GLOBAL PERSPECTIVES ON WEALTH AND DISTRIBUTION

The Coronavirus Pandemic and Inequality

A Global Perspective

Edited by
Shirley Johnson-Lans

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Global Perspectives on Wealth and Distribution

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Shirley Johnson-Lans
Editor

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CHAPTER 1

Introduction

Shirley Johnson-Lans

1 Introduction

This book has been a long time in the making. It was first conceived in the summer of 2020 at which time few people expected a pandemic of the length we have experienced, dealing with a virus that is so efficient in morphing into ever more transmissible variants. Much of the world, including Europe, the United States, and Australia, now seems to have reached a point where COVID-19 is beginning to be regarded as endemic with occasional upticks, much like the annual influenza epidemics with which we have all learned to live. However, since we are not really out of the woods yet with respect to the COVID-19 pandemic, especially as vaccination rates in many parts of the world are well below where they need to be, this book can only be a provisional assessment of the effects and response to the coronavirus pandemic. It is an attempt to summarize and take stock of where many countries in the world stand as of October 2022.

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Other serious epidemics that have occurred in the twenty-first century have been much more imited either in location, in the demographic groups affected, or in duration: These include the 2002–2004 SARS outbreaks in China and Asian Countries and local outbreaks in some US States, the 2008 H5N1 influenza outbreak in West Bengal, the 2009 H1N1 influenza outbreak which was very widespread but much milder than had been feared, the 2013–2015 and 2018–2020 Ebola outbreaks in Western Africa and Democratic Republic of Congo, the 2014 Edisha hepatitis outbreak, the 2015 US H5N2 outbreak, the 2016 Yellow Fever outbreak in Angola and the Democratic Republic of Congo, the 2018 Madagascar and 2019 New York measles outbreaks, and the 2019 outbreak of MERS, mostly in Saudi Arabia but with a very high death rate among those reported as contracting the disease. Many countries used their experiences with these outbreaks to develop plans for dealing with future pandemics.

2 Comparison and Contrast with the Influenza Pandemic of 1918

Because of the worldwide spread and the serious health consequences of the novel coronavirus that was first identified by the World Health Organization (WHO) as a Public Health Emergency of International Concern on January 3, 2020 and as a Pandemic on March 11 of the same year, references to and comparison with the 1918 influenza epidemic are often made. Both were novel respiratory viruses and both spread at an alarming rate. The cumulative death rate in 1918 went from 3/100,000 population to about 100/100,000 in 30 days.[1] It is estimated that the disease caused at least 50 million deaths (when the world population was only 1/3 of its current size). However, according to the United States Centers for Disease Control and Prevention (CDC), the US COVID death toll surpassed that of the country's 1918 Spanish Flu death toll (estimated at 675,000) by September 2021.[2]

In the early twentieth century, there were no vaccines nor even any effective antibiotics, but mask wearing and social distancing were also employed in 1918–1919. Ships were quarantined at sea in both cases. Economic effects of both pandemics resulted in contractions in income and employment and the closing of businesses and schools. Many of us grew up hearing accounts of the 1918–1919 Spanish flu epidemic and assuming that nothing of this dimension could occur in a world with

more advanced medical treatments available. It is clear from examining what has happened around the world since January 2020 that this was a false assumption.

3 Focus of This Book

The country analyses included in this volume encompass Africa, Australia, Asia, and North and South America and include both large and small countries, some that have been very successful in dealing with COVID-19, such as Australia and Taiwan, and some which have had a more difficult time, including Brazil, Italy, and the United States.[3] Taiwan is a poster child for a country that has done a very good job of controlling the coronavirus, especially given its proximity to mainland China, the source of the first infections in humans of this novel respiratory virus. The contrast between the United States and Australia is particularly remarkable, considering that they are both large, English speaking, continental-wide countries with similar demographic profiles in terms of age distribution and urban/rural divide. Yet, the Australian death rate from COVID-19 was roughly one-tenth that of America's as of August 2021, given the lack of preparedness and early failures at handling the pandemic in the United States.[4]

African countries have tended to experience lower infection and death rates partly because the age distribution is very different (a much younger population) and because Africans tend to engage in less long-distance travel. However, their vaccination rates are much lower than in most other parts of the world, so they are very vulnerable to future spikes in COVID-19. The excellent empirical study of the effects of the pandemic in Comoros (Chapter 7) shows that there were important social and economic effects in this small African island country even though infection and death rates from the coronavirus have been very low to date. Ethiopia, which has had even lower rates of infection and death, has also found that the global reduction in international trade has created hardships for its economy, reduced employment, and resulted in migration from cities to rural areas.

This book is concerned with inequality and includes studies of inequality in income, socio-economic status, employment, education, immigration status, age, gender and race/ethnicity in the countries examined. Socio-economic inequality is often associated with location, age,

and/or race/ethnicity, all of which have contributed to the level of vulnerability to the coronavirus found around the globe during 2020–2022.[5]

It is informative to examine the results of a study by Angus Deaton undertaken early in the pandemic.[6] He found more coronavirus deaths per 100,000 population in higher-income countries which also tended to have greater loss of income. This resulted in a lowering of the degree of income inequality between countries. However when countries were weighted by population, so that each person anywhere in the world was counted equally, income inequality between countries was found to have increased, at least over the first year of the pandemic. This result was driven by a widening of the income distribution in India, given its large population. Deaton's study demonstrates that results obtained in studies of income inequality depend upon exactly what is being measured.

As we consider different countries, it will be important to examine both the health effects of COVID-19 and the changes to the country's economy and the socio-economic dimensions of people's lives. The chapters in this book will analyze the effects on aggregate GDP, employment and the distribution of employment and income in the eight countries included in the following chapters. The roles that public policy and healthcare systems have played will also be examined.

The nations included in this global study represent at least one country from each major continental area. We begin with the country in which this book was organized, the United States, and then continue on to other western hemisphere countries, Canada and Brazil. We then move east to Europe, represented by Italy, one of the hardest hit European nations. Moving south to Africa, where to date COVID-19 infection rates have been much lower than in other parts of the world, we find chapters on Ethiopia, the African nation with the second largest population, followed by an empirical study of the effects of COVID-19 in a very small low-income island country, Comoros. Moving on to Asia, the next chapter tells the story of a model country in its handling of the pandemic, Taiwan. The last country to be studied is another success story, Australia. The book concludes with a final chapter comparing the findings in this varied group of nations, focusing particularly on the effects of the pandemic on inequality.

Tables 1 and 2 give some summary information on population, population density, age distribution, and life-expectancy in the countries

Table 1 Population Statistics*

Rank	*Name*	*2022 Population*	*% Chg from 2021*	*Population Density/km²*
3	U.S.A	338,289,857	+0.38	36
7	Brazil	215,313,498	+0.46	25
12	Ethiopia	123,379,924	+2.57	112
25	Italy	59,037,474	−0.34	196
40	Canada	38,454,327	+0.78	4
56	Australia	26,177,413	+0.99	3
58	Taiwan	23,893,394	+0.14	660
168	Comoros	836,774	+1.84	449

**Data Source* Worldometer https://worldometers.info.com

Table 2 Countrywide Age-Distribution and Life-Expectancy*

Country	*Median Age*	*%under 20 years of age*	*Life-Expectancy*
Italy	46.5	16.8	84.8
Canada	41.8	21	81.8
U.S.A	38.5	24.7	77.4
Australia	37.5	25.3	83.3
Brazil	33.2	27.9	76.2
Taiwan	42.5	24**	80.9
Ethiopia	19.8	50.7	67.0
Comoros	19.7***		64.3

**Source* Worlddata.info. **data only available for proportion of population under 25 years of age. ***most recent data available, 2015 at https://knoema.co

included in this volume. This information should help readers to understand some of the inter-country differences that they will encounter as they read the following chapters.

Notes

1. Beach, Brian, Karen Clay, and Martin H. Saavedra, "The 1918 Influenza Pandemic and its Lessons for COVID-19", National Bureau pf Economics Research (NBER) Working Paper, 23673, August, 2020.
2. World Health Organization Director General's remarks at COVID-19 Media Briefing, August 25, 2021.

3. May 16th, 2022, Centers for Disease Control and Prevention (CDC) report based on data from Johns Hopkins University (JHU) Bloomberg School of Public Health.
4. Cave, Damien, "How Australia Saved Thousand of Lives While COVID Killed a Million Americans", *NY Times,* May 16, 2022.
5. See Kaiser Family Fund study by Latoya Hill and Samantha Artiga, "COVID-19 Cases and Deaths by Race/Ethnicity: Current Data and Changes Over Time", published on line, February 22, 2022.
6. Deaton, Angus, "COVID-19 and Global Income Inequality", NBER Working Paper, 28392, January 2021, updated in February, 2021.

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CHAPTER 2

The Response of the United States to the Coronavirus Pandemic

Shirley Johnson-Lans

1 Introduction

By the middle of March 2022, the United States had emerged from the extreme surge in COVID-19 that had peaked in mid-January. The diagram of new reported daily cases shown below illustrates the extreme transmissibility of the Omicron variant of COVID-19, which appeared at the end of November, 2021. Although this surge in new cases greatly exceeded previous peaks, deaths from the coronavirus in winter and spring of 2021–22 were lower than in earlier surges, and by the end of March, hospitalizations were at new lows.[1] Even so, by mid-May, the United

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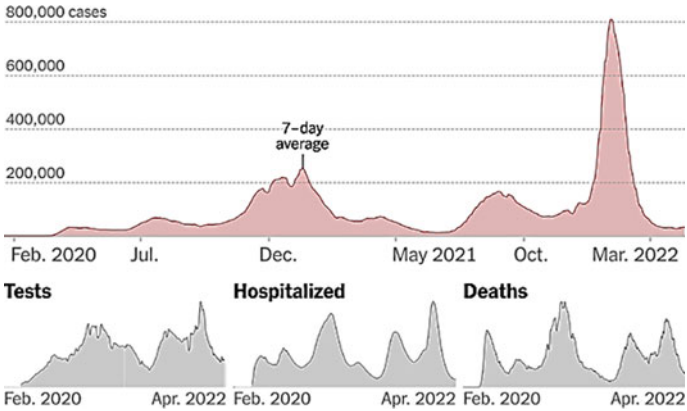

Fig. 1 Seven Day Average of New Reported U.S. COVID-19 Cases (*Source New York Times*, April 13, 2022. Charts based on CDC figures)

States was the first country to report a total number of COVID-19 deaths surpassing one million.[2] Extending the report to summer, 2022, we note a slight increase in cases mid-April through May, followed by a decline in June with some increase in July when the even more highly transmissible subvariant of Omicron, BA.5, became dominant. By the end of July 2022, the daily case count in the U.S. was stable and lower than the previous lows reached in March and April. This trend has continued throughout September. However, since January 2020, at least 1 in 3 US residents has been infected and at least 1 in 314 has died of COVID-19.[3] (Fig. 1).

Pandemic fatigue, coupled with the development of new vaccines and treatments, has led to a transition in the United States to viewing COVID-19 less as an ongoing pandemic than as an endemic disease, not unlike influenza. Section 2 of this chapter traces the history of the pandemic in the U.S. Sections 3 and 4 discuss the Healthcare Response and the Economic Impact and Policy Response. Section 5 provides an evaluation of the pandemic's effects on the population of the U.S. and on different vulnerable subgroups.

2 The History of the US COVID-19 Pandemic

The history of infection in humans from the new respiratory SARS-CoV-2 virus begins in late 2019 in the People's Republic of China. The first confirmed case of COVID-19 in the United States occurred in Washington State on January 19, 2020, in a person who had returned from

Wuhan, China. Several other early cases of the coronavirus in California had been misdiagnosed. Shortly thereafter, a nursing home in Kirkland, Washington State had four coronavirus deaths, also originally misdiagnosed as influenza. This resulted in visitors and nursing home staff spreading coronavirus to the community.

On February 25, the mayor of San Francisco declared a state of emergency. In early March, the San Francisco Bay Area began a shelter-in-place regime after two cases surfaced there on March 5. A six-county lockdown was ordered on March 16, and the whole state of California had strict stay-at-home orders by March 19.

In late February, a man employed in New York City and living in the town of New Rochelle a few miles north of the City also came down with COVID-19, diagnosed on March 3rd. This was one of the first US cases of community spread with source of first infection unknown. Over 1000 people in New Rochelle were quarantined; a one-square mile area was cordoned off. The National Guard were called in to sterilize the area and distribute food.

It was widely believed at that time that if travel to and from China were restricted, and those returning quarantined, the epidemic could be successfully contained much as had been the case with the 2002–4 SARS epidemic. This was a mistake as early cases on the East Coast were more likely related to contact with travelers arriving from Europe and were found to be from a different strain of the virus. Unfortunately, it was not until mid-March that travel from Europe (except for returning US citizens and permanent residents) was suspended. At that time Canada, Mexico, and the U.S. agreed to restrict all non-essential international travel.

On March 13, 2020, an emergency declaration related to COVID-19 was made for the state of New York. On March 18, amusement parks, bowling alleys, shopping malls closed and all but essential businesses were ordered to reduce their work force by 50%, followed by a stay-at-home order, effective from March 22. Social distancing was required and no assemblies including religious services were allowed. Schools closed on March 23 with remote learning beginning on March 30. Schools in New York City became centers for food distribution to children. (As of April 2, food was also distributed to any adult showing up at a distribution center.) Computers were supplied to children who needed one. Centers for children whose homes had no internet and daycare centers for children of essential workers were opened.[4]

New York state quickly became the epicenter of the pandemic in the United States with 122,000 confirmed cases and deaths approaching 4000 at the beginning of April 2020. New York City alone had 63,307

confirmed cases and 2254 deaths. The national count of confirmed cases at that time exceeded 330,000 with 9500 deaths. By April 9th there were more COVID-19 related deaths in New York and New Jersey than in the rest of the country combined.[5] However, by May 3, Gov. Cuomo's daily television report noted that new cases of COVID-19 in New York State were the lowest in a month.

The surge continued in other states. In Louisiana, with the epicenter in New Orleans, Mardi Gras crowds undoubtedly contributed to the spread. Florida's surge was believed to be related to its March Spring Break beach crowds. Large numbers of cases were also seen in other states. Major cities, including Boston, Massachusetts and Detroit, Michigan were severely affected and had surges peaking later than in New York City.

As COVID-19 spread throughout the country, large clusters of cases emerged in smaller town communities, particularly those having large meat processing plants. (This was notable In Iowa, Nebraska, South Dakota, Pennsylvania., Georgia, Colorado, and Texas.)

A 45-day voluntary shutdown was announced by President Trump in March, but as it was voluntary, not all states complied. By the end of March, 29 states had issued stay-at-home-orders, 30 had closed all non-essential businesses, 39 had prohibited all gatherings with greater than 10 participants, 44 had closed restaurants and bars except for takeout/delivery orders, and 47 states had statewide closures of public schools.

