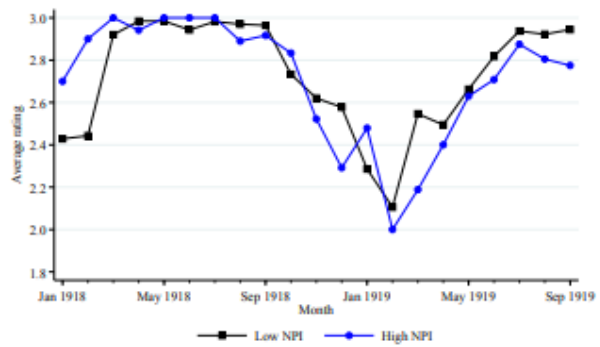
(d) Manufacturing

High NPI cities are defined as cities with above median NPI Intensity and NPI Speed

FIGURE A8
NON-PHARMACEUTICAL INTERVENTIONS IN FALL 1918 AND MEDIUM-RUN
ECONOMIC OUTCOMES
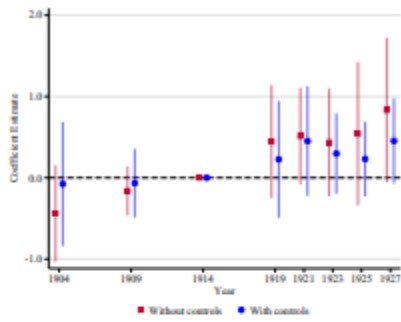
(a) *NPI Speed* and log manufacturing employment.
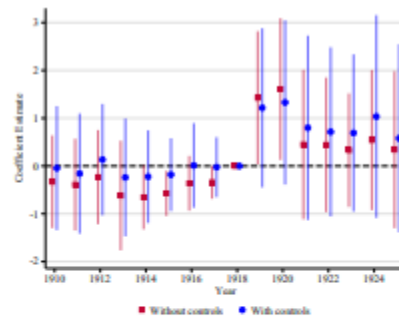
(b) *NPI Speed* and national bank assets.
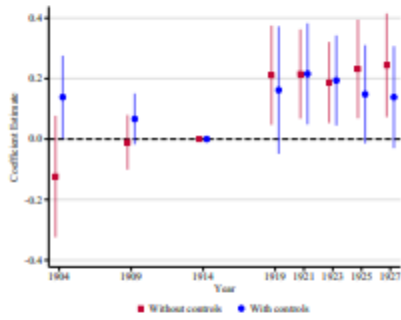
(c) *NPI Intensity* and log manufacturing value.
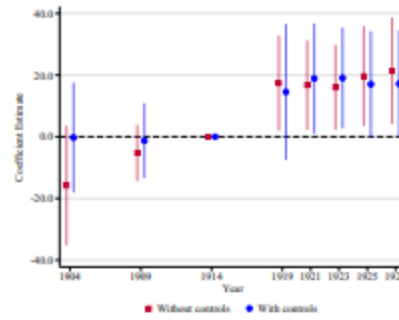
(d) *High NPI* and log manufacturing value.
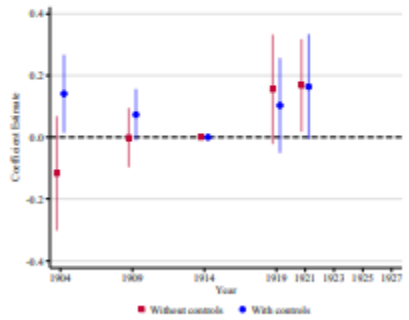
(e) *NPI Intensity* and log manufacturing value added.
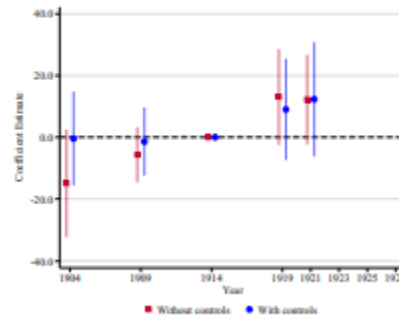
(f) *High NPI* and log manufacturing value added.

All panels show results from estimating Equation (3) for various outcomes with and without controls. 95% confidence bands

TABLE A1
NON-PHARMACEUTICAL INTERVENTIONS (NPI) IN 43 CITIES DURING FALL 1918
(MARKEL ET AL., 2007)

City	State	First Case	Mortality Acc. Date	Response Date	NPI Speed$_{c1918}$	NPI Intensity$_{c1918}$	Mortality$_{c1917}$	Mortality$_{c1918}$
Albany	New York	Oct/06/1918	Oct/15/1918	Oct/18/1918	-3	47	187.4	679.1
Baltimore	Maryland	Sep/27/1918	Oct/08/1918	Oct/18/1918	-10	43	251.9	836.5
Birmingham	Alabama	Oct/03/1918	Oct/09/1918	Oct/18/1918	-9	48	334.7	843.6
Boston	Massachusetts	Sep/13/1918	Sep/21/1918	Oct/04/1918	-13	50	228	844.7
Buffalo	New York	Oct/03/1918	Oct/07/1918	Oct/19/1918	-12	49	184	637.5
Cambridge	Massachusetts	Sep/13/1918	Sep/20/1918	Oct/04/1918	-14	49	164.2	676.5
Chicago	Illinois	Sep/26/1918	Oct/07/1918	Oct/05/1918	2	68	201.7	516.6
Cincinnati	Ohio	Oct/03/1918	Oct/13/1918	Oct/15/1918	-2	123	171.3	605.4
Cleveland	Ohio	Sep/29/1918	Oct/16/1918	Oct/14/1918	2	99	198.5	590.9
Columbus	Ohio	Sep/29/1918	Oct/15/1918	Oct/20/1918	-5	147	168.1	451.9
Dayton	Ohio	Sep/29/1918	Oct/14/1918	Oct/09/1918	5	156	157.8	525.2
Denver	Colorado	Sep/26/1918	Oct/06/1918	Oct/15/1918	-9	151	134.4	727.7
Fall River	Massachusetts	Sep/18/1918	Sep/25/1918	Oct/05/1918	-10	60	229.7	799.7
Grand Rapids	Michigan	Oct/02/1918	Oct/11/1918	Oct/28/1918	-17	62	89.6	282.7
Indianapolis	Indiana	Oct/01/1918	Oct/09/1918	Oct/16/1918	-7	82	156.6	459.4
Kansas City	Missouri	Sep/29/1918	Oct/05/1918	Oct/05/1918	0	170	205	718.1
Los Angeles	California	Oct/06/1918	Oct/15/1918	Oct/20/1918	-5	154	93.3	484.5
Louisville	Kentucky	Sep/22/1918	Oct/10/1918	Oct/16/1918	-6	145	209.5	1012.9
Lowell	Massachusetts	Sep/18/1918	Sep/25/1918	Oct/06/1918	-11	59	183.6	696.1
Milwaukee	Wisconsin	Sep/23/1918	Oct/15/1918	Oct/20/1918	-5	132	186.3	474.1
Minneapolis	Minnesota	Sep/30/1918	Oct/15/1918	Oct/21/1918	-6	116	126.3	387.7
Nashville	Tennessee	Sep/30/1918	Oct/15/1918	Oct/16/1918	-1	55	188.6	910.2
New Haven	Connecticut	Sep/23/1918	Oct/02/1918	Oct/24/1918	-22	39	236	768
New Orleans	Louisiana	Sep/19/1918	Oct/10/1918	Oct/17/1918	-7	78	178.5	768.6
New York	New York	Sep/14/1918	Oct/08/1918	Sep/27/1918	11	73	204.5	582.5
Newark	New Jersey	Sep/15/1918	Oct/09/1918	Oct/19/1918	-10	33	184	680.4
Oakland	California	Oct/10/1918	Oct/17/1918	Oct/21/1918	-4	127	96.3	496.9
Omaha	Nebraska	Sep/27/1918	Oct/13/1918	Oct/14/1918	-1	140	207.1	660.8
Philadelphia	Pennsylvania	Sep/05/1918	Oct/04/1918	Oct/12/1918	-8	51	228	932.5
Pittsburgh	Pennsylvania	Sep/13/1918	Oct/06/1918	Oct/13/1918	-7	53	380.4	1243.6
Portland	Oregon	Oct/11/1918	Oct/16/1918	Oct/20/1918	-4	162	72.4	448.2
Providence	Rhode Island	Sep/17/1918	Sep/26/1918	Oct/15/1918	-19	42	221.7	737.4
Richmond	Virginia	Sep/30/1918	Oct/08/1918	Oct/15/1918	-7	60	199.5	661
Rochester	New York	Oct/01/1918	Oct/15/1918	Oct/18/1918	-3	54	151.7	522.7
Saint Paul	Minnesota	Sep/30/1918	Oct/11/1918	Nov/15/1918	-35	28	112	480.6
San Francisco	California	Oct/03/1918	Oct/16/1918	Oct/27/1918	-11	67	126.4	647.7
Seattle	Washington	Oct/03/1918	Oct/10/1918	Oct/15/1918	-5	168	58.9	425.5
Spokane	Washington	Oct/07/1918	Oct/18/1918	Oct/19/1918	-1	164	102.5	487.4
St. Louis	Missouri	Oct/02/1918	Oct/16/1918	Oct/17/1918	-1	143	227	536.5
Syracuse	New York	Sep/21/1918	Sep/27/1918	Oct/16/1918	-19	39	155.2	704.6
Toledo	Ohio	Sep/30/1918	Oct/22/1918	Oct/24/1918	-2	102	152.4	401
Washington	District of Columbia	Sep/20/1918	Oct/02/1918	Oct/12/1918	-10	64	166.8	758
Worcester	Massachusetts	Sep/18/1918	Sep/21/1918	Oct/06/1918	-15	44	192.3	727.1