Although forty-two of the fifty States had lockdown orders in place in March–May of 2020, in June these began to be lifted, even in some states in which the surge was not abating.[6] Ironically, on July 7, a day when the United States surpassed 3 million reported cases of COVID-19, the country began its formal withdrawal from the World Health Organization (WHO). In April, the federal government had begun announcing that the U.S. would stop funding the World Health Organization and soon would withdraw from the organization as President Trump claimed that WHO was mishandling the pandemic.

On July 16th, a spike of 75,600 new daily cases was reported for the U.S. At the beginning of August, 2020, the United States was still the country with the most confirmed number of coronavirus cases (4,749,000).[7] The August total was nearly four times the number of cases that had been reported at the beginning of May, and a number of states were backtracking on their re-opening programs. Seven imposed new restrictions and 17 paused or delayed their re-openings.[8]

A high proportion of coronavirus deaths, particularly in the early stages of the pandemic, had occurred in the elderly, especially in those exceeding75 years in age. The high incidence of infection in nursing homes throughout the United States was a source of great concern. Over the course of the pandemic, much has been done to improve the ability to diagnose and isolate the cases within these institutions, but this is still a very vulnerable part of the population as is the segment of the population incarcerated in jails and prisons.

In the course of the pandemic, variant forms of the coronavirus began to circulate. In November, 2020, the Alpha variant was identified in the United Kingdom. The first case in the United States was in Colorado at the end of December 2020 in someone who had no history of traveling outside the region.

The first case of the Delta variant, which originated in India, was recorded in the United States at the end of February 2021. This variant gradually took over from the Alpha strain and became the dominant strain by July, when especially states with low vaccination rates saw an increase in this new more transmissible and also more deadly strain. The dominance of the Delta variant unfortunately coincided with "cautious optimism" that the pandemic was receding into the background. At this time, the Centers for Disease Control and Prevention (CDC) was adamant about the importance of combining vaccination with mask wearing, hand washing, and social distancing.

By late November 2021, the Omicron variant of COVID-19, which appears to have originated in South Africa, surfaced in the United States. During December 2021 and January 2022, daily cases reached previously unheard of peaks, with the Omicron variant being many times more transmissible than previous forms of the coronavirus. However, symptoms tended to be less severe than those associated with the Delta variant, particularly for the part of the population that was now vaccinated. Nonetheless, the United States reached one million known deaths from COVID-19 on May 13, 2022.[9]

Figures 2 through 4[10] shown below sketch the number of new daily cases, 7 day average in cases per 100,000 population, and deaths per day over the Omicron surge from Thanksgiving 2021 through May 2022.

By spring, and certainly by summer 2022, it was clear that a transition was occurring in how COVID-19 was viewed in the United States. No longer was it seen as an ongoing pandemic, but rather as an endemic virus with occasional outbreaks expected from time to time, not unlike

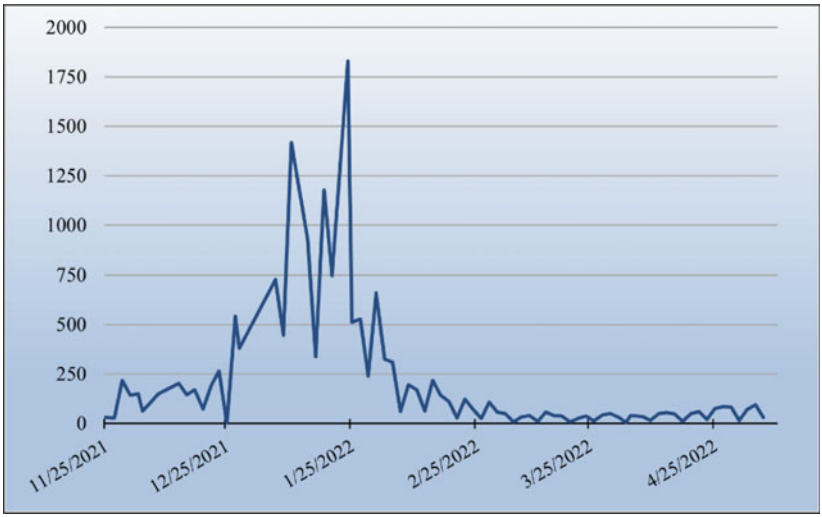

Fig. 2 New Daily U.S. COVID-19 Cases during the Omicron Surge (*Source* Coronavirus Tracker, CDC figures, published online daily by the *New York Times*)

influenza. Going forward, no major shutdowns are expected. Schools are open in the fall of 2022 as are most businesses. International border control for airline travel has been greatly relaxed. And masks are not even required on flights.

One notable change is that online virtual conferences are now a widely accepted alternative to some in-person meetings. Health care, including optional surgery, has resumed, although waiting times for appointments are often long in 2022, given the backlog, and tele-medicine is now much more widely used.

3 The Health Care Response

The White House established a Coronavirus Taskforce early in 2020 after the Department of Health and Human Services declared the coronavirus a public health emergency on January 27, 2020. Health care for COVID-19 patients, however, has been handled primarily by the states, under the direction of their governors, with assistance from the federal government

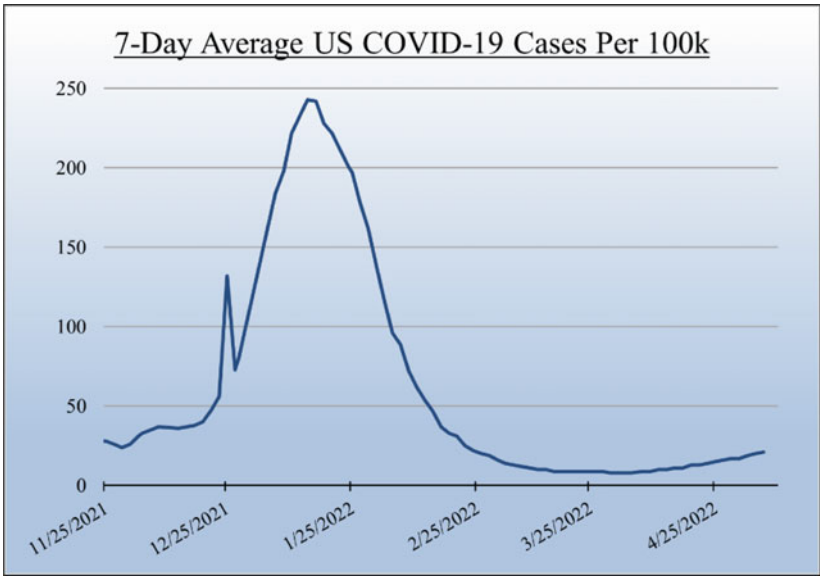

Fig. 3 7-day Average US COVID-19 Cases per 100,000 during the Omicron Surge (*Source* Coronavirus Tracker, CDC figures, published online daily by the *New York Times*)

consisting of funding for hospitals, research, and testing. Briefings have been provided by the CDC and some funds and equipment were supplied by the Federal Emergency Management Agency (FEMA). In the early stages of the pandemic, some assistance was also given by the National Guard and U.S. military. For instance, a U.S. Navy hospital ship sent from Maryland to help with hospital overflow was docked in the Hudson River along the West Side of Manhattan.

There was a severe shortage of Personal Protection Equipment (PPE), hospital facilities, equipment such as respirators, and medical personal, especially in the first wave of the pandemic. Masks, face shields, and gowns, many of which were manufactured abroad, were in short supply even for healthcare workers and first responders throughout the country, and individual states were often competing with each other and even with FEMA for the scarce supplies. China was a major source of essential medical equipment, from N-95 masks to ventilators. Orders were often

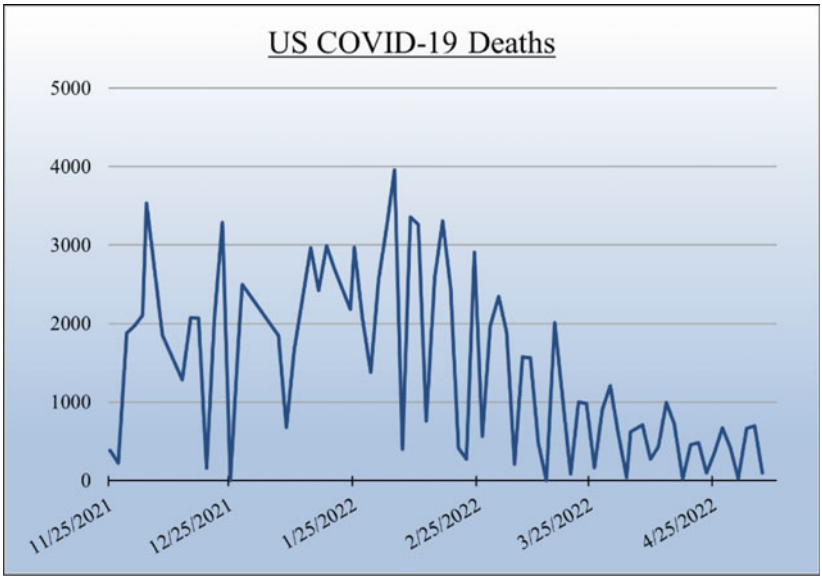

Fig. 4 US COVID-19 Daily Deaths during the Omicron Surge (*Source* Coronavirus Tracker, CDC figures, published online daily by the *New York Times*)

delayed or cancelled, with the situation aggravated by supply chain problems and price wars. Some masks and ventilators were provided by the Federal government, by states not yet facing crisis proportions, and by charitable donations, but the distribution system was not well coordinated by the federal government. When a major city became an epicenter, lines of ambulances containing seriously ill patients waited outside hospitals, and temporary morgues were set up in the streets. If more adequate equipment and facilities had been available, a much higher incidence of illness and death especially in frontline health workers could have been avoided.

There was also a continuing shortage of tests and testing facilities even though the Food and Drug Administration (FDA) awarded Emergency Use Authorization to state and local public health authorities and private laboratories to develop tests for coronavirus in February of 2020. A defective batch of tests worsened the problem, and delays in receiving test results contributed to the lack of effective contact tracing.

Even though the federal government has the authority to invoke the Defense Production Act of 1950 to direct and allocate the production of protective equipment and medical supplied by private companies, it delayed its use until March 18, 2020. General Motors was not directed to begin production of ventilators until March 27 by which time the number of confirmed COVID-19 cases had exceeded 100,000. In March, President Trump first announced cooperation with pharmaceutical and biotech companies to develop a vaccine and treatments for COVID-19.

The CDC was often slow to act and its pronouncements to the public often seemed confusing or unclear.[11] This undoubtedly increased the degree of havoc wrought by the coronavirus pandemic, particularly in the first year. Mask wearing by the general public was not emphasized by the CDC until late in 2020. It was unclear whether this delay was largely the result of health policy experts not really understanding the protective value of masks or of a policy decision based, at least in part, on the practical consideration that there were not enough masks for both essential healthcare workers and the general public.

At the state level, the mitigation efforts of some states were better organized. In New York, for example, Gov. Cuomo organized the state's public and private hospitals into one integrated system during the first surge of the pandemic. Emergency hospital facilities were built, assisted by the Army Corps of Engineers. For instance, a 2500 bed facility was created in the Javits Convention Center in New York City, medically equipped tents were erected in Manhattan's Central Park and in such venues as the U.S. Tennis Center in the borough of Queens. But shortages of critical care facilities in some of the hardest hit parts of New York City contributed to delays in treatment for some of the most critically ill patients and added to the increase in the death rate.

It also should be noted that even after the passage of the Affordable Care Act (Obamacare) in 2010, many Americans still have no health insurance coverage and, therefore, avoided necessary treatment for COVID-19. This avoidance was particularly noticeable in relatively low-paid workers who did not have employer-provided insurance. Many of these low-paid workers were just above the income threshold that would have entitled them to public insurance through Medicaid.

Despite the advice of Dr. Anthony Fauci, Director of NIAID (the National Institute of Allergy and Infectious Diseases) and other public health experts, President Trump did not issue a countrywide stay-at-home order in 2020 with the onset of the coronavirus pandemic. The extent of

social distancing and working from home varied by state as did the decisions about school closures and remote learning. The sound advice of vocal public health experts, such as Dr. Fauci and Dr. Ezekiel Emanuel of the University of Pennsylvania, that social distancing was an essential component of a successful campaign to control the pandemic was often ignored.

In retrospect, President Trump's order to shut down the National Security Council's entire Global Health Security Unit in 2018 was a disastrous error. The White House Coronavirus Task Force began to hold regular meetings under the direction of Vice President Pence only in late March 2020.

Early in the pandemic, in March and April of 2020, Congress passed several important pieces of legislation to aid both the U.S. economy and the healthcare system. While this legislation is discussed more fully in the next section of this chapter, a summary of its parts that directly affected the healthcare system and provision of care for COVID-19 patients is presented here. The first bill to be enacted, the Coronavirus Preparedness and Response Supplemental Appropriations Act was passed on March 6, 2020. It designated $8.3 billion for COVID-19 preparedness and response, including more than $2 billion for the CDC and about $560 million for states and localities to mitigate the pandemic. The law focused on immediate pandemic response needs, including funding to create viral test kits and support for vaccine and drug development. The Coronavirus Aid, Relief and Economics Security Act (CARES ACT) was passed on March 27. It appropriated $2 trillion, including $150 billion for the healthcare system and $150 billion for state and local governments. The Paycheck Protection Program and Healthcare Enhancement Act was passed on April 21. It allocated another $75 billion to hospitals and $25 billion to testing. Delays were experienced, however, in distributing the allocated funds. As of June 2020, $100 billion in pandemic relief funding had not yet been distributed to healthcare providers.[12]

As the number of cases of COVID-19, hospitalizations, and deaths surged again in fall and winter of 2020, news of the progress in the development of several vaccines, which were soon to be granted emergency use authorization (EUA) by the FDA, provided some degree of comfort to the American public. The EUA for adults (defined as persons 16 years and older) was granted by the Food and Drug Administration (FDA) for the Pfizer BioNTech vaccine on December 11 and on December 18 it

was extended to the Moderna vaccine. These vaccines were first administered to emergency workers and then to adults over 75 years of age and those with compromised immune systems. Eligibility for these two-dose vaccines was gradually extended in January 2021.Within days, the eligibility was extended to those over 65 years of age, and then a few days later it was extended to include those over 60.

A third vaccine produced by Johnson and Johnson had the same level of approval from the FDA by February 2021. It required only one dose, was slightly less effective, but was useful for people who had allergies to the other two vaccines or who, for whatever reason, were not able to schedule two appointments to be vaccinated. Vaccines for COVID-19, whether given as part of the one or two shot sequence necessary to be "fully vaccinated" and additional booster shots are free of charge to individuals, regardless of their insurance status.

By 2021, when President Biden assumed the presidency, the public perception was that the pandemic was being better handled. Households and businesses were benefitting from the massive rescue bills that had been passed. Despite the existence and FDA approval of effective vaccines, new variants of the coronavirus disease kept appearing and appointments to be vaccinated were still very hard to obtain in many parts of the country through at least the first four months of 2021.[13]

The United States has continued to be far below the top ranking countries in proportions of people vaccinated, but by December 2021, 71 percent of those aged 12 and over (all who were then eligible for vaccination) and 88 per cent of those 65 years and older, were fully vaccinated. As of summer 2022, the figures for all ages (including infants who are now eligible to receive vaccines) is 67 percent, and for those 65 years and older, 92 percent.[14] Among countries represented by chapters in this book, only the two African countries, the Comoros Islands (45 percent) and Ethiopia (33 percent) have (as of August, 2022) lower vaccination rates than does the United States. Australia has 86 percent of its population fully vaccinated; Taiwan and Canada each have 84 percent; Brazil has 81 percent; and Italy has 80 percent.[15]

The percent of the U.S. population vaccinated varies greatly from one region to another, between more and less affluent communities, by education level, and by race/ethnicity. The final section of this chapter, which includes an overall evaluation of the pandemic in the United States and of inequalities in its effects on different subgroups, will include an analysis of

the effect of political views on proportions of the population vaccinated in different states.

Overtime several types of very effective treatment drugs have been developed which can be administered to those who test positive for COVID. The monoclonal drugs which needed to be infused were given in hospital settings, but the development of oral antiviral drugs that can be administered at home (first approved by the FDA in December 2021) are an important step forward in the treatment of the virus.[16]

And, on the last day of August 2022, the FDA announced approval of new booster vaccination shots to specifically target the Omicron subvariants of COVID-19 and which will probably be effective against other new future variants. This new booster vaccine was ready for distribution by mid-September 2022.

As the US Census data for 2021 were analyzed, one of the positive results announced was that healthcare insurance coverage increased and the number of uninsured persons fell in 28 states between 2019 and 2021; only one state, North Dakota, saw an increase in the uninsured.[17] This result was likely due at least in part to the rescue legislation enacted in 2020 and 2021.

4 Economic Impact and Response

The economic impact of the pandemic was immediately noticeable throughout late winter and early spring of 2020. The National Bureau of Economics Research (NBER) declared February 2020 to be the beginning of the downturn, which followed the longest economic expansion in US history.[18] While Gross Domestic Product (GDP) in real terms declined by 3.4 percent, it was short-lived, of two month duration, from late February to late April.

Small businesses, and those with more limited financial backing were most severely affected. By mid-April, it was reported that one-third had at least temporarily closed. By mid-May, more than two-thirds had laid off or furloughed at least some of their employees, and it was projected that 1.4 million to 2.1 million (25 to 35 percent) could close permanently. Studies also found that minority-owned businesses and those whose owners had only a high school degree or less were more at risk.[19]

The Bureau of Labor Statistics (BLS) reported that 3,300,000 persons filed for unemployment benefits during the last week of March after

most states had implemented stay-at-home orders. BLS data show nonfarm payrolls to have shed 22.1 million jobs between January and April of 2020. The unemployment rate by April had risen to 14.8 percent. It was the highest level recorded since post-World War II data were collected in 1948.[20] The labor force participation rate declined to 60.2 percent in April, down from 63.4 percent in January of 2020. The sectors losing the most jobs were leisure and hospitality followed by education and services and then by government. Also severely affected were transport and utilities, manufacturing, construction, mining and wholesale and retail trade.

Part-time workers were more severely affected than full-time workers; women were more adversely affected than men; and younger workers were more affected than older more established workers. Black and Hispanic workers had much higher unemployment rates than did White workers (16.7 percent vs. 14.2 percent in spring of 2020 compared with 5.2 percent and 3.1 percent at the beginning of 2020 before the pandemic took effect). And those with lower levels of education, particularly those who had not completed high school, suffered much greater job loss.[21]

Congress passed four major pieces of legislation in 2020 to deal with the economic effects of the coronavirus pandemic. Three bills were signed into law in March.

(1) The first, summarized in Section 3 above, the Coronavirus Preparedness and Response Supplemental Appropriations Act, provided $8.3 billion to support the institutions needed to mitigate the coronavirus pandemic (the CDC and states and localities). It provided funding for Health and Human Services (HHS) to be used for the CDC, the National Institutes of Health, the Public Health and Social Services Emergency Fund, and state agencies, localities, territories, and tribes. It specifically allowed HHS to temporarily waive certain Medicare regulations about telehealth services.
(2) The Families First Coronavirus Response Act, signed into law on March 18, 2020, provided $3.5 billion in benefits (through December 31, 2020) in paid sick leave and family and medical leaves to employees of covered employers (those employing fewer than 500 employees). It provided funding for 14 days of leave

for workers affected by the pandemic, plus funding for free coronavirus testing and expanded provision of food stamps. If the employee was unable to work because of quarantine and/or experiencing COVID-19 symptoms and seeking a medical diagnosis, the paid sick leave was to be at the regular rate of pay. If the employee was unable to work because of a need to take care of another individual subject to quarantine or to care for children under 18 whose schools were closed or childcare providers unavailable due to COVID-19 related causes, reimbursement was at 2/3 the rate of normal pay. Employees who had been at work for the same employer for at least 30 days were eligible for an additional 10 weeks of paid family leave to care for a child under circumstances related to COVID-19. The Unemployment Provisions of the bill provided a down payment of $1 billion in federal funding to help states process and expand unemployment benefits. It also temporarily waived interest on federal loans incurred by states to pay benefits.

(3) The Coronavirus Aid Relief and Economic Security Act (The CARES Act), signed into law on March 27, 2020, provided an additional $2.2 trillion in pandemic relief funds. It was the largest stimulus package enacted in US history. Important components were $300 billion in one-time payments to individuals (who submitted tax returns plus certain qualified Social Security receivers) with benefits phased out beginning at $75,000 for single individuals, $112,500 for head of household filers, and $150,000 for married joint returns. Fully qualifying households were to receive up to $1200 per adult and $500 per dependent child, aged 16 or younger. It also provided $260 billion in increased unemployment benefits, increasing payments to qualified recipients by $600 and expanding the program to cover more workers. It created the Paycheck Protection Program providing forgivable loans to small businesses (with an additional $350 billion funding, later increased to $669 billion in subsequent legislation), provided $500 billion in loans to corporations, and $339.8 billion to state and local governments. It was signed into law on March 27, 2020.

(3a) The Paycheck Protection and Healthcare Enhancement Act was passed in late April 2020 with nearly unanimous approval in both houses of Congress. (However, House Minority leader

Mitch McConnell insisted that allocation of funds to directly help state and local governments be deleted from the version that passed after several days of intense negotiations.) It has been referred to as Phase 3.5 of the legislative measures to deal with the Coronavirus Epidemic and its economic consequences. It provided interim funding to replace CARES ACT funding that had expired.

It also appropriated an additional $320 billion for the Paycheck Protection Program (PPP), which provided low-interest loans for payroll costs and other expenses to small businesses that are forgivable under certain circumstances. Of that amount, $60 billion was for PPP loans made by small banks, small credit unions, and community financial institutions. In addition, it appropriated an additional $10 billion for emergency Economic Injury Disaster Loans (EIDL), expanding eligibility for emergency EIDL to include farms and agricultural-related businesses, $5 billion for Small Business Administration disaster loans, an additional $75 billion to the Public Health and Social Services Emergency Fund for healthcare providers' expenses or lost revenues, $25 billion to the Public Health and Social Services Emergency Fund for COVID-19 testing, and $2.1 billion for Small Business Administration salaries.

(4) The Consolidated Appropriations Act 2021 (Signed into law on December 27, 2020) appropriated another $2.3 trillion. It provided a refundable tax credit of $600 per family member. Eligibility consisted of an adjusted gross income (AGI) of less than $75,000. It also required transparency in billing of healthcare services, specifically protection to consumers against surprise billing.[22] It provided $325 billion for small businesses including forgivable loans, with specific allocations for businesses in low-income communities.

It extended the deadline for increased federal unemployment benefits to March 14, 2021, increased funding for schools and universities, with a specific provision for aid to Native American schools, provided additional assistance for vaccines, testing, and health providers, assistance to state and local governments for rental assistance, and increased the SNAP/food assistance program

benefit by 15 percent through June 30, 2021. It provided direct payments to the farming and ranching industry, and provided an additional $10 billion for child care and another $10 billion for forgiveness of a loan to the US Postal Service. It extended the moratorium on evictions for failure to pay rent until January 31, 2021 to tenants with incomes below $99,000.

As the pandemic-related legislation took effect, output and personal consumption expenditure in the United States picked up considerably. The GDP in real terms grew by 5.7 percent during 2021 with the 4th quarter increase approaching 7 percent, in sharp contrast to its decline in 2020. Unemployment was at a near 50 year low. But labor force participation rates also remained lower than usual as some workers had retired earlier in the pandemic and others found that they could not return to their jobs while caring for dependents. There were continuing worldwide supply chain disruptions, and many households were still struggling. Twenty million households at the end of 2021 reported having too little to eat in the last seven days; 10 million reported struggling to pay their rent early in 2022, and 3 million fewer were employed than before the pandemic began.[23]

Reports at the beginning of August 2022 have revealed some optimistic news about the labor market. A record number of new jobs, 528,000, were reported for July according to the BLS (Bureau of Labor Statistics) report released on Friday morning, August 5. This means that the labor market is returning to its pre-pandemic level. This information is reinforced by the news that unemployment fell to 3.5%, down from 3.6% at the end of June. The number of jobs (non-farm employment) is approximately twice the number that economists had predicted (258,000) and is a significant increase from June (398,000).[24] Even so, many Americans are still struggling financially, particularly with the rises in food and fuel prices. Bureau of Economic Analysis (BEA) data show a large decline in the savings rate. In May 2022, the average household savings rate was down to 5.4 percent of disposable income compared with 10.9 percent a year before.[25]

Inflation has emerged as a major threat to the economic recovery and a challenge to the Federal Reserve which has a dual mandate of ensuring price stability and full employment, by raising interest rates without precipitating a serious recession. In June 2022, the inflation rate (annualized) reached 9.1 percent. As of the end of July 2022, the Federal

Reserve had already raised interest rates three times: 25 basis points (a quarter of a percent) in mid-March, 75 basis points (three quarters of a percent) in mid-June, and an additional 75 basis points on July 28. Additional interest rate increases are expected throughout the rest of the year, and an additional 75 basis point increase took place in late September 2022.

It is important to realize that the inflation is worldwide and not just the result of the huge pandemic rescue program that was undertaken in this country in 2020–21. International supply chain problems continue, and they are at least in part the result of factors other than the coronavirus pandemic, including the Russian invasion of Ukraine, which has exacerbated supply shortages and price hikes in oil and gas as well as in industrial equipment and wheat and other foods.

5 Evaluation of the Pandemic's Effects

If one were asked for a very brief explanation of why the U.S. was less successful than many other high-income countries in handling the coronavirus pandemic, one could point to the lack of preparedness, following the shutdown of the National Security Council's entire Global Health Security Unit in 2018, reductions in federal budgets for public health, and delays in instituting measures such as restricting international travel, mandating social distancing, etc. But the public also failed to be united in trusting science and taking the danger of COVID-19 seriously. Despite the success in developing effective vaccines and treatments in the United States, there has continued to be a serious divide, related to political party affiliation, on the importance of masking, testing, being vaccinated, and taking advantage of the excellent treatments available to reduce the risk of serious symptoms and death.[26]

The United States ranked lower in proportion of population vaccinated than did many other high-income industrialized nations. It lagged behind in testing and contact tracing as well. The fact that the United States has such a fragmented healthcare system was also a detriment in the midst of the pandemic. Unfortunately, the U.S. has suffered a higher death rate from the COVID-19 pandemic than have many other countries. As of summer 2022, the deaths per 100,000 population were higher than in any country in the EU or the United Kingdom and slightly higher than in Canada. In August, 2022, the United States ranked 8th from the top

in the list of countries having the most coronavirus deaths, exceeded only by Peru, Russia, Brazil, Iran, the Philippines, Chile, and India.[27]

The United States was more successful in handling the effects of the pandemic on the economy. The very large package of relief legislation enacted in 2020 enabled the country to experience only a very short, although extreme, downturn. As described in Section 4, the annual growth rate in real GDP by 2021 was 5.7 percent. It reached 7 percent in the fourth quarter of that year. The rate of unemployment and the decline in household incomes were significantly cushioned by the relief legislation.

However, the effects of the pandemic on different subgroups of the population have been very unequal. The elderly, particularly those in live-in care centers, tended to have more severe cases of COVID and to suffer higher death rates. In the later stages of the pandemic, younger people seem to have faced higher infection rates than was the case for them in earlier stages of the pandemic.

Education level has made a huge difference to both health and economic outcomes, with ability to work from home being a major advantage during the shutdowns. Lower socioeconomic status was associated with higher infection rates. A number of reasons which help to explain this association are: the likelihood of those with lower education being employed in more dangerous jobs, not having jobs that enable them to work from home, need to use public transportation, living circumstances that often made effective social distancing impossible; and unequal access to health care.

Women were at a disadvantage in the labor market as more were employed in frontline jobs requiring working in close contact with others and as child care in a period of closed schools and daycare centers required more women to leave their jobs if they could not work from home.

Although women and men appear to have had the same susceptibility to contracting COVID-19, when data are standardized for age and race, men have been found to have higher rates of serious infection and death.[28] However, recent research suggests that women are more likely to suffer from "long COVID" although a great deal is still unknown about the various ways in which the virus may linger in different parts of the body.

Both unemployment and rates of coronavirus infection were initially higher for Black and Hispanic Americans, who also had higher rates of underlying health conditions contributing to their vulnerability. Black

people have had a slightly higher share of deaths, relative to their share of the population, than Hispanics. Native Americans and Alaskan Natives (AIANs) generally had poorer access to health care, as did people living in rural or small town areas. Initially, highest rates of serious illness and death were among Native Americans. Next highest were Blacks, then Hispanics, then Whites, and lowest were Asian Americans. (However, once vaccines became available, Native American tribes were given allocations directly and under their own supervision. The result was very high vaccination rates, and much lower death rates.)[29] In later surges, particularly during those dominated by the Delta and Omicron variants of COVID-19, the relative effects of the virus shifted. Although rates of infection were higher for all groups of color, rates for Hispanics increased relative to Blacks and were more than twice as high as for Whites. This was also the first time since early in the pandemic when the infection rate for AIANs was higher than for other groups. It should be noted that standardizing for age distribution of the different groups was very important. Since the average age of Whites tends to be higher, there were periods of time when Whites actually showed higher death rates than Blacks and Hispanics when this standardization was not done. As of the end of February 2022, infection rates were lower and disparities between races and ethnicities had narrowed.[30]

Evidence based on the U.S., as well as other countries, shows that young people experienced significant learning losses due to school closures and that the extent of loss also depended on socioeconomic status of both individual families and communities.[31] Of course, the long-term effects of schooling loss will not be able to be judged for years to come.