Notes: This table list all 43 cities used in Markel et al. (2007) for which NPI data are available. NPIs are measures such as the closure of schools and churches, the banning of mass gatherings, but also other measures such as mandated mask wearing, case isolation, and public disinfection/hygiene measures. The table reports our two main measures for *NPI Speed* and *NPI Intensity*. The former is measured as the difference between the response date and the mortality acceleration date which is the day the mortality rate exceeds twice its base. The later counts the cumulative total number of days NPIs measures are activated from Markel et al. (2007).

TABLE A2
COMPARISON OF CITIES WITH HIGH AND LOW NPIS

	Low NPI		High NPI		Difference	
	Mean	Std	Mean	Std	Diff	t-stat
Longitude	-80.94	12.05	-96.07	16.48	-15.13	-3.32
NPI Speed	-11.56	7.06	-1.50	4.40	10.06	5.74
NPI Intensity	56.28	23.42	132.72	30.89	76.44	8.85
Influenza mortality, 1917	194.61	63.48	157.72	53.18	-36.89	-2.07
Influenza mortality, 1918	721.04	181.38	544.78	146.10	-176.25	-3.53
Log city population, 1910	12.33	0.72	12.66	1.00	0.33	1.20
Log city population, 1900	12.07	0.79	12.20	1.14	0.12	0.40
City Density, population 1910 per sqm	9033.44	4694.15	7933.83	4371.95	-1099.61	-0.79
Health expenses in 1917/Population in 1910	0.55	0.26	0.52	0.22	-0.04	-0.50
Manuf. Emp./Population in 1910	0.14	0.07	0.11	0.05	-0.03	-1.51
Log manuf. emp, 1914	1023.90	82.21	1035.75	128.49	11.85	0.34
Agr. empl. share in 1910, state-level	19.67	18.44	27.44	10.47	7.77	1.75

Notes: This table reports differences in city-level and state-level characteristics for the 43 cities with NPIs. *High NPI* cities have above-median *NPI Speed* and above-median *NPI Intensity*.

TABLE A3
1918 FLU PANDEMIC EXPOSURE AND ECONOMIC ACTIVITY

Panel A: No Controls			
	State-Level		City-Level
	(1) ln(Emp)	(2) Emp/Pop	(3) ln(Emp)
$Mortality_{1918} \times$ Post	-0.067 (0.020)	-0.0044 (0.0010)	-0.036 (0.017)
R^2 (Within)	.47	.16	.42
N	180	180	394
No of units	30	30	66
Panel B: Baseline Controls $\times$ Post			
	(1)	(2)	(3)
$Mortality_{1918} \times$ Post	-0.095 (0.023)	-0.0055 (0.0011)	-0.021 (0.017)
R^2 (Within)	.53	.18	.45
N	180	180	394
No of units	30	30	66
Panel C: Instrumenting with Distance to Military Camps			
	(1)	(2)	(3)
$Mortality_{1918} \times$ Post	-0.12 (0.026)	-0.0047 (0.0016)	-0.15 (0.046)
First Stage F-Stat (KP)	13	13	19
R^2 (Within)	.53	.18	.27
N	180	180	394
No of units	30	30	66
State and Post FE	Yes	Yes	Yes

Notes: The table reports results from estimating a regression of the following form:

$$Y_{st} = \alpha_s + \beta \times Mortality_{s,1918} \times Post_t + \delta \times Post_t + \gamma \times X_s \times Post_t + \varepsilon_{st},$$

where $Mortality_{s,1918}$ is state/city mortality from influenza and pneumonia in 1918, $Post_t$ is a dummy variable that takes the value of one after 1918. Controls in X_s for state-level regressions are the 1910 agriculture employment share, 1910 manufacturing employment share, 1910 urban population share, 1910 income per capita, and log 1910 population. Controls for the city-level regressions are 1910 population, manufacturing employment in 1914 to 1910 population, health expenditures in 1917 to 1910 population, city density in 1910, state agriculture employment share in 1910, and the state war production dummy. Census of Manufactures dependent variable outcomes are measured in 1904, 1909, 1914, 1919, 1921,and 1923.
Standard errors clustered at the state or city level in parentheses.

TABLE A4
NON-PHARMACEUTICAL INTERVENTIONS AND ECONOMIC DISRUPTIONS IN BRADSTREETS TRADE CONDITIONS: ESTIMATES WITHOUT CONTROLS

| | Panel A: NPI Intensity Measure | | | |
	Combined W+R+M	Wholesale Trade	Retail Trade	Manufacturing
	(1)	(2)	(3)	(4)
$NPI\ Intensity_c \times Post_t$	-0.064	-0.0011	-0.0043	-0.14
	(0.075)	(0.10)	(0.13)	(0.082)
R^2 (Within)	.0061	8.4e-07	9.7e-06	.02
N	344	343	342	340
	Panel B: NPI Speed Measure			
	(1)	(2)	(3)	(4)
$NPI\ Speed_c \times Post_t$	-0.20	-0.43	0.18	-0.32
	(0.39)	(0.52)	(0.74)	(0.34)
R^2 (Within)	.0019	.0038	.0005	.0029
N	344	343	342	340
	Panel C: High NPI Measure			
	(1)	(2)	(3)	(4)
$High\ NPI_c \times Post_t$	-3.86	-4.97	5.41	-11.5
	(7.92)	(10.9)	(12.9)	(10.4)
R^2 (Within)	.0021	.0017	.0015	.012
N	344	343	342	340
No of cities	25	25	25	25
City and Time FE	Yes	Yes	Yes	Yes
Controls	No	No	No	No

Notes: The table is analogous to Table 2 but reports estimates from specifications excluding controls $X_c \times Post_t$.

FIGURE A9
BRADSTREET'S STREET AT A GLANCE

October 26, 1918

FIGURE A10
MAP OF THE MANUFACTURING PLANTS ON THE OUTSKIRTS OF RICHMOND, VA

As of the 1909 Census, overlaid against a 1923 map of the territorial expansion of the City of Richmond from Richmond's Department of Public Works

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TRANSLATED VERSION: SPANISH

Below is a rough translation of the insights presented above. This was done to give a general understanding of the ideas presented in the paper. Please excuse any grammatical mistakes and do not hold the original authors responsible for these mistakes.