Mental and emotional illness also spiked among adolescents during the pandemic in the United States as well as in many other countries. Anxiety, depression and adolescent suicides and threats of suicide increased alarmingly. One study finds a 93.6 percent increase in anxiety from April 2020 over April 2019 and an 83.9 percent increase in depression over the same period for 13–18 year olds. Substance abuse over the same period rose by 62.7 percent for this age group.[32]

Data released by the CDC show an alarming COVID-19-related decline in the life-expectancy of Americans, with marked differences among racial and ethnic groups, and between men and women. The decline in life-expectancy for the population as a whole (-1½ years) was

the largest drop since World War II and resulted in the lowest level of life-expectancy since 2003.[33]

Life-expectancy fell in both 2020 and 202 l. For a person born in the United States, life-expectancy was 79 years in 2019. It fell to 77 years in 2020 and to 76.1 years in 2021. This was particularly disturbing because many other high-income countries saw a rebound in life-expectancy between 2020 and 2021. Deaths due to COVID-19 infection were responsible for 74 percent of the decline in life-expectancy between 2019 and 2020 and for a decline of 68 percent between 2020 and 2021. Moreover, other life-threatening health conditions were often not treated during the pandemic, and deaths due to drug overdoses also rose during this period. Life-expectancy also varied (by county) for people living in areas with different vaccination rates.[34].

Hispanics had a longer life-expectancy than either White or Black non-Hispanics prior to the pandemic but they had a larger decline in 2020 (from 81.1 years to 78.8 years). However, from 2020–2021 both Hispanics and non-Hispanic Blacks saw a reduction in the decline in their life-expectancy rates. For White Americans, the drop in life-expectancy was higher in 2021 than in 2020. And over the two-year period, AIAN people (American Indian and Alaskan Native) had a dramatic drop in life-expectancy which fell by 6.6 years to 65 years.

Since men have had higher rates of serious illness and death from the coronavirus, it is not surprising that the decline in life-expectancy was greater for men than for women over this two-year period. Between 2019 and 2020, US life-expectancy decreased 2.13 years for males and 1.51 years for females. From 2020 to 2021, it decreased one full year for males and 0.8 for females.[35]

As the pandemic progressed, communities with lower vaccination rates were at a severe disadvantage and became even more vulnerable as the more transmissible variants of the virus spread throughout the country. The extent to which resistance to vaccination is politicized in the United States is quite remarkable and is accompanied by differences in rates of mask wearing and social distancing. The Cook Partisan Values Index (CVI) is a useful tool for studying the association between political views and vaccination rates. The CVI ranks areas with respect to their voting for Republicans or Democrats, considering local, county, and state-level support for Democratic, independent, and Republican governors, mayors,

senators, and representatives. Using the 2022 state-level CVI, which ranks political leanings based on voting for President in the 2020 Presidential election and political party of governors, senators, and congressional representatives in 2022, we find a positive correlation between extent of democratic political leanings in states and the proportion of the population vaccinated against COVID-19 (See Appendix Table 1: the Cook Political Values by State for 2022 and Appendix Table 2, which show the correlation coefficients).

The analysis was conducted separately for 18–64-year olds versus those 65 years and older. Figure 5 illustrates this, and shows the younger group's vaccination rates to be more highly correlated with their political views.

Association between Cook Partisan Voter Index Values and Proportion of State Population Vaccinated.

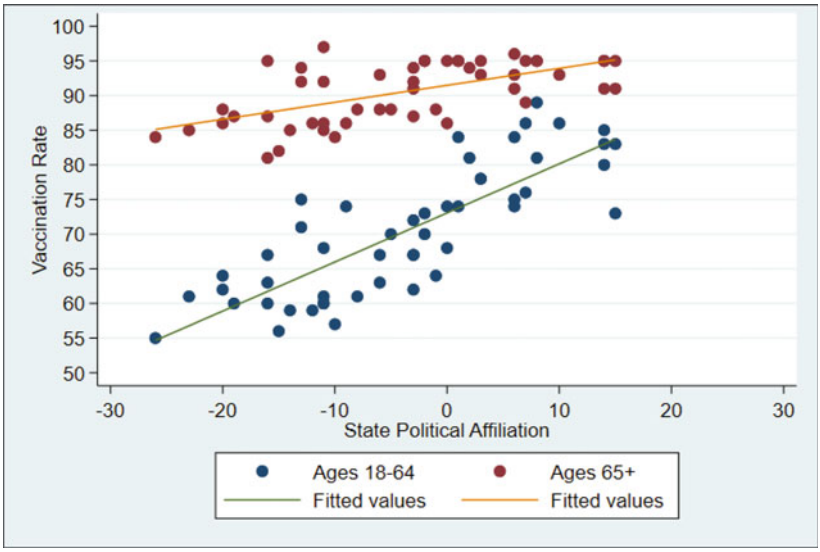

Fig. 5 Association between Cook Partisan Voter Index Values and vaccination rates

The blue line is for 18–64-year olds, and the red line for those over 65 years of age. (See Appendix Table 1 for the CVI rankings and Appendix Table 2 for the Correlation Analysis Results.)

The effect of political affiliation of governors on state-level decisions about policy to deal with the COVID-19 pandemic has also been studied. A multivariate longitudinal study found levels of testing for COVID-19 and incidence of COVID-19 infections and death rates exhibiting very different patterns over time depending on the political affiliation of the governors. The Republican-led states moved from initially lower levels of infection and morbidity to higher ones as the pandemic progressed. The opposite was reported for states having Democrats as governors, where negative effects of the coronavirus declined after policy was implemented. The authors present a strong argument that policy should be based on public health considerations rather than political ideology.[36]

The COVID-19 pandemic still greatly affected life in the United States throughout the winter and spring of 2022, but the economy appeared to be flourishing, although inflation has become a serious concern. As the United States emerges from the pandemic phase of COVID-19, resuming, with caution, its communal life, there is the need to move beyond political divisiveness as this is not only necessary for a well-functioning democratic society but also for individual well-being.

Opinions differ about how the pandemic has affected the income and wealth distributions in the United States. It should be noted that measuring inequality is not a simple task and that different ways of measuring inequality often lead to different results.[37] A widely held view is that the effect of the coronavirus pandemic has been to increase inequality (on most measures) since lower-skilled lower-wage workers generally had more job disruption as well as worse health consequences from COVID-19. They also shared less in the stock market boom of 2021 and parts of 2022 than did higher-income employees with more generous employment-related benefits, including contributions to retirement investment accounts. However, one report in June 2022 showed the bottom 50 percent of households actually gaining in share of net worth (wealth). Federal Reserve data showed the bottom half of the distribution holding a higher share of the nation's wealth than they have in twenty years, their collective net worth having almost doubled in the last two years.[38] It should be noted that it was the middle-class households whose

wealth was only a few percentage points higher in the wealth distribution (than the bottom half), not the extremely wealthy, who lost in relative wealth position as those at the bottom of the distribution gained. This was probably a temporary effect, which also appears to have coincided with a stock market dip.[39]

However, in September 2022, the US Census Bureau released a report based on the Current Population Survey showing that the 2021 median household income was virtually unchanged from 2020, but for the first time since 2011, income inequality in the United States had increased, driven by a loss of real pre-tax income at the lower end of the distribution.[40] This study also shows the level of child poverty to have decreased, and the number of people without health insurance has also decreased over this same period.

It is likely that the longer-run effects of the COVID-19 pandemic will be a widening of the income and wealth distributions in the United States when differential effects of health status, education level, type of employment, and learning losses (greater in lower-income families and school districts) are taken into account. However, this projected increase in inequality could be offset somewhat if the experience of the coronavirus pandemic leads the U.S. to undertake health policy reforms that include moving toward universal health insurance and more government expenditure on public health, particularly if additional measures to directly reduce income and/or wealth inequality are also enacted.

Appendices

Appendix Table 1

The PVIs for states are calculated based on the results of the most recent US presidential election (2020) and the current members of Congress and governors, as of January 2022.

State	PVI	Party of governor	Party in Senate	House balance
Alabama	R+15	Republican	Republican	6R, 1D
Alaska	R+9	Republican	Republican	1R
Arizona	R+3	Republican	Democratic	5D, 4R
Arkansas	R+16	Republican	Republican	4R
California	D+14	Democratic	Democratic	42D, 11R
Colorado	D+3	Democratic	Democratic	4D, 3R
Connecticut	D+7	Democratic	Democratic	5D
Delaware	D+6	Democratic	Democratic	1D
Florida	R+3	Republican	Republican	16R, 11D
Georgia	R+3	Republican	Democratic	8R, 6D
Hawaii	D+15	Democratic	Democratic	2D
Idaho	R+19	Republican	Republican	2R
Illinois	D+7	Democratic	Democratic	13D, 5R
Indiana	R+11	Republican	Republican	7R, 2D
Iowa	R+6	Republican	Republican	3R, 1D

State	PVI	Party of governor	Party in Senate	House balance
Kansas	R+11	Democratic	Republican	3R, 1D
Kentucky	R+16	Democratic	Republican	5R, 1D
Louisiana	R+12	Democratic	Republican	5R, 1D
Maine	D+1	Democratic	Both*	2D
Maryland	D+14	Republican	Democratic	7D, 1R
Massachusetts	D+14	Republican	Democratic	9D
Michigan	R+1	Democratic	Democratic	7D, 7R
Minnesota	D+1	Democratic	Democratic	4D, 4R
Mississippi	R+10	Republican	Republican	3R, 1D
Missouri	R+11	Republican	Republican	6R, 2D
Montana	R+11	Republican	Both	1R
Nebraska	R+13	Republican	Republican	3R
Nevada	EVEN	Democratic	Democratic	3D, 1R
New Hampshire	EVEN	Republican	Democratic	2D
New Jersey	D+6	Democratic	Democratic	10D, 2R

State	PVI	Party of governor	Party in Senate	House balance
New Mexico	D+3	Democratic	Democratic	2D, 1R
New York	D+10	Democratic	Democratic	19D, 8R
North Carolina	R+3	Democratic	Republican	8R, 5D
North Dakota	R+20	Republican	Republican	1R
Ohio	R+6	Republican	Both	12R, 4D
Oklahoma	R+20	Republican	Republican	5R
Oregon	D+6	Democratic	Democratic	4D, 1R
Pennsylvania	R+2	Democratic	Both	9D, 9R
Rhode Island	D+8	Democratic	Democratic	2D
South Carolina	R+8	Republican	Republican	6R, 1D
	R+16	Republican	Republican	1R
Tennessee	R+14	Republican	Republican	7R, 2D
Texas	R+5	Republican	Republican	23R, 13D
Utah	R+13	Republican	Republican	4R
Vermont	D+15	Republican	Democratic*	1D

State	PVI	Party of governor	Party in Senate	House balance
Virginia	D+2	Republican	Democratic	7D, 4R
Washington	D+8	Democratic	Democratic	7D, 3R
West Virginia	R+23	Republican	Both	3R
Wisconsin	R+2	Democratic	Both	5R, 3D
Wyoming	R+26	Republican	Republican	1R
* Includes an independent senator who caucuses with the Democrats.				

Appendix Table 2

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. corr statepol workingagevax plusvax
(obs=50)