VERSION TRADUCIDA: ESPAÑOL

A continuación se muestra una traducción aproximada de las ideas presentadas anteriormente. Esto se hizo para dar una comprensión general de las ideas presentadas en el documento. Por favor, disculpe cualquier error gramatical y no responsabilite a los autores originales de estos errores.

INTRODUCCIÓN

¿Las intervenciones no farmacéuticas (NPI) como el distanciamiento social tienen costos económicos, o las medidas de salud pública destinadas a contener la propagación de una pandemia también reducen su gravedad económica? El brote de la pandemia COVID-19 ha suscitado preguntas urgentes sobre el impacto de las pandemias y las respuestas de salud pública asociadas en la economía real. En este documento, examinamos los efectos económicos de las intervenciones no farmacéuticas durante la mayor pandemia de gripe en la historia de los Estados Unidos, la pandemia de gripe de 1918.

En nuestro análisis empírico, explotamos la variación en la velocidad e intensidad de la implementación de npis en las ciudades de Estados Unidos durante el otoño de 1918. Los NPI implementados en 1918, aunque menos extensos, se asemejan a las políticas utilizadas para reducir la propagación de COVID19, incluidos los cierres de escuelas, teatros e iglesias, prohibiciones de reunión pública, cuarentena de casos sospechosos y horarios comerciales restringidos.

Comenzamos estudiando el impacto de los NPI en la mortalidad. De conformidad con las pruebas existentes de la literatura epidemiológica (Markel et al., 2007; Hatchett et al., 2007), encontramos que los NPI lograron reducciones sustanciales en la mortalidad máxima, de alrededor del 45%, aplanando así la curva de infección. También encontramos evidencia de que las ciudades que intervinieron de manera temprana y agresiva experimentaron una reducción modesta en el exceso de mortalidad acumulada de alrededor del 20%. Por lo tanto, los NPI lograron reducir la tasa de transmisión de enfermedades y, en menor medida, las tasas acumuladas de infección, potencialmente mediante la mitigación del exceso epidémico (Bootsma y Ferguson, 2007).

Nuestro análisis principal examina el impacto de los NPI en la actividad económica en las ciudades de Estados Unidos a corto y medio plazo. En teoría, los efectos económicos de los INP podrían ser positivos o negativos. Todos los demás iguales, los NPI restringen las interacciones sociales y, por lo tanto, la actividad económica que se basa en tales interacciones. Sin embargo, la actividad económica en una pandemia también se reduce en ausencia de tales medidas, ya que los hogares reducen el consumo y la oferta de mano de obra para reducir el riesgo de infectarse, y las empresas reducen la inversión en respuesta al aumento de la incertidumbre. Además, si bien el efecto directo de los NPI es reducir la actividad económica, también mitigan el impacto del shock original: la propia pandemia. Al contener la pandemia, los NPI también pueden mitigar las perturbaciones económicas relacionadas con la pandemia.

Para estudiar el impacto a corto plazo de los NPI en la actividad económica local, construimos un índice a nivel de ciudad de las interrupciones del negocio a una frecuencia mensual basada en una revista comercial contemporánea. Nuestro índice implica que la pandemia en sí está asociada con un aumento de las interrupciones del negocio en el otoño de 1918. El aumento de las interrupciones del negocio está respaldado por la evidencia narrativa de los periódicos contemporáneos, que reportan descensos significativos en la producción y las ventas en una amplia gama de industrias debido a la escasez de mano de obra y la caída de la demanda. Sin embargo, cuando comparamos las ciudades con los NPI estrictos y indulgentes, encontramos que el aumento de las interrupciones del negocio en el otoño y el invierno de 1918 fue cuantitativamente similar en los dos conjuntos de ciudades. Por lo tanto, nuestras conclusiones indican que los INP no exacerbaron claramente la recesión económica durante la pandemia.

Además, examinamos el impacto económico de los INP a medio plazo. No encontramos pruebas de que las ciudades que intervinieron antes y de manera más agresiva funcionen peor en los años posteriores a la pandemia, medida por el empleo y la producción manufacturera locales y el tamaño del sector bancario local. Como mínimo, nuestras estimaciones rechazan que las ciudades con NPI más estrictos experimentaron una gran disminución del empleo y la producción en los años posteriores a la pandemia, en relación con las ciudades con npis indulgentes. En todo caso, las ciudades con alto PNNP experimentan un aumento relativo de la actividad económica a partir de 1919. En conjunto, nuestros hallazgos sugieren que, si bien las pandemias están asociadas con perturbaciones económicas, los NPI pueden reducir la transmisión de enfermedades sin exacerbar la recesión inducida por la pandemia.

Nuestras conclusiones están sujetas a la preocupación de que las respuestas políticas sean endógenas y pueden estar impulsadas por factores relacionados con los resultados económicos futuros. Esta preocupación se ve algo mitigada por la percepción de que las ciudades que experimentaron brotes en fechas posteriores tendieron a implementar NPI antes dentro de su brote, como aprendieron de las experiencias de

las ciudades afectadas anteriormente (Hatchett et al., 2007). Por lo tanto, a medida que la gripe se movía de este a oeste, las ciudades situadas más al oeste eran más rápidas en la implementación de los NPI. Es importante destacar que también mostramos que nuestros resultados son sólidos para controlar los shocks variables en el tiempo correlacionados con características que difieren entre las ciudades occidentales y orientales, como la exposición a la agricultura, el crecimiento demográfico pasado, la densidad y los proxies para la calidad de las instituciones locales.

Hacemos hincapié en la prudencia al generalizar estos resultados al actual brote COVID-19. La pandemia de gripe de 1918 fue significativamente más mortífera que las estimaciones actuales que sugieren para COVID-19, especialmente para las personas en edad de trabajar. Por lo tanto, los méritos económicos de los NPI pueden haber sido mayores en 1918. Los INP implementados en 1918 también fueron menos extensos que los utilizados durante el brote DE COVID-19. Además, la estructura de la economía y la sociedad de los Estados Unidos ha evolucionado sustancialmente a lo largo de un siglo. Sin embargo, nuestros resultados sugieren que no es una conclusión obvia que exista un equilibrio entre la reducción de la transmisión de enfermedades y la estabilización de la actividad económica en una pandemia.

El resto del documento se estructura de la siguiente manera. En la Sección 2 se analizan los antecedentes históricos de las intervenciones de 1918 sobre la pandemia de gripe y las intervenciones no farmacéuticas. La Sección 3 describe nuestro conjunto de datos. Las secciones 4 presentan nuestros resultados, y la Sección 5 ofrece un debate y observaciones finales.

CONCLUSIÓN

Este documento examina el impacto de las intervenciones no farmacéuticas durante la pandemia de gripe de 1918 en la mortalidad y la actividad económica. Encontramos que si bien los NPI aplanaron la curva de transmisión de la enfermedad, no se asociaron con peores resultados económicos durante o después de la pandemia. En cambio, nuestros hallazgos sugieren que la principal fuente de perturbación económica fue la propia pandemia.

Hay varias advertencias importantes a tener en cuenta con nuestro análisis. En primer lugar, nuestra muestra está limitada a sólo 43 ciudades. En segundo lugar, no podemos examinar cuidadosamente las pretegencias de los resultados de fabricación en los años 1915, 1916 o 1917, ya que los datos no están disponibles con una frecuencia anual. En tercer lugar, el entorno económico hacia finales de 1918 fue inusual debido al final de la Primera Guerra Mundial. En cuarto lugar, nuestro análisis interregional no nos permite capturar los efectos de equilibrio agregado de los NPI.

Con estas advertencias en mente, nuestros hallazgos plantean, no obstante, la pregunta: ¿Por qué los NPI no podrían ser económicamente perjudiciales durante una pandemia, y posiblemente incluso beneficiosos a medio plazo? Es difícil arrojar luz sobre los mecanismos exactos a través de los cuales los NPI afectaron a la economía con los datos limitados disponibles para 1918, pero ofrecemos algunos canales potenciales. El efecto directo de los INP, como los cierres de teatros y las prohibiciones de reunión pública, es contractivo, ya que estas políticas restringen necesariamente la actividad económica. Sin embargo, la pandemia en sí misma puede ser altamente perturbadora para la economía. Muchas actividades que restringen los NPI probablemente no se habrían producido incluso en ausencia de NPI. Para evitar contraer el virus, los hogares recortan el consumo y la oferta de mano de obra (véase, por ejemplo, Eichenbaum et al., 2020), mientras que las empresas reducen la inversión en respuesta a la escasez de mano de obra, la menor demanda y el aumento de la incertidumbre. Como resultado, la contrafáctica sin NPI todavía implicaría una desaceleración.

Además, los NPI pueden tener beneficios económicos indirectos al abordar la raíz de la perturbación económica —la propia pandemia— de manera coordinada. La mitigación de la pandemia puede prevenir una recesión económica en última instancia. Por ejemplo, Bodenstein y otros (2020) presentan un modelo bidimensional en el que los NPI mitigan la disminución de la producción aplanando la curva, incluso sin reducir significativamente la infección acumulativa. En su modelo, la producción en el sector esencial para la economía se ve menos perturbada cuando la enfermedad y el riesgo de contraer un virus en un momento dado es menor, lo que conduce a una menor disminución general de la producción. Además, al reducir las

tasas de infección acumulada, los NPI pueden tener beneficios económicos a mediano plazo al reducir directamente la enfermedad y la mortalidad y al reducir los costos asociados con el aumento de la morbilidad.

Detalles históricos más específicos también arroja luz sobre por qué los NPI en 1918 no empeoraron la recesión económica. Los INP aplicados en 1918 fueron más leves que las adoptadas en algunos países durante el COVID-19. Es probable que las medidas más severas, como los cierres de negocios, aumenten el costo de los NPI. Los cierres de escuelas fueron menos costosos en 1918, ya que la participación de la fuerza laboral femenina fue menor. Las estimaciones sugieren que la gripe de 1918 fue más mortífera que COVID-19, especialmente para los trabajadores en edad de primera, lo que también sugiere impactos económicos más graves de la gripe de 1918 y mayores beneficios de las NPI de 1918. El virus H1N1 de 1918 también tuvo un período de incubación más corto que el COVID-19, lo que facilitó la identificación y aislamiento de casos sospechosos. Como resultado, destacamos los límites de validez externa de las lecciones de la pandemia de gripe de 1918.

A pesar de estas importantes diferencias, las investigaciones en curso encuentran que los NPI implementados en 2020 han reducido la transmisión de enfermedades sin conducir a perturbaciones económicas sustanciales adicionales (véanse, por ejemplo, Andersen et al., 2020; Lin y Meissner, 2020), y los países que implementaron npis en las primeras etapas de la pandemia COVID-19 tienen mejores resultados económicos a corto plazo (véase, por ejemplo, Demirg-Kunt et al., 2020). Esperamos con interés futuras investigaciones que desenreden el impacto neto, los costos directos y los beneficios indirectos de los NPI implementados durante COVID-19 tanto a corto como a mediano plazo.

TRANSLATED VERSION: FRENCH

Below is a rough translation of the insights presented above. This was done to give a general understanding of the ideas presented in the paper. Please excuse any grammatical mistakes and do not hold the original authors responsible for these mistakes.

VERSION TRADUITE: FRANÇAIS

Voici une traduction approximative des idées présentées ci-dessus. Cela a été fait pour donner une compréhension générale des idées présentées dans le document. Veuillez excuser toutes les erreurs grammaticales et ne pas tenir les auteurs originaux responsables de ces erreurs.

INTRODUCTION

Les interventions non pharmaceutiques (INP) telles que la distanciation sociale ont-elles des coûts économiques, ou les mesures de santé publique destinées à contenir la propagation d'une pandémie peuvent-elles également réduire sa gravité économique? L'éclosion de la pandémie COVIDE-19 a suscité des questions urgentes sur l'impact des pandémies et les réponses connexes en matière de santé publique sur l'économie réelle. Dans cet article, nous examinons les effets économiques des interventions non pharmaceutiques pendant la plus grande pandémie de grippe de l'histoire des États-Unis, la pandémie de grippe de 1918.

Dans notre analyse empirique, nous exploitons la variation de la vitesse et de l'intensité de la mise en œuvre des INP dans les villes américaines au cours de l'automne 1918. Les INP mises en œuvre en 1918, bien que moins étendues, ressemblent à des politiques utilisées pour réduire la propagation des COVID19, y compris les fermetures d'écoles, de théâtres et d'églises, les interdictions de rassemblement public, la quarantaine des cas suspects et les heures d'ouverture restreintes.

Nous commençons par étudier l'impact des INP sur la mortalité. Conformément aux données probantes existantes de la littérature épidémiologique (Markel et coll., 2007; Hatchett et coll., 2007), nous constatons que les INP ont obtenu des réductions substantielles de la mortalité maximale, d'environ 45 %, aplatissant ainsi la courbe d'infection. Nous trouvons également des preuves que les villes qui sont intervenues à la

fois tôt et agressivement ont connu une réduction modeste de la surmortalité cumulative d'environ 20 %. Ainsi, les INP ont réussi à ralentir le taux de transmission de la maladie et, dans une moindre mesure, à les taux cumulatifs d'infection, potentiellement en atténuant les dépassements épidémiques (Bootsma et Ferguson, 2007).

Notre analyse principale examine l'impact des INP sur l'activité économique dans les villes américaines à court et moyen terme. En théorie, les effets économiques des INP pourraient être positifs ou négatifs. Toutes choses égales par ailleurs, les NIP limitent les interactions sociales et donc l'activité économique qui repose sur de telles interactions. Toutefois, l'activité économique dans une pandémie est également réduite en l'absence de telles mesures, car les ménages réduisent la consommation et l'offre de main-d'œuvre pour réduire le risque d'infection, et les entreprises réduisent leurs investissements en réponse à l'incertitude croissante. De plus, si l'effet direct des INP est de réduire l'activité économique, ils atténuent également l'impact du choc initial : la pandémie elle-même. En limitant la pandémie, les INP peuvent ainsi atténuer les perturbations économiques liées à la pandémie.

Pour étudier l'impact à court terme des INP sur l'activité économique locale, nous construisons un indice au niveau de la ville des perturbations d'affaires à une fréquence mensuelle basée sur une revue commerciale contemporaine. Notre indice implique que la pandémie elle-même est associée à une augmentation des perturbations d'affaires à l'automne 1918. L'augmentation des perturbations d'affaires est soutenue par les preuves narratives des journaux contemporains, qui rapportent des baisses significatives de la production et des ventes dans un large éventail d'industries en raison de pénuries de main-d'œuvre et de la baisse de la demande. Toutefois, lorsque nous comparons les villes à des INP strictes et clémentes, nous constatons que l'augmentation des perturbations d'affaires à l'automne et à l'hiver 1918 était quantitativement similaire dans les deux ensembles de villes. Nos résultats indiquent donc que les INP n'ont pas clairement exacerbé le ralentissement économique pendant la pandémie.

De plus, nous examinons l'impact économique des INP à moyen terme. Nous ne trouvons aucune preuve que les villes qui sont intervenues plus tôt et plus agressivement obtiennent de moins en moins dans les années qui ont suivi la pandémie, mesurées par l'emploi et la production manufacturières locaux et la taille du secteur bancaire local. À tout le moins, nos estimations rejettent le fait que les villes où les INP sont plus strictes ont connu une forte baisse de l'emploi et de la production dans les années qui ont suivi la pandémie, par rapport aux villes où les INP sont indulgentes. En fait, les villes à forte NPI connaissent une augmentation relative de l'activité économique à partir de 1919. Dans l'ensemble, nos résultats suggèrent que, bien que les pandémies soient associées à des perturbations économiques, les INP peuvent réduire la transmission de la maladie sans exacerber le ralentissement causé par la pandémie.