             | statepol workin~x  plusvax
-------------+---------------------------
    statepol |   1.0000
workingage~x |   0.8172   1.0000
     plusvax |   0.6113   0.7127   1.0000
```

Notes

1. News summary, NBC, March 31, 2022.
2. May 16th, 2022, Centers for Disease Control and Prevention (CDC) report based on data from Johns Hopkins University(JHU) Bloomberg School of Public Health.
3. Source: CDC data, reported in the *New York Times,* July 6, 2022.

4. May, 2020, Johnson-Lans, Shirley, *New York's Response to the Covid-19 Pandemic"*, Anglo-American Health Policy Network blog series (Distributed by Cambridge University): https://www.cambridge.org/core/blog/tag/country-responses-to-the-covid19-pandemic/
5. *New York Times*, April 10th, 2020.
6. August, 2020, Alexander, Matthew, Lyn Unruh, and Andriy Koval, Anglo American Health Policy Network blog series, *Country Responses to the Covid-19 Pandemic, The U.S. Response to the COVID-19 Pandemic*.(Distributed by Cambridge University). https://www.cambridge.org/core/blog/tag/country-responses-to-the-covid19-pandemic/
7. Source: World Health Organization (WHO) Coronavirus (COVID-19) Dashboard, August, 2020.
8. Op.cit, endnote vi.
9. Johns Hopkins University Vaccine Access Center, Crystal Watson, senior researcher at JHU Center for Health Security, announced that "Hundreds of thousands more people have died from COVID in the United States than are officially counted".
10. I wish to thank my research assistant, Evan Ross, for creating these excellent diagrams. He is entirely responsible for Figs. 2, 3 and 4, Appendix Table 2, and Fig. 5.
11. The CDC has taken responsibility for its mistakes in handling the coronavirus. On August 17, 2022, director Rochelle Walensky acknowledged its failures to act rapidly enough and issue clear enough directives to the public. She said it will focus more on public health needs including faster responses to emergencies and attention to providing information in a way that ordinary people and local health authorities can understand and put to use.
12. Emmons, William and Drew Dahl, "Was the Paycheck Protection Program Effective?", July 6, 2022, Federal Reserve Bank of St. Louis bulletin.
13. A further type of inequality was in ability to schedule a vaccination appointment. It was very difficult in the United States for people with no access to the internet to do so as almost all instructions gave only online access to sites. This put households with no internet connection at a disadvantage and also was a disadvantage to elderly persons with no experience in accessing online information, many of whom had neither computers nor smart phones.
14. Source: Economic Policy Institute, 2020.
15. Vaccination Rates compiled by Our World in Data Project, Oxford University. The figures used are an update published by the *New York Times*, August 15, 2022.
16. For instance, President Biden, who tested positive for COVID in late July 2022 and had a mild case, was administered oral anti-viral Paxlovid while isolating but continuing to work in his office in the White House. It is

interesting that several days after he returned to testing negative, he again tested positive, a not-uncommon occurrence in those who have been given these drugs.

17. Source: U.S. Census Bureau, 2021a, b American Community Survey (ACS).
18. The National Bureau of Economic Research (NBER) Business Cycle Dating Committee was created in 1978 and has since then been the institution officially dating business cycles in the U.S.
19. "Which small businesses are most vulnerable to COVID-19 and when", report of McKinsey and Company, June 18, 2020. https://www.mckinsey.com Americas.
20. Based on the Bureau of Labor Statistics (BLS) Current Employment Statistics (CES).
21. BLS Monthly Employment Situation News Releases and COVID-19 Impact Surveys, March–December 2020.
22. Unfortunately, this provision is still being ignored by many hospitals in the summer of 2022. However, it is being addressed again in connection with the Inflation Reduction Act of 2022.
23. U.S. Census Bureau, Household Pulse Surveys, 2021 (These were weekly and semi weekly surveys instituted to measure and rapidly disseminate household responses to the coronavirus pandemic).
24. Report of the July non-farm payroll, released by the Bureau of Labor Statistics, Friday August 5, 2022.
25. Economic Personal Savings Rate (PSAVERT)/FRED) St. Louis Fed: Bureau of Economic Analysis (BEA) Data collected by the Federal Reserve Bank of St. Louis.
26. Dr. Ashish Zha, the White House COVID response coordinator, quoted in the *New York Times* report, "The Morning" by David Leonardt, October 7, 2022.
27. COVID World Vaccine Tracker, *New York Times*, August 23, 2022.
28. Mukherjee, S. and K. Pahan, "Is COVID-19 Gender-sensitive?" *Jounal of Neuroimmune Pharmacology,* (2021) 1: 38–47.
29. Kaiser Family Foundation. See particularly Policy Brief for April 2021.
30. Hill, Latova, and Samantha Artiga, "Covid-19 Cases and Deaths by Race/Ethnicity: Current Data and Changes over Time", Kaiser Family Foundation report released on February 22, 2022.
31. For a summary of research on learning loss due to COVID-19, see Donnelly, R., Patrinos, H.A., "Learning Loss during Covid-19: An early systematic review". *Prospects* (2021). https://www.doi.org/10.1007/s11125-021-09582-6., A study of the Netherlands found that 4th-7th grade students from disadvantaged homes experienced a 55% greater loss of learning than did the children of higher socioeconomic status, see Per

Engzell, Arun Frey, and Mark Verhagen, "Learning Inequality during the COVID-19 Pandemic," https://pubmed.ncbi.nlm.nih.gov/33827987/.

32. See, the CDC's MMWR Surveillance Supplement report, January-June 2021, National survey of the Division of Adolescent and School Health on mental health among students: https://www.cdc.gov/healthyyouth/mental-health/index,htm and Pfefferbaum B. and C.S. North, "Mental Health and the Covid-19 Pandemic", *New England Journal of Medicine*, (2020) April 13, and Octavius, Gilbert Sterling, et al., "Impact of COVID-19 on adolescents' mental health: a Systemic Review", *Middle East Current Psychiatry,* (2020) Vol. 27, (72).
33. Centers for Disease Control and Prevention (CDC) Office of Communications. https://www.cdc.govnchs>podcasts
34. Reported by Dr. Steven Woolf, NPR (National Public Radio) podcast, August 31, 2022.
35. Johnson, Akila, and Sabrina Malhi, "U.S. Life Expectancy Down for Second Straight Year, Fueled by COVID-19". *The Washington Post*, August 31, 2022.
36. Neelan, Brian, et al., "Associations Between Governor Political Affiliation and Covid-19 Cases, Deaths, and Testing in the U.S.", *American Journal of Preventive Medicine,* (2021), 61 (1): 11.
37. See, Anderson, Gordon, *Multilateral Wellbeing Comparison in a Many Dimensional World: Ordering and Ranking Collections of Groups*, (2019, Palgrave/Macmillan).and Deaton, Angus, "COVID- 19 and Income Inequality" *LSE Public Policy Review,* (2021), 1 (4): 1–10.
38. Steverman, Ben, "America's Inequality Problem Just Improved for the First Time in a Generation", Bloomberg, U.S. edition, Business Week, June 8, 2022. https://www.bloomberg.com.
39. June 8 was an anxious day for the US stock market as the nation awaited the May CPI (consumer price index) news and the consequent likely move of the Federal Reserve to raise interest rates. The Dow Jones Industrial Average fell 638.11 points (1.94%), the Standard and Poor 500 Index dropped 2.38%, and the Nasdaq lost 2.75%. xl U.S. Census Bureau, September, 2022, Report based on the Current Population Survey Annual Social and Economic Supplement (CPS ASEC).
40. U.S. Census Bureau, September, 2022, Report based on the Current Population Survey Annual Social and Economic Supplement (CPS ASEC).

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CHAPTER 3

Inequalities Associated with the COVID-19 Pandemic in Canada: The Legacy of Socio-Demographic Fault Lines and Inter-Provincial Differences

Jaunathan Bilodeau and Amélie Quesnel-Vallée

Canada features among the high-income countries that have experienced some of the lowest levels of mortality from COVID-19, in league with Scandinavian countries like Denmark and Sweden (Our World in Data 2022a). However, many of the measures taken to control the spread of COVID-19 fed into existing inequalities across Canadian provinces and highlighted the impact of social determinants of health identified long before the pandemic (Link and Phelan 1995; Quesnel-Vallée et al.

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S. Johnson-Lans (ed.), *The Coronavirus Pandemic and Inequality*, Global Perspectives on Wealth and Distribution,
https://doi.org/10.1007/978-3-031-22219-1_3

2021). While the existence of socioeconomic determinants of health and of their exacerbated effects in times of pandemics are undisputed, the velocity and magnitude of spread of deleterious consequences among certain underserved, marginalized, and vulnerable populations (e.g. older adults with a loss of autonomy, BIPOC (Black, Indigenous, and People of Color) groups, essential workers, immigrant populations) at the onset of COVID-19 was quite unprecedented. In reaction, many researchers and community organizations quickly mobilized to warn of the likelihood of disproportionate effects of the pandemic on disadvantaged groups, although data were still very scarce (Bambra et al. 2020; Bilodeau and Quesnel-Vallée 2020; Haeck and Lefebvre 2020). Furthermore, these social factors often intersected with the key biological determinants of disease severity and risk of mortality (e.g. age and pre-existing conditions). The objective of this chapter is to provide an overview of the impact of the COVID-19 pandemic and the associated governmental responses on the modulation of health and socioeconomic inequalities in Canada.

1 Epidemiology of the COVID-19 Pandemic in Canada: A Federation with Heterogeneous Policies and Outcomes

The extent of the crisis following the onset of the pandemic in Canada is illustrated in Fig. 1 showing the evolution in hospitalizations between May 2020 and June 2022. Indeed, while hospitalizations attributable to COVID-19 put considerable strain on provincial and territorial Canadian healthcare systems during the first four waves, data show that the last waves have been the most critical. The peak number of daily hospitalizations during the first four waves was 81, 128, 116, and 67 cases per million respectively. However, despite Canada having one of the highest proportions of individuals fully vaccinated against COVID-19 globally (76,85% on January 1, 2022), hospitalizations peaked at 285 and 182 cases per million in the fifth and sixth waves respectively (Our World in Data 2022b). These last waves correspond to the propagation of the new variant Omicron and its subvariants, which have evolved a capacity to evade immunity against infection conferred by vaccination or a prior infection (Government of Canada 2021, 2022a). In contrast, Omicron and its subvariants do not appear to have developed a capacity to evade

the protection against severe disease and death associated with vaccination. Hence, hospitalizations and deaths during these last waves occurred disproportionately among the unvaccinated population in Canada, which fueled some debates and tensions within the population (Government of Canada 2022a; Bains 2021). This also contributes to an explanation of why deaths due to COVID-19 did not rise in step with hospitalizations in Canada, as shown in Fig. 2 (Public Health Ontario 2022; Ulloa et al. 2022).

These previous two figures mask, however, important inequalities that arose from or were amplified by the pandemic and the public health measures to contain it. As the wife of the Prime Minister of Canada, Sophie Grégoire Trudeau, was infected in the early stages of the pandemic, some commentators suggested that this was evidence that "we were all in the same boat" against this disease. However, many quickly pointed out that, as in the Titanic, the lifeboats were unevenly distributed or that a more apt metaphor was that we were perhaps in the same storm, but in different boats (Bambra et al. 2020; Carde 2020; Davies and Sepulveda 2021).

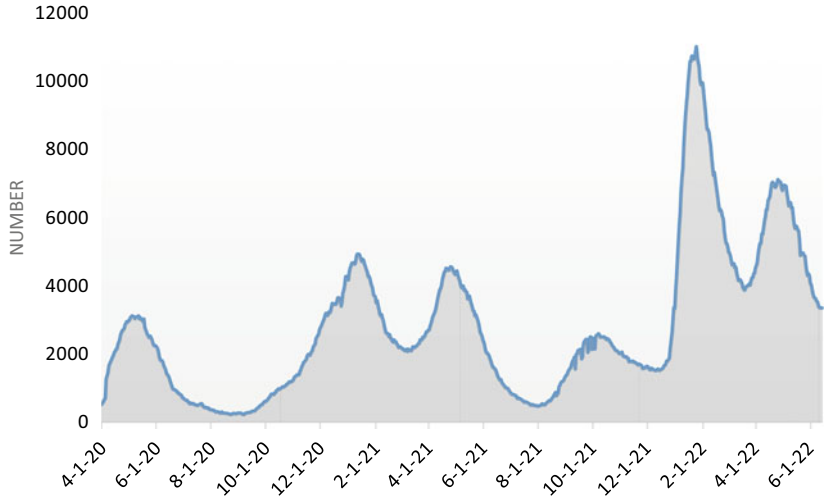

Fig. 1 Daily number of hospital beds and ICU beds occupied by COVID-19 patients as of June 13, 2022 (*Source* https://health-infobase.canada.ca/COVID-19/)

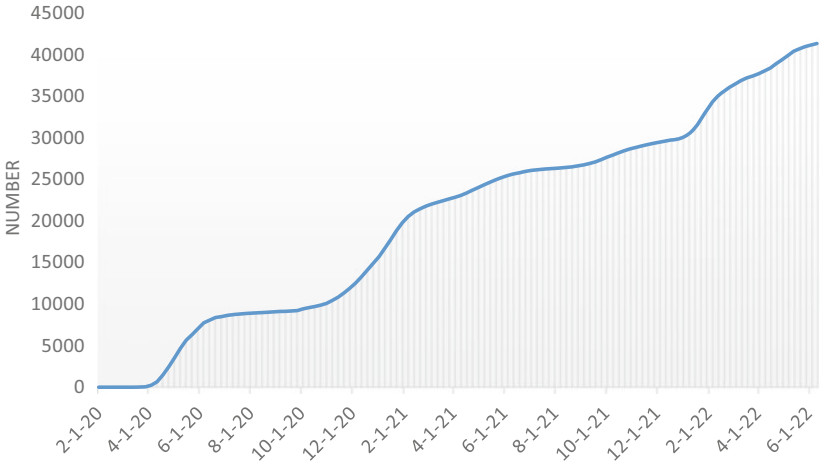

Fig. 2 Count of total death related to COVID-19 in Canada up to June 11, 2022 (*Source* https://health-infobase.canada.ca/COVID-19/)

First, the risks of contracting and dying from COVID-19 were unevenly distributed across the provinces and territories (McGrail 2022; Government of Canada 2022a). Indeed, Canada is a federation, and the administration, funding, and delivery of health care and education are primarily provincial and territorial jurisdictions. In turn, the federal government managed border control, economic support and stimulus measures, and supply chains (e.g. vaccines) (Desson et al. 2020; Urrutia et al. 2021). This helps to explain some of the differences between provinces and territories in their responses to the pandemic, which resulted in heterogeneous provincial and territorial realities in terms of the propagation of the virus and the number of hospitalizations and deaths (La Presse Canadienne 2020; INSPQ 2022b; Allain-Dupré et al. 2020; Polisena et al. 2020). To illustrate, after the World Health Organization (WHO) declared on March 11 that COVID-19 represented a public health emergency of international concern (i.e. a pandemic), the province of Quebec declared a state of public health emergency on March 13, 2020, while British Columbia and Ontario only did so on March 17, 2020. Moreover, while some provinces such as British Columbia and Ontario only recommended teleworking, other provinces such as Quebec, Alberta, and Manitoba instead mandated working from home, with

Québec going as far as establishing curfews (Canadian Institute for Health Information 2021). Similarly, face coverings were initially not recommended for public use across Canadian provinces and territories. Quebec and British Columbia began recommending the use of face coverings on April 7 and 10, 2020 respectively, while Ontario issued its recommendation on May 20, 2020 (Canadian Institute for Health Information 2021). The wearing of face coverings became mandatory in Quebec in enclosed public spaces as of July 18, 2020, while a similar measure was only adopted in Ontario on October 3, 2020. In British Columbia, face coverings were not required to be worn in closed public space until November 19, 2020, but many businesses and services imposed this measure of their own initiative (CBC 2020; Karaivanov et al. 2021).

Canada also depended on the provinces to provide a representative picture of the evolution of positive cases, hospitalizations, and deaths caused by COVID-19; given varying capacity for testing and reporting and different definitions for case counts (even with regard to mortality), the accuracy of the data was highly variable depending on the province, which only compounded errors in the data aggregated at the national level (Desson et al. 2020; La Presse Canadienne 2020). Initially, Canada struggled to maintain a high level of COVID-19 testing due to a lack of laboratory materials and logistical preparedness at central testing facilities (Allin et al. 2022; Desson et al. 2020; Yu et al. 2020). Faced with this situation, provinces quickly established local testing systems, but the roll-out was uneven across the country and remained heterogeneous. For instance, after a slow start, Quebec instituted an intense and widespread system of COVID-19 testing, while Ontario made testing available on a more gradual basis (Desson et al. 2020). However, at the turn of 2022, all provinces restricted PCR tests to priority populations such as healthcare workers and teachers (Léouzon and Carabin 2022; Government of Ontario 2021). This decision coincided with the distribution of rapid tests, which relied on voluntary self-reporting of positive cases through a government website. However, the accessibility to rapid testing varies substantially between province and a study in Quebec indicated that only 27.4% of positive cases reported their test results (Statistics Canada 2022a; Vieira 2022). Surveillance of case progression and risk also relied on a (largely ineffective because not widely adopted by the population) mobile contact tracing application and on the collection of wastewater samples (Sun et al. 2022; Government of Canada 2022b). Consequently, the official data regarding numbers of positive cases starting at the end of

2021 are not considered reliable (Government of Canada 2022a). These differences in detection and prevention capabilities have important implication regarding the capacity of provinces to limit the transmission of the virus and, therefore, the number of hospitalizations and deaths (Sun et al. 2022; Government of Canada 2022c; National Institute of Aging 2020). This information can also be crucial for the population to adapt their behavior according to the progression of COVID-19 transmission in their community.

2 Inter-Provincial Inequalities in Health Systems Capacity