Nos constatations sont sujettes à la crainte que les réponses politiques soient endogènes et qu'elles puissent être motivées par des facteurs liés aux résultats économiques futurs. Cette préoccupation est quelque peu atténuée par l'idée que les villes qui ont connu des éclosions à des dates ultérieures ont eu tendance à mettre en œuvre des INP plus tôt au cours de leur éclosion, comme elles l'ont appris des expériences des villes touchées plus tôt (Hatchett et al., 2007). Ainsi, à mesure que la grippe se déplaçait d'est en ouest, les villes situées plus à l'ouest étaient plus rapides dans la mise en œuvre des INP. Fait important, nous montrons également que nos résultats sont solides pour contrôler les chocs variables dans le temps corrélés avec des caractéristiques qui diffèrent entre les villes de l'Ouest et de l'Est, telles que l'exposition à l'agriculture, la croissance démographique passée, la densité et les procurations pour la qualité des institutions locales.

Nous mettons l'accent sur la prudence lors de la généralisation de ces résultats à l'éclosion actuelle de COVID-19. La pandémie de grippe de 1918 était beaucoup plus mortelle que ce que les estimations actuelles suggèrent pour COVID-19, en particulier pour les personnes en âge de travailler. Ainsi, les mérites économiques des INP ont peut-être été plus importants en 1918. Les INP mises en œuvre en 1918 étaient également moins étendues que celles utilisées lors de l'éclosion de COVID-19. De plus, la structure de l'économie et de la société américaines a considérablement évolué au cours d'un siècle. Néanmoins, nos résultats suggèrent qu'il n'est pas acquis qu'il y a un compromis entre la réduction de la transmission de la maladie et la stabilisation de l'activité économique en cas de pandémie.

Le reste du document est structuré comme suit. La section 2 traite du contexte historique de la pandémie de grippe de 1918 et des interventions non pharmaceutiques. La section 3 décrit notre jeu de données. Les sections 4 présentent nos résultats, et la section 5 offre une discussion et des remarques finales.

CONCLUSION

Cet article examine l'impact des interventions non pharmaceutiques pendant la pandémie de grippe de 1918 sur la mortalité et l'activité économique. Nous constatons que même si les INP ont aplati la courbe de transmission de la maladie, elles n'ont pas été associées à une performance économique plus mauvaise pendant ou après la pandémie. Au lieu de cela, nos résultats suggèrent que la principale source de perturbation économique était la pandémie elle-même.

Il y a plusieurs mises en garde importantes à garder à l'esprit avec notre analyse. Tout d'abord, notre échantillon est limité à seulement 43 villes. Deuxièmement, nous ne pouvons pas examiner attentivement les tendances préalables aux résultats de fabrication dans les années 1915, 1916 ou 1917, car les données ne sont pas disponibles à une fréquence annuelle. Troisièmement, l'environnement économique vers la fin de 1918 était inhabituel en raison de la fin de la Première Guerre mondiale. Quatrièmement, notre analyse interrégional ne nous permet pas de saisir les effets d'équilibre global des INP.

Compte à l'esprit de ces mises en garde, nos conclusions soulèvent néanmoins la question suivante : pourquoi les INP ne pourraient-elles pas être économiquement nuisibles en cas de pandémie, et peut-être même bénéfiques à moyen terme? Il est difficile de faire la lumière sur les mécanismes exacts par lesquels les INP ont affecté l'économie avec les données limitées disponibles pour 1918, mais nous offrons certains canaux potentiels. L'effet direct des INP telles que les fermetures de théâtres et les interdictions de rassemblement public est de contraction, car ces politiques restreignent nécessairement l'activité économique. Toutefois, la pandémie elle-même peut être très perturbatrice pour l'économie. De nombreuses activités que les INP restreignent n'auraient probablement pas eu lieu même en l'absence d'inp. Pour éviter de contracter le virus, les ménages réduisent la consommation et l'offre de main-d'œuvre (voir, par exemple, Eichenbaum et coll., 2020), tandis que les entreprises réduisent leurs investissements en réponse aux pénuries de main-d'œuvre, à la baisse de la demande et à l'incertitude accrue. Par conséquent, le contrefactuel sans INP impliquerait toujours un ralentissement.

De plus, les INP peuvent avoir des avantages économiques indirects en s'attaquant à la racine de la perturbation économique — la pandémie elle-même — d'une manière coordonnée. L'atténuation de la pandémie peut prévenir un ralentissement économique en fin de compte pire. Par exemple, Bodenstein et coll. (2020) présentent un modèle à deux secteurs où les INP atténuent la baisse de la production en aplatissant la courbe, même sans réduire considérablement l'infection cumulative. Dans leur modèle, la production dans le secteur essentiel à l'économie est moins perturbée lorsque la maladie et le risque de contracter un virus à un moment donné est plus faible, ce qui entraîne une baisse globale de la production. De plus, en réduisant les taux cumulatifs d'infection, les INP peuvent avoir des avantages économiques à moyen terme en réduisant directement la maladie et la mortalité et en réduisant les coûts associés à l'augmentation de la morbidité.

Des détails historiques plus précis ont également permis de comprendre pourquoi les INP en 1918 n'ont pas aggravé le ralentissement économique. Les INP mises en œuvre en 1918 étaient plus modérées que les mesures adoptées dans certains pays au cours de la COVIDE-19. Des mesures plus sévères, comme les fermetures d'entreprises, augmentent probablement le coût des INP. Les fermetures d'écoles ont été moins coûteuses en 1918, car la participation des femmes à la population active était plus faible. Les estimations suggèrent que la grippe de 1918 a été plus mortelle que la COVID-19, en particulier pour les travailleurs d'âge élevé, ce qui suggère également des impacts économiques plus graves de la grippe de 1918 et de plus grands avantages à moyen terme des INP. Le virus H1N1 de 1918 a également connu une période d'incubation plus courte que le COVID-19, ce qui a facilité l'identification et l'isolement des cas suspects. Par conséquent, nous insistons sur les limites de la validité externe des leçons tirées de la pandémie de grippe de 1918.

Malgré ces différences importantes, les recherches en cours révèlent que les INP mises en œuvre en 2020 ont réduit la transmission de la maladie sans entraîner de perturbations économiques supplémentaires importantes (voir, par exemple, Andersen et coll., 2020; Lin et Meissner, 2020), et les pays qui ont mis en œuvre des INN dans les premiers stades de la pandémie COVIDE-19 ont de meilleurs résultats économiques à court terme (voir, par exemple, Demirgüç-Kunt et al., 2020). Nous nous réjouissons à l'idée de mener des recherches futures qui dissualisent l'impact net, les coûts directs et les avantages indirects des INP mises en œuvre au cours de la COVIDE-19 à court et à moyen terme.

TRANSLATED VERSION: GERMAN

Below is a rough translation of the insights presented above. This was done to give a general understanding of the ideas presented in the paper. Please excuse any grammatical mistakes and do not hold the original authors responsible for these mistakes.

ÜBERSETZTE VERSION: DEUTSCH

Hier ist eine ungefähre Übersetzung der oben vorgestellten Ideen. Dies wurde getan, um ein allgemeines Verständnis der in dem Dokument vorgestellten Ideen zu vermitteln. Bitte entschuldigen Sie alle grammatikalischen Fehler und machen Sie die ursprünglichen Autoren nicht für diese Fehler verantwortlich.

EINLEITUNG

Haben nichtpharmazeutische Interventionen (npis) wie soziale Deistancing wirtschaftliche Kosten, oder können Maßnahmen im Bereich der öffentlichen Gesundheit, die die Ausbreitung einer Pandemie eindämmen sollen, auch ihre wirtschaftliche Schwere verringern? Der Ausbruch der COVID-19-Pandemie hat dringende Fragen über die Auswirkungen von Pandemien und die damit verbundenen Reaktionen auf die öffentliche Gesundheit auf die Realwirtschaft aufgeworfen. In diesem Beitrag untersuchen wir die wirtschaftlichen Auswirkungen nicht-pharmazeutischer Interventionen während der größten Grippepandemie in der US-Geschichte, der Grippepandemie von 1918.