Provinces also differed in the resources available to deal with increasing pressures on the healthcare system, such as hospitalizations. For instance, prior to the pandemic, inter-provincial differences in intensive care beds per capita were notable (Urrutia et al. 2021). Indeed, the most populous provinces, which were also hardest hit by the first waves of the pandemic, such as Ontario and Quebec, also had proportionally fewer beds available than provinces with smaller population sizes, such as New Brunswick and Newfoundland and Labrador. Nevertheless, this was not the only factor at play, as Ontario and British Columbia were able to increase their intensive care capacity by repurposing beds while Quebec did not have the same flexibility in resource allocation, which had deleterious effects on its surge capacity response (Desson et al. 2020; Urrutia et al. 2021). Thus, while all provinces had to resort to load shedding measures (Gerbet 2022; Urrutia et al. 2021), it is likely that the medium- and long-term effects of postponing elective surgeries and diagnostic testing to attend to the pandemic emergency measures will be most severe in provinces that experienced the heaviest burden of cases coupled with the least capacity to reallocate resources (Al Talalwah and McIltrot 2019; Uimonen et al. 2021). These examples highlight the differences between provincial policies and available resources that can fuel inequalities between populations within the same country.

Figure 3 contrasts the evolution of the death rate due to COVID-19 between Alberta, British Columbia, Ontario, and Quebec. This figure shows that Quebec was particularly affected at the beginning of the pandemic. The average rate of new deaths per 1,000,000 population reported in the last 7 days was 12.8 in Quebec, 3.8 in Ontario, 0.8 in Alberta, and 0.4 in British Columbia as of May 7, 2020 (INSPQ 2022b).

As of November 2020, Quebec and Ontario accounted for 61% and 31% of the country's cases respectively (Allain-Dupré et al. 2020). During the first wave, the city of Montreal (Metropolis of the province of Quebec) had one of the highest mortality rates from coronavirus in North America and Europe (Rastello 2020). The spring break in Quebec, which occurred before the other provinces, was initially identified as a major vector that has driven the heaviest toll observed compared to the other provinces (Desson et al. 2020). However, a later study suggested that much of the spread in the province was attributable to transmission of cases prior to spring break (Murall et al. 2021). Hence, the reasons underlying the heavier burden of mortality in Quebec are not yet elucidated.

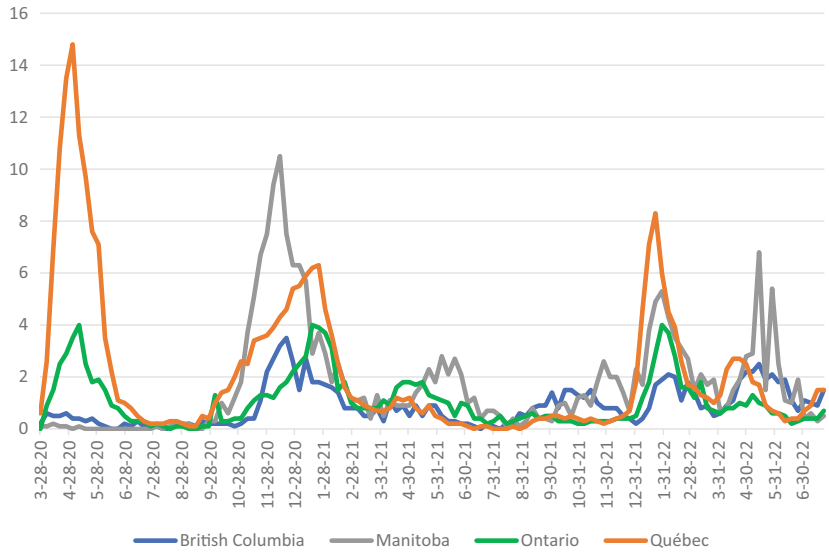

Fig. 3 Average rate of new deaths reported in the last 7 days by province (per 1,000,000) (*Source* Institut National de Sante publique du Quebec [INSPQ] https://www.inspq.qc.ca/covid-19/donnees/comparaisons)

3 Inequalities in COVID-19 Risk of Infection and Mortality

The higher mortality rate in Quebec is also deeply related to the socio-demographic characteristics of the groups disproportionately affected by this pandemic. Worldwide, epidemiological data corroborate that death rates among people aged 80 and over are significantly higher than for all other age groups (Bonanad et al. 2020). In Canada, as of July 14, 2022, 60.3% of COVID-related deaths were observed among people aged 80 and over (Government of Canada 2022a). The pre-existence of comorbidities was also identified as an important determinant of risk of death (O'Brien et al. 2020; Ejaz et al. 2020). Considering this, Quebec failed to protect its most vulnerable populations who were living in residential and long-term care facilities which were significantly more affected than in other provinces at the early phase of the pandemic (Badone 2021; Nguyen et al. 2022; Carde 2020; Urrutia et al. 2021). During the first wave in Quebec, 73.4% of the deaths attributable to COVID-19 were observed among the population aged 80 years and over, while 69% of all deaths involved people in long-term care facilities or hospital-based long-term-care units. In comparison, 67.5% of COVID-related deaths occurred in the group aged 80 and over in waves 6 and 17% occurred in long-term care facilities or hospital-based long-term care units (INSPQ 2022a, 2022c). To a lesser extent, these populations have also been hit hard in other provinces such as Ontario (Badone 2021; Fisman et al. 2020; Hsu et al. 2020). The management of care personnel who were mobilized in many facilities and who had less stringent protections than in other provinces such as British Columbia would have precipitated the spread among these vulnerable populations (Allin et al. 2022; Hsu et al. 2020; Nguyen et al. 2022). This crisis was also exacerbated by the considerable increase in the number of healthcare personnel who had to isolate themselves after contracting the virus, to such an extent that the Canadian force had to be mobilized in these facilities in Quebec and Ontario (Badone 2021; Desson et al. 2020). The case of Quebec and Ontario reveals that the risk of hospitalization and death related to COVID-19 among the elderly goes beyond a simple vulnerability related to biological age (Nguyen et al. 2022; Public Health Ontario 2020). This age group also faced disproportionally some stressors such as isolation, discrimination, and ageism, which can contribute to poor physical and mental health (D'cruz and Banerjee 2020). For example, the hashtag "Boomer

removal" circulated widely among the social media in reaction to what was considered by some group of the population as an inordinate burden placed on society to protect these more vulnerable populations (D'cruz and Banerjee 2020).

The data also quickly revealed the gendered impact of COVID-19 considering the differences between women and men in their risk of infection, hospitalization, and death from COVID-19. In Canada, there were 42,279 deaths attributable to COVID-19 reported up to July 15, 2022. Of these, 52.8% were male (Government of Canada 2022a). This dissimilitude is linked to sex and gender factors in a complex way. As in other countries, Canadian women had been particularly afflicted by the pandemic and the multiple measures used to contain it. Indeed, most provinces mandated the closure of nonessential businesses and services in order to limit the spread of the virus. This contributed to a disproportionately higher viral exposure among women since they are overrepresented in the care sector or other sectors considered essential (e.g. grocery stores) (Bilodeau and Quesnel-Vallée 2020; Baylis et al. 2022; St-Denis 2020). Consequently, the number of confirmed cases of COVID-19 was greater among women than among men (Government of Canada 2022a). However, despite this overexposure, the proportion of deaths was overall higher for men than for women. Quebec was a notable exception at the beginning of the pandemic when a higher proportion of women than men died from the virus (INSPQ 2022). This exception must be understood considering the higher life expectancy of women and that they were therefore overrepresented in long-term care facilities which were hard hit at the beginning of the pandemic (Conseil du statut de la femme 2021). In Canada, people over 80 years of age are the only group with a higher number of deaths among women (Government of Canada 2022a). Even though women accounted for a larger proportion of deaths in Quebec in the first wave, the overall mortality rate from COVID-19 remains higher for men than for women in Canada. Although the reasons behind this greater mortality from COVID-19 among men, which is true all around the world, remain to be investigated, some studies have suggested a difference in the immune system that puts men at greater risk (Hawkes and Buse 2021). However, gender has also been put forward in a Canadian context. For example, smoking and alcohol consumption, behaviors associated with a higher severity and risk of death from COVID-19, are higher among men compared to women (Hawkes and Buse 2021). Men are also less likely to seek care when needed. When they do seek care,

their condition may be more severe and therefore more difficult to treat. The effect of gender, men adopting behaviors that demonstrate their masculinity, then has important repercussions to the disadvantage of male health (Courtenay 2000).

Health measures such as lockdowns and school and daycare closures could become a breeding ground for stress and domestic violence among women (Bilodeau and Quesnel-Vallée 2020). Studies have documented the negative impact on the mental health of women compared to men (Vindegaard and Benros 2020). Following the distancing measures in Canada, women reported worse mental health and more anxiety symptoms than did men (Moyser 2020; Jenkins et al. 2021). In addition, studies also support the view that the pandemic has had a significant impact on trans and non-binary people's access to health care, isolation, and mental health (Jenkins et al. 2021; Kia et al. 2022).

The data collected on age and gender highlighted that risks were not equally distributed. However, these correspond to only a few pathways of inequalities. Compared to other countries, Canada and the provinces do not systematically collect socio-demographic data such as ethnicity, immigration status, education, or income. Many researchers have criticized the paucity of data collected on different socio-economic groups in Canada, which has limited the ability to better illuminate the inequities arising from or amplified by COVID-19 and thus to intervene efficiently to reverse these trends (Blair et al. 2022; Etowa and Hyman 2021; Passos-Castilho et al. 2022; Thompson et al. 2021).

Initial evidence that the pandemic and its containment measures were contributing to widening health inequalities among racialized groups and immigrants in Canada came primarily from aggregate community-level data (Blair et al. 2022; Urrutia et al. 2021). Comparable to what was observed in the United States, these data demonstrate that the risk of being infected, hospitalized, or dying because of COVID-19 varied significantly by ethno-cultural concentration in a neighborhood (Blair et al. 2022; Urrutia et al. 2021). For example, one Canadian study shows that a higher proportion of black individuals in a region was associated with more confirmed cases of COVID-19 (Choi et al. 2021). Focusing on 16 metropolitan areas in four Canadian provinces, a study suggests that a disproportionate number of cases of infection occurred in the cities with a higher proportion of visible minorities and recent immigrants (Xia et al. 2022). Another nationwide study indicates that the

age-standardized mortality rate per 100,000 population among all residents was 16 in areas with the lowest ethno-cultural concentration and 37 in areas with the highest concentration (Blair et al. 2022). Finally, there appear to be inter-provincial differences in the extent to which the proportion of visible minority individuals was associated with greater mortality. Indeed, the COVID-19 age-standardized mortality rates per 100,000 in wave 1 were 35.1 in Quebec when the proportion of the neighborhood population belonging to designated visible minority groups was less than 1%, whereas the rate rose to 123.1 when the proportion was 25% or more (Subedi 2020). In Ontario, Alberta, and British Columbia, these mortality rates were 7.1, 5.0, and 0.5 respectively when the proportion of visible minorities was less than 1% while these rates were 25.9, 7.4, and 5.6 respectively when the proportion of visible minorities was 25% or more (Subedi 2020).

Regretfully, scant individual-level data exist on health inequalities that may have emerged during the pandemic among racialized or immigrant groups. A study has demonstrated that Indigenous peoples and immigrants were among the groups most at risk for viral exposure (St-Denis 2020). Furthermore, inequalities in co-morbidity, which disproportionately affect these groups, has also been proposed as a contributing factor (Etowa and Hyman 2021; Passos-Castilho et al. 2022; Thompson et al. 2021).

In response to the lack of data on different ethnic populations and the inequities highlighted by regional-level data, various researchers as well as cities such as Toronto and Peel (in Ontario) and provinces such as Manitoba and Ontario have undertaken the compilation of data on different ethnic groups and immigrant status (Passos-Castilho et al. 2022; McKenzie et al. 2021; Public Health Ontario 2020).

The rare data available in Canada at the individual level strengthen the view that racialized populations have disproportionately borne the burden of the pandemic (McKenzie et al. 2021; Passos-Castilho et al. 2022). For example, data collected in Ontario revealed that, compared to white Ontarians, racialized groups had 1.2–7.1 times higher rates of infection, 1.7–9.1 times higher rates of hospitalization related to COVID-19, and 1.7–7.6 times higher rates of death from COVID-19 infection (McKenzie et al. 2021). These same data indicate that Latinos and South Asians were the groups most affected by the pandemic, having 7.1- and 6.7-times greater infection rates than whites. In Toronto (capital of Ontario), data collected up to December 31, 2021, also shows an overrepresentation

of cases and hospitalization among South Asians, Southeast Asians, Latin Americans, Blacks, Arabs, Middle Easterners, and West Asians (City of Toronto 2021).

Information from Manitoba collected between May 1 and December 3, 2020, reached a similar conclusion. First, although representing only 3% of the province's population, South Asians accounted for 8% of infections. Similarly, Filipino and black people represented 7% and 2% of the population respectively but accounted for 12% and 6% of the positive cases identified (Government of Manitoba 2021). Finally, while Indigenous peoples represent 13% of the population, they accounted for 17% of the cases.

While the Director of Public Health for the province of Quebec had publicly announced his intention to collect data on racialized groups, the province has done an about-face by pointing to other factors that underlie the overrepresentation of different racialized groups, including socioeconomic status and living conditions (SES) (Lapierre 2020; Shingler 2021). This decision was strongly criticized by many as diluting the importance of racialized group membership in a series of downstream factors, thereby obscuring systemic sources of discrimination (Shingler 2021). For example, an immigrant from a racialized group that does not understand one of the official languages could have difficulties in accessing information regarding public health recommendations and restrictions that is otherwise clear to someone without this language barrier. Another example is related to immigrants in an irregular or sponsored situation whose statuses do not allow access to free healthcare services (Carde 2020; Edmonds and Flahault 2021). Studies have also documented the effects of the pandemic context on overt discrimination, verbal abuse, or even physical violence experienced by minority groups, which can give rise to adverse health effects (Miconi et al. 2021).

Notwithstanding the inequities associated with racialized group membership, it was also shown early in the pandemic that poorer neighborhoods were more severely affected in terms of cases, hospitalizations, and mortality from COVID-19 (Allain-Dupré et al. 2020; Mishra et al. 2022). One study also found that gender gaps varied by income at the community level (Public Health Agency of Canada 2021).

However, few studies in Canada have documented the relationship between individual-level income and the health consequences of the COVID-19 pandemic. Again, Toronto stands out as one of the only health regions collecting individual-level income data. Through

December 31, 2021, while the general population rate of hospitalization was 75 per 100,000 people in this region, the rate was 165 for families with incomes under $30,000 and 22 for families with incomes of $150,000 or more (City of Toronto 2021). It has been suggested that lower-income populations are more likely to be essential workers who have fewer opportunities to telecommute or take time-off work and who live in more confined spaces (Brodeur et al. 2021), and indeed, the socio-occupational risks of viral exposure were found to be higher among people with lower incomes (St-Denis 2020). Furthermore, these disparities exist even within frontline occupations since a study in Quebec found that nurses of a lower socioeconomic status were at greater risk of contracting the virus (Godefroy and Lewis 2022).

In addition, containment measures can have disproportionate effects on the health of socioeconomically disadvantaged people, as they affect access to green and blue spaces as well as health behaviors including physical activity, eating habits, and screen time (López-Bueno et al. 2021). It appears for example that lower socioeconomic status was associated with more sedentary behavior, which may contribute to health inequalities over the longer term (Spencer et al. 2020).

The COVID-19 pandemic has highlighted the fact that health inequalities are also fueled by labor standards and specific employment conditions. For example, while British Columbia allowed leave if needed for reasons such as school or daycare closure, Quebec only supported a 10-day personal leave (Fuller and Qian 2021). Moreover, those with higher incomes and more prestigious jobs generally enjoyed more social protections in terms of time-off work in case of infection, flexible schedules, and possibility to work from home (Government of Canada 2022a). In addition, following daycare and school closures and working from home mandates, the difficulty of balancing work and family responsibilities was not evenly distributed among the population, which is identified as a major determinant of health (Schieman et al. 2021). Finally, low-income, and less educated people report more job insecurity following business closures, which is related to distress and mental health problems (Pacheco et al. 2020; Béland et al. 2022).

School closures also contributed to inter-provincial inequalities for families living in poverty. Indeed, these measures were synonymous with the reduction of access to the subsidized or low-cost school meals, which in some cases constitute one of the only nutritional supports for some children. Thus, although research remains to be done, school closures,