In unserer empirischen Analyse nutzen wir Die Geschwindigkeit und Intensität der Implementierung von npis in US-Städten im Herbst 1918. Npis, die 1918 eingeführt wurden – wenn auch weniger umfangreich – ähneln Maßnahmen, die verwendet werden, um die Verbreitung von COVID19 zu reduzieren, einschließlich Schul-, Theater- und Kirchenschließungen, Versammlungsverboten, Quarantäne von Verdachtsfällen und eingeschränkten Geschäftszeiten.

Wir beginnen damit, die Auswirkungen von npis auf die Sterblichkeit zu untersuchen. In Übereinstimmung mit den vorhandenen Erkenntnissen aus der epidemiologischen Literatur (Markel et al., 2007; Hatchett et al., 2007), stellen wir fest, dass npis eine erhebliche Verringerung der Spitzensterblichkeit um etwa 45 % erreichten und damit die Infektionskurve abflachten. Wir finden auch Beweise dafür, dass Städte, die sowohl früh als auch aggressiv intervenierten, einen bescheidenen Rückgang der kumulativen Übersterblichkeit um etwa 20 % erlebten. So gelang es den npis, die Übertragungsrate von Krankheiten und in geringerem Maße die kumulativen Infektionsraten zu verlangsamen, möglicherweise durch die Abschwächung der Seuchenüberschreitung (Bootsma und Ferguson, 2007).

Unsere Hauptanalyse untersucht die Auswirkungen von npis auf die Wirtschaftstätigkeit in US-Städten kurz- und mittelfristig. Theoretisch könnten die wirtschaftlichen Auswirkungen von npis entweder positiv oder negativ sein. Alles andere gleich, npis beschränken soziale Interaktionen und damit wirtschaftliche Aktivität, die auf solche Interaktionen angewiesen ist. Allerdings wird die Wirtschaftstätigkeit in einer Pandemie auch in Ermangelung solcher Maßnahmen reduziert, da die Haushalte den Verbrauch und das Arbeitskräfteangebot verringern, um das Risiko einer Infektion zu verringern, und die Unternehmen ihre Investitionen als Reaktion auf die zunehmende Unsicherheit kürzen. Darüber hinaus sind die npis zwar die unmittelbare Wirkung, die Wirtschaftstätigkeit zu verringern, aber sie mildern auch die Auswirkungen des

ursprünglichen Schocks: die Pandemie selbst. Durch die Eindämmung der Pandemie können npis somit auch die pandemiebedingten wirtschaftlichen Störungen abmildern.

Um die kurzfristigen Auswirkungen von npis auf die lokale Wirtschaftätigkeit zu untersuchen, erstellen wir einen Index von Betriebsstörungen auf Stadtebene in einer monatlichen Häufigkeit, basierend auf einer zeitgenössischen Fachzeitschrift. Unser Index impliziert, dass die Pandemie selbst mit einer Zunahme von Betriebsstörungen im Herbst 1918 verbunden ist. Der Anstieg der Betriebsstörungen wird durch narrative Beweise zeitgenössischer Zeitungen gestützt, die aufgrund von Arbeitskräftemangel und sinkender Nachfrage deutliche Produktions- und Umsatzrückgänge in einer Vielzahl von Branchen melden. Wenn wir jedoch Städte mit strengen und milden npis vergleichen, stellen wir fest, dass die Zunahme von Betriebsstörungen im Herbst und Winter 1918 in den beiden Gruppen von Städten quantitativ ähnlich war. Unsere Ergebnisse deuten daher darauf hin, dass die npis den wirtschaftlichen Abschwung während der Pandemie nicht eindeutig verschärft haben.

Darüber hinaus untersuchen wir die mittelfristigen wirtschaftlichen Auswirkungen von npis. Wir finden keine Beweise dafür, dass Städte, die früher und aggressiver interveniert haben, in den Jahren nach der Pandemie schlechter abschneiden, gemessen an der Beschäftigung und Produktion des lokalen verarbeitenden Gewerbes und der Größe des lokalen Bankensektors. Zumindest lehnen unsere Schätzungen ab, dass Städte mit strengeren npis in den Jahren nach der Pandemie einen starken Rückgang von Beschäftigung und Produktion im Vergleich zu Städten mit milden npis erlebthaben. Wenn überhaupt, verzeichnen hohe NPI-Städte ab 1919 einen relativen Anstieg der Wirtschaftätigkeit. Insgesamt deuten unsere Ergebnisse darauf hin, dass Pandemien zwar mit wirtschaftlichen Störungen verbunden sind, npis aber die Krankheitsübertragung reduzieren können, ohne den pandemiebedingten Abschwung zu verschärfen.

Unsere Ergebnisse sind der Sorge unterworfen, dass politische Reaktionen endogene sind und von Faktoren im Zusammenhang mit künftigen wirtschaftlichen Ergebnissen angetrieben werden können. Diese Sorge wird etwas durch die Einsicht gemildert, dass Städte, die zu späteren Zeitpunkten Ausbrüche erlebten, dazu neigten, npis früher innerhalb ihres Ausbruchs umzusetzen, wie sie aus den Erfahrungen der zuvor betroffenen Städte lernten (Hatchett et al., 2007). Als sich die Grippe von Ost nach West bewegte, waren die weiter westlich gelegenen Städte bei der Umsetzung von npis schneller. Wichtig ist auch, dass unsere Ergebnisse robust für die Kontrolle von zeitverändernden Schocks sind, die mit Merkmalen korrelieren, die zwischen westlichen und östlichen Städten variieren, wie die Exposition gegenüber der Landwirtschaft, das vergangene Bevölkerungswachstum, die Dichte und Stellvertreter für die Qualität lokaler Institutionen.

Wir betonen Vorsicht, wenn wir diese Ergebnisse auf den aktuellen COVID-19-Ausbruch verallgemeinern. Die Grippepandemie von 1918 war deutlich tödlicher als die aktuellen Schätzungen für COVID-19, insbesondere für Personen im erwerbsfähigen Alter. So könnten die wirtschaftlichen Vorteile der npis 1918 größer gewesen sein. Die 1918 eingeführten npis waren ebenfalls weniger umfangreich als die, die während des COVID-19-Ausbruchs verwendet wurden. Darüber hinaus hat sich die Struktur der US-Wirtschaft und Gesellschaft im Laufe eines Jahrhunderts wesentlich weiterentwickelt. Dennoch deuten unsere Ergebnisse darauf hin, dass es nicht selbstverständlich ist, dass es einen Kompromiss zwischen der Verringerung der Übertragung von Krankheiten und der Stabilisierung der Wirtschaftätigkeit in einer Pandemie gibt.

Der Rest des Papiers ist wie folgt aufgebaut. Abschnitt 2 behandelt den historischen Hintergrund der Grippepandemie von 1918 und nicht-pharmazeutische Interventionen. Abschnitt 3 beschreibt unser Dataset. In Abschnitt 4 werden unsere Ergebnisse präsentiert, und Abschnitt 5 enthält eine Diskussion und abschließende Bemerkungen.

SCHLUSSFOLGERUNG

In diesem Papier werden die Auswirkungen nichtpharmazeutischer Interventionen während der Grippepandemie 1918 auf die Sterblichkeit und die Wirtschaftätigkeit untersucht. Wir stellen fest, dass npis zwar die Kurve der Krankheitsübertragung abgeflacht haben, aber nicht mit schlechterer

Wirtschaftsleistung während oder nach der Pandemie in Verbindung gebracht wurden. Stattdessen deuten unsere Ergebnisse darauf hin, dass die Hauptursache für wirtschaftliche Störungen die Pandemie selbst war.