which varied substantially in duration and severity between provinces, may have had important effects by amplifying the food insecurity of many families and its effects on health (Petit and Tedds 2020), not to mention the developmental effects that will likely be evident for many years to come.

In sum, the pandemic and the measures taken in Canada, as in other countries, have accentuated health disparities among the population, including between provinces of residence, age, gender, ethnicity, immigration, and socioeconomic status. Furthermore, these determinants can cluster in complex ways to further exacerbate health disparities over time. This is especially true since the unequal distribution of some of these determinants has itself been affected by measures instituted to contain the COVID-19 pandemic. In this next section, we therefore turn to socioeconomic inequalities more generally.

4 Effect of COVID-19 on Socioeconomic Inequalities

The COVID-19 pandemic and measures such as travel restrictions, closure of nonessential services, and social distancing have drastically affected the Canadian economy. In 2020, Canada was facing one of the worst recessions in its history. In April 2020, real gross domestic product (GDP) fell by 10.9% compared to March (Statistics Canada 2022b), and the unemployment rate rose to 13.7%, an unprecedented level since these data first started to be collected in 1976 (Statistics Canada 2020a). However, the deleterious individual consequences of these macro-economic trends were not evenly distributed in the population, and, as such, in addition to the direct consequences on health, the COVID-19 pandemic context has also contributed to socioeconomic inequalities, which, in turn, operate as a major determinant of health inequalities (Quesnel-Vallée et al. 2021). Indeed, the risk of job loss was highly correlated with the risk of virus exposure, disproportionally affecting specific economic sectors (e.g. accommodation and food services) and professions (e.g. Sales and services) (Béland et al. 2022; Baylis et al. 2022; Lemieux et al. 2020).

Overall, employment data indicate that the COVID-19 pandemic has hit women harder than men (Mo et al. 2020; Bilodeau and Quesnel-Vallée 2020). One study found that 68.5% of job losses between February and June 2020 were among women in Canada (Baylis et al. 2022). This

group is predominantly employed in jobs with high risk of viral transmission and with less opportunity for telecommuting such as health care and social assistance, accommodation and food services (Deng et al. 2020; St-Denis 2020). The job losses, however, varied largely among women depending on the health measures that have been instituted. Indeed, studies show that women with children between the ages of 6 and 12 were significantly more affected than women with children under the age of 6 (Qian and Fuller 2020). School and daycare closures in the early waves effectively laid bare the gendered structuring of work-family conciliation, as the increase in hours spent on childcare was higher among women than men, with many having to leave their jobs to care for children (Johnston et al. 2020). Moreover, as women held a higher proportion of part-time jobs than men, the economic calculus often favored men when it came to choose who stayed at home (Qian and Fuller 2020). Finally, an intersection with education is likely, as a study suggests that less educated women with preschool children would have been at higher risk of job losses compared to the more educated (Qian and Fuller 2020). The gap would have been larger, however, during the early waves of the pandemic when health measures such as lockdowns and school closures were in effect.

During the pandemic, gender as a social structure also affected female entrepreneurship. Indeed, women obtained fewer loans and closed their businesses at a higher rate than men (Mo et al. 2020; Béland et al. 2020). Income loss was also greater among women than men entrepreneurs. Compared to what is suggested for wage earners, one study suggests that school and daycare closures would potentially be less important because job losses among women business owners would likely be greater among those without children than among those with children (Béland et al. 2020).

Studies in Canada have found that job loss and reduced work hours varied by racialized and immigrant status as well (Hou et al. 2020; Statistics Canada 2020b, 2022c). However, as with infections, hospitalizations, and deaths, studies of the socioeconomic consequences on these populations remain sparse and the evidence could be interpreted as mixed, though notable differences in study design and measurement of race and ethnicity must be noted. Indeed, data from one study shows that racialized individuals were at greater risk of reduced work hours or job loss compared to white individuals (45% and 32%, respectively), with disproportionate effects among black populations (52%) (EISR, 2021).

In contrast, according to a Crowdsourcing survey by Statistics Canada, visible minority groups and the white population experienced similar levels of reduced hours or job loss, with the notable exception of West Asians (46.5%) and Filipinos (42.2%) (Hou et al. 2020).

Possibly compounding the effects of racialized or visible minority status, there is also some evidence that immigrants also experienced more job losses, reduced hours, and business closures (Béland et al. 2022; Baylis et al. 2022; Hou and Picot 2022; Statistics Canada 2020b). As with women, the overrepresentation of immigrant groups in sectors of the economy considered to be at higher risk could help in explaining these higher rates. However, these trends appear to be more pronounced among recent immigrants, while the gaps are smaller for 2nd and 3rd generation immigrants (EISR 2021; Baylis et al. 2022).

Job loss and reduced hours also disproportionately affected those with lower levels of education or income (MacGee et al. 2022). For example, one study shows that among those with a university degree, 29% lost their jobs or reduced their hours, while the proportion was 43% for the group with no degree (EISR 2021). Baylis et al. (2022) suggest that job losses among the less educated are likely driven by employment characteristics, as this group of workers enjoys fewer social protections. With respect to low-income populations, Lemieux et al. (2020) found that nearly half of the job losses were among the lowest income quartile. It is also noteworthy that nearly half of the jobs lost among this group were in the retail trade and accommodation and food services sectors.

In addition to the inequalities mentioned above, the pandemic and the measures to contain it have been catalysts for amplifying disadvantages for a range of other groups based on, for example, age, language, and disability. While the pandemic affected more older people in terms of health, job losses were concentrated among younger age groups (Lemieux et al. 2020). Data in Canada also indicate that job losses have been greater among francophones (French speakers) compared to anglophones (English speakers) (Achou et al. 2020). Moreover, many studies report an increase in financial hardship among people with disabilities (Maroto et al. 2021; Gignac et al. 2021; EISR 2021). Finally, it is important to consider that most of these categories of disadvantage cluster or interact with one another, indicating the salience of adopting an intersectional perspective regarding the socioeconomic impact of COVID-19 (Fuller and Qian 2021; Wall 2021). For example, studies suggest that women

with recent immigrant status as well as women belonging to an ethnic minority have been the hardest hit (Statistics Canada 2020b).

5 Mitigating Risk of Poverty Through Policy

Contrary to what one might expect, the massive job losses following the closure of nonessential services was not followed by an increase in poverty across the country (Statistics Canada 2022d). Quite to the contrary in fact, as the poverty rate reached a historically low rate in Canada during the pandemic. This is due in part to the multiple initiatives and generous benefits offered by different jurisdictions (Petit and Tedds 2020). For example, the federal government suspended student debt payments without penalties and interest, reached agreements with the major banks to allow deferrals of debt and mortgage payments, and extended the deadline for tax returns. At the provincial level, various measures were also enacted ranging from rent assistance in British Columbia to one-time cash benefits in some provinces (Robson 2020).

But the flagship measure of the federal government was undoubtedly the Canadian Emergency Response Benefit (CERB), a benefit of 2,000$ per four weeks for up to 16 weeks, with much less stringent eligibility requirements than the existing employment insurance system (Béland et al. 2021; Robson 2020). Students or those who completed their studies but could not work because of COVID-19 were supported through a similar program, but which set the benefit level at 1,250$. The nimble response afforded by these programs highlighted the limitations of traditional employment insurance systems and contributed to the debate about a guaranteed minimum-income program. This measure indeed addressed the fact that one-third of the workforce would not have been eligible for the traditional employment insurance system (Robson 2020). As of April 19, 2020, 6.73 million Canadians (or one-third of the workforce) had applied for these programs, a number that grew to 8.37 million on June 2, 2020 (Lemieux et al. 2020; Robson 2020). These benefits had notable effects for several population groups, particularly those of low income (Robson 2020; Statistics Canada 2022d). For example, some people earned more with these benefits than by working (Lemieux et al. 2020; MacGee et al. 2022; Petit and Tedds 2020), and, not surprisingly, some studies suggest that indicators of food insecurity have declined overall (Polsky and Garriguet 2022; Lamarche et al. 2021).

However, again, this overall picture does not capture the fact that poverty and socioeconomic inequalities in Canada have not been reduced for all. Indeed, while the average wealth gap between the top 10% and bottom 50% remained similar between 2018 and 2021, the gap has increased during this period between the top 1% and bottom 50% (WID 2022). While savings increased for all income brackets, 40% of savings in 2020 were among the highest income quintile (MacGee et al. 2022). The risk of poverty was also unevenly distributed across the country. For example, while benefit measures have temporarily kept many vulnerable groups above the poverty level, this was not the case in Alberta and Newfoundland and Labrador where some groups could receive less under CERB than under pre-COVID-19 benefits (Petit and Tedds 2020; Statistics Canada 2022d). Moreover, the poverty rate has remained very heterogeneous, with families experiencing greater declines than individuals living alone, and older adults experiencing increases in poverty, while all other age groups saw decreases (Statistics Canada 2022d). The study by Lamb et al. (2022) also suggests that recent immigrants gained from government transfers only if they already had an income above the median level. This could be germane to the observation that racialized groups reported more difficulty meeting their financial obligations compared to the white population (Hou et al. 2020). Similarly, data collected between November and December 2020 found that 36% of respondents reported income losses compared to before the pandemic, but this proportion is significantly higher among the least affluent (54%) compared to the more affluent (25%) (EISR 2021). Finally, generous measures such as the CERB only targeted the employed, thus neglecting a large part of the most vulnerable populations such as people on social assistance and the homeless (Petit and Tedds 2020).

6 Conclusion

The purpose of this chapter was to provide an overview of the health and socioeconomic inequalities that have occurred in Canada since the onset of the COVID-19 pandemic. As in other countries, decisions made to contain the pandemic were not neutral with regard to gender, ethnicity, or residency status. Their consequences often exposed, and in many cases exacerbated existing fault lines of stratification that were operating long before the pandemic. The pandemic also highlighted the close interdependence between socioeconomic status and health in Canada. Indeed,

those who were already most vulnerable socioeconomically experienced the greatest risk of exposure, hospitalization, and death from COVID-19, while greater exposure to the virus and being disabled further compounded both the risk of losing one's job and associated deleterious health effects.

The rise in inequalities observed to date is worrisome as it may threaten the efforts made over the last decade in the fight against inequalities. While Canada is committed to sustainable development goals that include the reduction of health inequalities and poverty, several pandemic policy decisions have lacked that equity lens. Moreover, the heterogeneity of the measures adopted in different provinces and the lack of representative data on certain groups raise serious questions about the capacity of the country and the provinces to devise evidence-based interventions. Yet, the need to reduce inequalities is even more pressing given a new crisis that has emerged during this pandemic. Indeed, Canada is experiencing high inflation which is having a disproportionate effect on the most vulnerable populations. As the CERB and other income support and fiscal stimulus packages have run their course and purchasing power is eroding significantly, it is becoming increasingly difficult for a growing proportion of the population to afford basic needs such as housing and food.

Thus, we now must turn to considering the longer-term socioeconomic inequalities that may arise because of the pandemic and of the multiple measures put in place to mitigate it (Gallagher-Mackay et al. 2021). For students or those who lost their jobs, the delayed transition to employment may be a precursor to longer-term economic inequality. For instance, the proportion of neither employed nor in school (NEET) increased dramatically because of school and business closures, and, one year later, the rate had not gone back to pre-pandemic levels (Wall 2021). It will be critical to follow the evolution of these trends.

Education represents another example of a potential source of increased inequality in Canada over the longer term. School closures indeed varied substantially between provinces, with uneven effects on the chances of success for students with vulnerabilities such as those with disabilities or who lacked access to the internet (Gallagher-Mackay et al. 2021; Whitley et al. 2021). Several studies also report delays in learning, loss of motivation, and school perseverance (Gallagher-Mackay et al. 2021; Whitley et al. 2021). For example, a study in Quebec indicates that the achievement gap on a ministry test between those who performed better and those who performed worse has increased in 2021 compared

to 2019 (Haeck and Larose 2022). Thus, although most public health measures have been lifted in Canada and populations are now expected to learn how to live with the virus, the impact on socioeconomic inequalities could be felt for a long time.

This situation underlines the importance for Canada to take deliberate action to reduce inequality. However, this could become a utopian project if the accumulation of wealth of the richest is left to grow faster than that of the poorest. The wealth of the richest 1% (and more markedly for the 0.01 and 0.001%) of the world's population indeed increased substantially during the pandemic, which inevitably raises the question of the contribution of the richest to redistribution (Chancel et al. 2022). In Canada, it has also become increasingly difficult for younger generations to access property, which can further feed into intergenerational wealth inequalities. These are long-running trends that will require political will and societal support to motivate the fundamental interventions that are required; the upshot of tackling these rising inequalities, however, is well worth it, as it holds the promise of more equity and better population health for all.

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CHAPTER 4

COVID-19 Inequalities in Brazil: Health, Education, and Social Assistance Policies

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1 Introduction

COVID-19 is the major pandemic of the twenty-first century. Besides its dramatic consequences on the health of individuals and populations, the pandemic had a major impact on healthcare systems from a broad perspective (Farrar & Ahuja, 2022), as well as on the workforce from critical

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sectors, such as education, health, and other frontline services, including transportation and logistics. This chapter reflects on the COVID-19 health emergency and inequalities in Brazil. The first part contextualizes the country's response to the pandemic. The following three sections describe disparities in health, education, and social assistance. The conclusion reflects on the consequences of these findings. Although we focus on three areas (health, education, and social assistance), these are not the single or even the most affected sectors impacted by the pandemic. We believe the major consequences have yet to be fully evaluated and should be understood as a massive, entangled effect on the social fabric, accompanied by altered values in key indicators of inequality such as the Gini index. For example, we should remember that as of 2015, Brazil had a Gini Index of 51.9. In contrast, the corresponding 2020 figure was 48.9. Nevertheless, focusing on specific sectors is essential to foster in-depth analysis and inform public policies.