Es gibt einige wichtige Vorbehalte, die wir bei unserer Analyse beachten sollten. Erstens ist unsere Stichprobe auf nur 43 Städte beschränkt. Zweitens können wir die Vortrends für die Ergebnisse des verarbeitenden Gewerbes in den Jahren 1915, 1916 oder 1917 nicht sorgfältig untersuchen, da die Daten nicht in einer jährlichen Häufigkeit verfügbar sind. Drittens war das wirtschaftliche Umfeld gegen Ende 1918 aufgrund des Endes des Ersten Weltkriegs ungewöhnlich. Viertens erlaubt uns unsere überregionale Analyse nicht, aggregierte Gleichgewichtseffekte von npis zu erfassen.

Angesichts dieser Vorbehalte werfen unsere Erkenntnisse dennoch die Frage auf: Warum könnten npis während einer Pandemie nicht wirtschaftlich schädlich und mittelfristig möglicherweise sogar von Vorteil sein? Es ist schwierig, die genauen Mechanismen zu beleuchten, durch die npis die Wirtschaft mit den begrenzten Verfügbaren Daten für 1918 beeinflusst haben, aber wir bieten einige potenzielle Kanäle. Die direkten Auswirkungen von npis wie Theaterschließungen und Versammlungsverboten sind kontraktiv, da diese Maßnahmen zwangsläufig die Wirtschaftstätigkeit einschränken. Die Pandemie selbst kann jedoch für die Wirtschaft sehr störend sein. Viele Aktivitäten, die npis einschränken, wären wahrscheinlich auch ohne npis wahrscheinlich nicht aufgetreten. Um die Ansteckung mit dem Virus zu vermeiden, kürzen die Haushalte den Verbrauch und das Arbeitskräfteangebot (siehe z. B. Eichenbaum et al., 2020), während die Unternehmen ihre Investitionen als Reaktion auf Arbeitskräftemangel, geringere Nachfrage und erhöhte Unsicherheit reduzieren. Infolgedessen würde die Kontrafaktische ohne npis immer noch einen Abschwung mit sich bringen.

Darüber hinaus können npis indirekte wirtschaftliche Vorteile haben, indem sie die Wurzel der wirtschaftlichen Störung – die Pandemie selbst – koordiniert angehen. Die Abschwächung der Pandemie kann einen letztlich schlimmeren wirtschaftlichen Abschwung verhindern. Bodenstein et al. (2020) stellen beispielsweise ein Zwei-Sektoren-Modell vor, bei dem npis den Produktionsrückgang durch Abflachung der Kurve abschwächen, auch ohne die kumulative Infektion signifikant zu reduzieren. In ihrem Modell ist die Produktion in dem sektorwesentlichen Sektor, der für die Wirtschaft von wesentlicher Bedeutung ist, weniger gestört, wenn Krankheit und das Risiko, zu einem bestimmten Zeitpunkt an einem Virus zu erkranken, geringer ist, was zu einem geringeren allgemeinen Produktionsrückgang führt. Darüber hinaus können npis durch die Verringerung der kumulativen Infektionsraten mittelfristige wirtschaftliche Vorteile haben, indem sie Krankheiten und Sterblichkeit direkt verringern und die mit einer erhöhten Morbidität verbundenen Kosten senken.

Genauere historische Details beleuchten auch, warum die npis 1918 den wirtschaftlichen Abschwung nicht verschlimmerten. Die 1918 durchgeführten npis waren milder als die maßnahmen, die in einigen Ländern im Rahmen von COVID-19 ergriffen wurden. Strengere Maßnahmen wie Betriebsschließungen dürften die Kosten für npis erhöhen. Schulschließungen waren 1918 weniger kostspielig, da die Erwerbsbeteiligung von Frauen geringer war. Schätzungen zufolge war die Grippe 1918 tödlicher als COVID-19, insbesondere für Arbeitnehmer im Haupterwerbsalter, was auch auf schwerwiegendere wirtschaftliche Auswirkungen der Grippe von 1918 und größere mittelfristige Vorteile von npis hindeutet. Das H1N1-Virus von 1918 hatte auch eine kürzere Inkubationszeit als COVID-19, was die Identifizierung und Isolierung von Verdachtsfällen erleichterte. Daher betonen wir die Grenzen der externen Gültigkeit der Lehren aus der Grippepandemie von 1918.

Trotz dieser wichtigen Unterschiede stellt die laufende Forschung fest, dass die im Jahr 2020 eingeführten npis die Übertragung von Krankheiten verringert haben, ohne dass es zu erheblichen weiteren wirtschaftlichen Störungen geführt hat (siehe z. B. Andersen et al., 2020; Lin und Meissner, 2020) und Länder, die npis in den früheren Stadien der COVID-19-Pandemie implementiert haben, haben bessere kurzfristige wirtschaftliche Ergebnisse (siehe z. B. Demirgü-Kunt et al., 2020). Wir freuen uns auf zukünftige Forschungen, die die Nettoauswirkungen, die direkten Kosten und den indirekten Nutzen von npis, die während der COVID-19 sowohl kurz- als auch mittelfristig umgesetzt werden, entwirren.

TRANSLATED VERSION: PORTUGUESE

Below is a rough translation of the insights presented above. This was done to give a general understanding of the ideas presented in the paper. Please excuse any grammatical mistakes and do not hold the original authors responsible for these mistakes.

VERSÃO TRADUZIDA: PORTUGUÊS

Aqui está uma tradução aproximada das ideias acima apresentadas. Isto foi feito para dar uma compreensão geral das ideias apresentadas no documento. Por favor, desculpe todos os erros gramaticais e não responsacule os autores originais responsáveis por estes erros.

INTRODUÇÃO

As intervenções não farmacêuticas (npis) como o distanciamento social têm custos económicos, ou as medidas de saúde pública destinadas a conter a propagação de uma pandemia também reduzem a sua gravidade económica? O surto da pandemia COVID-19 suscitou questões urgentes sobre o impacto das pandemias e as respostas de saúde pública associadas à economia real. Neste artigo, examinamos os efeitos económicos das intervenções não farmacêuticas durante a maior pandemia de gripe da história dos EUA, a Pandemia da Gripe de 1918.

Na nossa análise empírica, exploramos a variação na velocidade e intensidade da implementação de npis em cidades americanas durante o outono de 1918. As npis implementadas em 1918 - embora menos extensas - assemelham-se a políticas usadas para reduzir a disseminação de COVID19, incluindo encerramentos escolares, teatros e igrejas, proibições de recolha pública, quarentena de casos suspeitos e horários de trabalho restritos.

Começamos por estudar o impacto das npis na mortalidade. Consistente com as evidências existentes da literatura epidemiológica (Markel et al., 2007; Hatchett et al., 2007), descobrimos que os npis alcançaram reduções substanciais na mortalidade máxima, de cerca de 45%, atenuando assim a curva da infeção. Também encontramos provas de que as cidades que intervieram precocemente e agressivamente sofreram uma redução modesta do excesso de mortalidade acumulado de cerca de 20%. Assim, as npis foram bem sucedidas em retardar a taxa de transmissão da doença e, em menor grau, as taxas de infeção cumulativas, potencialmente atenuando a superação epidémica (Bootsma e Ferguson, 2007).

A nossa principal análise examina o impacto das npis na atividade económica nas cidades americanas a curto e médio prazo. Em teoria, os efeitos económicos das npis podem ser positivos ou negativos. Tudo o resto igual, as npis limitam as interações sociais e, portanto, a atividade económica que se baseia nessas interações. No entanto, a atividade económica numa pandemia também é reduzida na ausência de tais medidas, uma vez que as famílias reduzem o consumo e a oferta de mão de obra para reduzir o risco de infeção, e as empresas reduzem o investimento em resposta ao aumento da incerteza. Além disso, embora o efeito direto das npis seja a redução da atividade económica, também atenuam o impacto do choque original: a própria pandemia. Ao conter a pandemia, as npis podem também atenuar as perturbações económicas relacionadas com a pandemia.

Para estudar o impacto a curto prazo das npis na atividade económica local, construímos um índice de perturbações de negócios a nível da cidade numa frequência mensal baseada numa revista de comércio contemporâneo. O nosso índice implica que a pandemia em si está associada a um aumento das perturbações do negócio no outono de 1918. O aumento das perturbações empresariais é apoiado por evidências narrativas de jornais contemporâneos, que reportam declínios significativos na produção e nas vendas em um vasto leque de indústrias devido à escassez de mão de obra e à diminuição da procura. No entanto, quando comparamos as cidades com npis rigorosos e tolerantes, constatamos que o aumento das perturbações comerciais no outono e inverno de 1918 foi quantitativamente semelhante em todos os dois conjuntos de cidades. As nossas conclusões indicam, portanto, que as npis não exacerbam claramente a desaceleração económica durante a pandemia.

Além disso, analisamos o impacto económico das npis a médio prazo. Não encontramos provas de que as cidades que intervieram mais cedo e de forma mais agressiva se agravem nos anos seguintes à pandemia,

medida pelo emprego e produção locais e pela dimensão do sector bancário local. No mínimo, as nossas estimativas rejeitam que as cidades com npis mais rigorosas tenham sofrido um grande declínio no emprego e na produção nos anos seguintes à pandemia, em relação às cidades com npis tolerantes. Em todo o caso, as cidades de Alto INPI experimentam um aumento relativo da atividade económica a partir de 1919. No total, as nossas conclusões sugerem que, embora as pandemias estejam associadas a perturbações económicas, as npis podem reduzir a transmissão de doenças sem exacerbar a desaceleração induzida pela pandemia.

As nossas conclusões estão sujeitas à preocupação de que as respostas políticas sejam endógenas e possam ser impulsionadas por fatores relacionados com os resultados económicos futuros. Esta preocupação é um pouco atenuada pela perceção de que as cidades que sofreram surtos em datas posteriores tendem a implementar npis mais cedo dentro do seu surto, como aprenderam com as experiências das cidades afetadas anteriormente (Hatchett et al., 2007). Assim, à medida que a gripe se movia de leste para oeste, as cidades localizadas mais a oeste eram mais rápidas na implementação de npis. É importante mostrarmos também que os nossos resultados são robustos para controlar os choques que variam o tempo, correlacionados com características que diferem entre as cidades ocidentais e orientais, como a exposição à agricultura, o crescimento populacional passado, a densidade e os proxies para a qualidade das instituições locais.

Enfatizamos a prudência ao generalizar estes resultados para o atual surto COVID-19. A Pandemia da Gripe de 1918 foi significativamente mais mortal do que as estimativas atuais sugerem para o COVID-19, especialmente para os indivíduos em idade ativa. Assim, os méritos económicos das npis podem ter sido maiores em 1918. As npis implementadas em 1918 também foram menos extensas do que as utilizadas durante o surto COVID-19. Além disso, a estrutura da economia e da sociedade dos EUA evoluiu substancialmente ao longo de um século. No entanto, os nossos resultados sugerem que não é uma conclusão precipitada de que existe uma compensação entre a redução da transmissão de doenças e a estabilização da atividade económica numa pandemia.

O resto do papel é estruturado da seguinte forma. A Secção 2 discute o passado histórico das intervenções da Pandemia da Gripe de 1918 e das intervenções não farmacêuticas. A secção 3 descreve o nosso conjunto de dados. As secções 4 apresentam os nossos resultados, e a Secção 5 oferece uma discussão e observações finais.

CONCLUSÃO

Este artigo analisa o impacto das intervenções não farmacêuticas durante a Pandemia da Gripe de 1918 na mortalidade e na atividade económica. Constatamos que, embora as npis tenham atenuado a curva da transmissão da doença, não estavam associadas a um pior desempenho económico durante ou após a pandemia. Em vez disso, as nossas conclusões sugerem que a principal fonte de disrupção económica foi a própria pandemia.

Há várias ressalvas importantes a ter em mente com a nossa análise. Primeiro, a nossa amostra está limitada a apenas 43 cidades. Em segundo lugar, não podemos examinar cuidadosamente as pré-tendências para os resultados da produção nos anos de 1915, 1916 ou 1917, uma vez que os dados não estão disponíveis numa frequência anual. Em terceiro lugar, o ambiente económico no final de 1918 foi invulgar devido ao fim da Segunda Guerra Mundial. Em quarto lugar, a nossa análise trans-regional não nos permite capturar os efeitos agregados de equilíbrio das npis.

No entanto, tendo em conta estas ressalvas, as nossas conclusões levantam a questão: por que razão as npis não podem ser economicamente prejudiciais durante uma pandemia e, possivelmente, até benéficas a médio prazo? É um desafio esclarecer os mecanismos exatos através dos quais as npis afetaram a economia com os dados limitados disponíveis para 1918, mas oferecemos alguns canais potenciais. O efeito direto das npis, como o encerramento de teatros e as proibições de recolha pública, é contraccionado, uma vez que estas políticas restringem necessariamente a atividade económica. No entanto, a pandemia em si pode ser altamente disruptiva para a economia. Muitas atividades que as npis restringem provavelmente não teriam ocorrido mesmo na ausência de npis. Para evitar a contração do vírus, as famílias reduzem o consumo

e a oferta de mão de obra (ver, por exemplo, Eichenbaum et al., 2020), enquanto as empresas reduzem o investimento em resposta à escassez de mão de obra, a menor procura e o aumento da incerteza. Consequentemente, o contrafactual sem npis continuaria a implicar uma recessão.

Além disso, as npis podem ter benefícios económicos indiretos ao abordar a raiz da disrupção económica - a própria pandemia - de forma coordenada. Atenuar a pandemia pode impedir uma desaceleração económica em última análise. Por exemplo, Bodenstein et al. (2020) apresentam um modelo de dois sectores onde as npis atenuam o declínio da produção, achatando a curva, mesmo sem reduzir significativamente a infeção cumulativa. No seu modelo, a produção no sector essencial para a economia é menos perturbada quando a doença e o risco de contrair um vírus num dado momento é menor, o que conduz a uma menor diminuição da produção global. Além disso, através da redução das taxas de infeção cumulativas, as INP podem ter benefícios económicos a médio prazo, reduzindo diretamente a doença e a mortalidade e reduzindo os custos associados ao aumento da morbilidade.

Detalhes históricos mais específicos também esclarecem por que razão as npis em 1918 não pioraram a desaceleração económica. As npis implementadas em 1918 foram mais suaves do que as medidas adotadas em alguns países durante o COVID-19. Medidas mais severas, como o encerramento de empresas, provavelmente aumentam o custo das npis. Os encerramentos escolares foram menos dispendiosos em 1918, uma vez que a participação da força de trabalho feminina foi menor. As estimativas sugerem que a gripe de 1918 foi mais mortal do que a COVID-19, especialmente para os trabalhadores de primeira idade, o que também sugere impactos económicos mais severos da Gripe de 1918 e maiores benefícios a médio prazo das npis. O vírus H1N1 de 1918 também teve um período de incubação mais curto do que o COVID-19, o que facilitou a identificação e isolamento de casos suspeitos. Como resultado, salientamos os limites da validade externa das lições da Pandemia da Gripe de 1918.

Apesar destas diferenças importantes, a investigação em curso conclui que as npis implementadas em 2020 reduziram a transmissão da doença sem levar a perturbações económicas substanciais (ver, por exemplo, Andersen et al., 2020; Lin e Meissner, 2020), e os países que implementaram npis nas fases anteriores da pandemia COVID-19 têm melhores resultados económicos de curto prazo (ver, por exemplo, Demirgüç-Kunt et al., 2020). Aguardamos com expectativa futuras investigações que desincam o impacto líquido, os custos diretos e os benefícios indiretos das npis implementados durante o COVID-19 a curto e médio prazo.