2 Contextualizing COVID-19 in Brazil

In a large country such as Brazil, a pandemic curve is likely to present multiple peaks and troughs at different places and times (Bastos, 2020), making a coordinated response a formidable challenge. From June to September 2020, Brazil had the second-highest number of COVID-19 cases worldwide. In mid-September 2020, India and the United States outpaced Brazil in the number of COVID-19 cases. Thus, both globally and within Latin America and the Caribbean region, Brazil was one of the countries most heavily affected by COVID-19. Moreover, several variants of coronavirus, including the more contagious P1 variant, have been first identified in Brazil.

Brazil's response to the virus has been acknowledged as controversial by the world community (Fonseca, Nattrass, Arantes, et al., 2021). President Jair Bolsonaro, a far-right, populist president, was a former army captain who has expressed opposition to abortion, gun control, same-sex marriage, and affirmative action. Bolsonaro's response to COVID-19 reflects his prioritization of narrow capitalist interests, and he was keen not to "stop" the national economy. At the outset of the pandemic, the Ministry of Health (MoH) acted promptly in cooperation with several subnational governments. However, the president and his supporters adopted a denialist, anti-science approach (Fonseca, Nattrass, Lazaro, et al., 2021), which made policy coordination even more difficult.

The pandemic struck the country during an economic crisis (Deweck et al., 2018). Responding to COVID-19 demanded increased social expenditures despite ongoing austerity policies, high unemployment rates, and a high degree of socioeconomic inequality. The COVID-19 emergency resulted in the federal government investing over $127 billion in fighting the virus between 2020 and 2022. Such investment funded much-needed social programs, and it contrasted sharply with the austerity policies promulgated by the Ministry of Finance and the president.

Nearly half of Brazil's population either lives in poverty, surviving on less than $5.50 per day, or is vulnerable to falling into poverty. Therefore, Brazil's population was particularly susceptible to the negative socioeconomic consequences of the COVID-19 pandemic (World Bank, 2020a). Particularly at risk were those living in *favelas* (urban slums) without necessary sanitation facilities, which makes compliance with hygiene standards and social distancing more challenging. Social policies to protect the poor, informal workers, and the unemployed were a necessary precondition for effectively implementing emergency measures, particularly non-pharmaceutical interventions (Greer, Jarman et al., 2021).

Brazil has one of the largest public healthcare systems in the world. It covers 75% of the population, is funded through general taxes, and offers universal access at no cost at the point of delivery. To understand healthcare inequalities during the COVID-19 pandemic, it is necessary to understand the allocation of authority and responsibility within the Brazilian healthcare system. The public healthcare system is highly decentralized. In total, 27 states and more than 5,000 municipalities are responsible for providing healthcare. As a means of coordinating healthcare provisions, there are 438 health regions (a network of municipalities ranging from 1 to 46 jurisdictions) that are responsible, among other things, for hospital assistance. The MoH has a constitutional mandate to coordinate Brazil's health policy, particularly during public health crises. However, President Bolsonaro's denialist position regarding COVID-19 placed an unprecedented degree of pressure on the MoH to avoid support for social-distancing measures and advocate for the use of experimental (and controversial) treatments, such as chloroquine. The MoH did not issue any national lockdowns, social-distancing mandates, or stay-at-home orders. Given the president's approach to the pandemic, it was difficult for the MoH to coordinate a response with those state governments that

were willing to follow World Health Organization's (WHO) pandemic guidelines (Fonseca, Nattrass, Arantes, et al., 2021).

Similar to the healthcare system, education is very decentralized in Brazil, but with far less coordination at the central level. Although the Ministry of Education sets policy goals and designs its framework, subnational governments are responsible for overseeing education within their jurisdictions, especially regarding early childhood, primary, and secondary education (OECD, 2015). The federal government is responsible for tertiary education. In 2020, the National Council of Education promulgated two crucial guidelines at the outset of the pandemic. It first issued norms regulating exceptions to the usual academic year, such as reducing the minimum number of days students must be in school (Provisional Decree 934/2020, then converted into Law 14.040/2020). Later, it provided regulations concerning the implementation of distance learning for higher education (Ministerial Decree 544/2020). However, the decision to open or close schools remained the prerogative of state and municipal governments overseeing pandemic control. Therefore, there was significant variation in education policy across the country.

Finally, Brazil has one of the most successful conditional cash transfer programs globally. This program is known as the Family Allowance Program (*Bolsa Familia*) (Rasella et al., 2013; Shei et al., 2014). During the pandemic, the government promoted adjustments to the Family Allowance Program and created a new social program to provide salary relief to vulnerable populations; this initiative was known as the Emergency Allowance (*Auxilio Emergencial*). The Family Allowance and the Emergency Allowance were the two most important social programs implemented in Brazil during the pandemic, and they have been judged to have been exemplary counter-pandemic measures (World Bank, 2020b). Paradoxically, Brazil instituted one of the most generous social assistance packages in the Latin American region despite its unhealthy fiscal situation.

Another important initiative, the Unified System of Social Assistance (*Sistema Único de Assistência Social*, SUAS) guarantees regular and automatic funding to subnational governments, defines each government's responsibilities, and provides intergovernmental arrangements, which result in service standardization, expansion, and a greater access to them, and municipal state capacity strengthening. Both, the Family Allowance Program and SUAS, were institutionalized during President Luis Inácio Lula da Silva's government (2003–2010) (Bichir et al., 2020; Lima-Silva

et al., 2020; Segatto et al., 2022). Although Brazil had promoted necessary calibration and social program adjustments during the COVID-19 pandemic, these were mostly temporary. Such adjustments included rules to avoid termination of benefits, advance payments, and modernization of services through digital technologies. We focus here on the Emergency Allowance given its resources and impact on poverty and inequality during the pandemic.

3 Health

Several studies have analyzed health inequalities in Brazil during the COVID-19 pandemic using large-scale healthcare data sets. Castro et al. (2021) analyzed the pattern of the spread of COVID-19 cases and deaths in Brazil, considering spatial and temporal scales from epidemiological week 9 (February 23–29, 2020) to week 41 (October 4–10, 2020). This represented what some analysts called the "first wave" of the pandemic (Iftimie et al., 2020), during which no vaccines were available and non-pharmacological measures were crucial to mitigating the spread of the virus. The authors identified highly variable infection and mortality rates across Brazilian municipalities. In nine states, including Amazonas and Rio de Janeiro, the rise of deaths was faster than that of cases over several weeks. Both states experienced a shortage of ICU beds, but Amazonas had smaller availability (approx. 11 ICU beds per 100,000 patients versus 23 in Rio de Janeiro), and ICU beds were concentrated in the capital city of Manaus. This demonstrates Brazil's historical problem of unequal access to tertiary care (Travassos et al., 2006), an issue that remains a key challenge for the health system. During the COVID-19 pandemic, this problem was exacerbated by the uncoordinated response at the federal level.

In addition, there is sound evidence that existing socioeconomic inequalities, rather than age or burden of chronic non-communicable diseases, had the greatest effect on the initial course of the pandemic and deaths from COVID-19, with a disproportionate adverse burden affecting socioeconomically vulnerable regions, states, and municipalities (Rocha et al., 2021). Both Rocha et al. (2021) and Castro et al. (2021) found that although COVID-19 was first recorded in the wealthy regions of São Paulo and Rio de Janeiro, nevertheless, death rates increased quickly in states with marked socioeconomic vulnerabilities, particularly in the North and Northeast regions. These are precisely the regions that score

the lowest on the social disparities index (SDI) for COVID-19, a novel measurement developed by the Centre for Data and Knowledge Integration for Health (CIDACS/Fiocruz). The research is funded by the Bill and Melinda Gates Foundation, and the index is meant to assess inequalities relevant to the COVID-19 pandemic, such as unequal access to health care (Ichihara et al., 2022). More than 97% of the municipalities in the north and northeast regions displayed high or very high SDI scores throughout the three moments of the pandemic, including the initial stage and the two critical peaks.

When studying health-related inequalities in Brazil, it is imperative to consider racial disparities. More than 300 years of black slavery followed by a complete absence of a comprehensive integration or at least the provision of basic education imposed a historical handicap on Afro-Brazilians and their descendants (Telles, 2006).

Several studies that used different data sets to study various epidemiological weeks have called attention to how the pandemic had disproportionately affected black individuals. For instance, although the incidence rates of COVID-19 were higher among the white population, the black population in all regions of the country showed higher fatality rates and an increased risk of death compared to whites, regardless of the region (Martins-Filho et al., 2021). A similar finding was reported by Marinho et al. (2022), who identified that excess mortality among black and brown people was remarkably higher compared to the white population. Finally, between February and August 2020, among hospitalized adults with COVID-19, black and brown patients showed higher in-hospital mortality, less frequently used hospital resources, and potentially suffered more severe conditions than white patients (Peres et al., 2021). It is worth noting that racial inequalities in Brazil are strongly associated with socioeconomic indicators, such as income and education (Lima & Prates, 2019).

Finally, vaccination against COVID-19 has also been a challenge. Historically, Brazil has been very successful at providing vaccinations despite the country's large size and divisions (Domingues et al., 2012). The National Immunization Program, which is funded completely by public resources, provides vaccines to the entire population. The logistics are impressive. In 2017, the National Immunization Program distributed 300 million vaccine doses (Interfarma, 2017). Although Brazil possesses the capacity to mass vaccinate the entire population, COVID-19 immunization has differed considerably among states. By September 2022,

media articles had begun calling attention to the fact that in Sao Paulo and Piaui, nearly 90% of the population had received two doses of the vaccine, while in Roraima and Amapá, less than 55% had received two doses of the vaccine (G1, 2022). There are few large-scale studies on the inequities of vaccination access in Brazil; however, a study on the first eight months of vaccinations found that socioeconomic disparities (measured by the human development index) negatively impacted the first dose vaccination rate in Brazilian municipalities (Bastos et al., 2022). However, access to primary healthcare coverage mitigated these disparities, suggesting that primary healthcare coverage ensured more equitable access to vaccines in vulnerable municipalities.

4 Education

The social distance measures adopted by state and municipal governments in Brazil led to the closure of schools, suspending face-to-face classes, across the country in March 2020. Following these decisions, state and municipal governments adopted different policies to ensure the continuity of classes through the pandemic. However, within a context of lack of national coordination in education policy in place since 2019, when Bolsonaro's government started, the federal government did not lead any national regulation to respond to the closure of schools and did not adopt any actions to decrease inequalities in this policy field (Abrucio et al., 2020). This resulted in a significant variation and, particularly, fragilities in education policy responses at the subnational level (Barberia et al., 2020; Segatto et al., 2022).

Subnational governments adopted strategies of remote learning over time. If in May 2020, 26% of students did not have access to any remote activity, in May 2021, 98% had access to remote activities (Itaú Social et al., 2022). In some cases, governments adopted innovative responses such as São Paulo's Media Center that broadcast content online and on TV. São Paulo's education department also adopted strategies to decrease inequalities in access: the online content could be accessed by students without using up their mobile data, and SIM cards were distributed to vulnerable students to expand their studying hours (Segatto et al., 2022).

However, this was not the case for most states and municipalities that did not adopt remote learning strategies due to fragilities in their fiscal and administrative capacities and to the lack of students' access to meaningful connectivity (e.g., access to stable high-speed Internet, and

suitable devices that would allow them to participate in video calls and live-streaming activities). This was mentioned by 86% of school managers as a challenge to the continuity of remote classes, particularly in rural, municipal, and state schools (CGI.br, 2021). To overcome these barriers, subnational governments printed activities and pedagogical materials and contacted families through online social networks such as WhatsApp and Facebook (Barberia et al., 2020; Bichir et al., 2020; CGI.br, 2021; Itaú Social, Fundação Lemann & Inter-American Development Bank, 2022; Undime, 2021).

According to the 2020 ICT in Education survey, 93% of schools (public and private) scheduled a day and time for parents and legal guardians to pick up printed activities and pedagogical materials at school, and 91% created groups in applications or social networks to communicate with students and parents and legal guardians. While only 65% conducted distance learning classes with students through videoconference platforms, and only 58% used virtual platforms and educational resources (CGI.br, 2021). Neri and Osório (2020) also highlight that the most vulnerable students had lower school attendance levels, assignments turned in, and time dedicated to them.

It is essential to mention that, with the closure of schools, students also suffered the suspension of free meals and were exposed to different risks, including violence, sexual abuse, discrimination, bullying, and online exposure (CGI.br, 2021). Regarding meals, the federal government did not adapt its project grant or distribute pandemic guidelines, resulting in fragmented policies, such as food distribution and cash transfer, and unclear eligibility criteria. In the case of the risks, a few subnational governments re-opened some schools for those students. This also benefited students with any disability who could have more support in the schools (Segatto et al., 2022).

In August 2021, governments authorized the re-opening of schools. However, in most cases, this only happened at the beginning of 2022. Subnational governments have been adopting different strategies to overcome the increasing dropout and truancy rates and the gaps in learning, which were revealed by the national exam that assesses student proficiency conducted in 2021 (INEP, 2022).

5 Social Assistance

Social policies to protect the poor, informal workers, and the unemployed are crucial to balance the short-term consequences and the longer-term impacts that disease control measures have during public health crises (Greer et al., 2021). Responding to the inequalities, the pandemic exacerbated—critical in an unequal country such as Brazil—the federal government created the Emergency Allowance to support low-income families and individuals who had lost their income during the pandemic, including workers who lost their jobs and informal workers. The Program was announced in mid-March 2020 after strong pressure from members of Congress on the Ministry of Economy. Although the executive government announced a R$ 200 allowance (US$37) per month, after a debate in Congress, it was increased to R$ 600 (US$ 110) per month (Piovesan & Siqueira, 2020). Initially, the Emergency Allowance was approved for five months, but in September 2020, it was renewed for four more months. Again, there was a dispute between the Minister of Economy and Congress on the duration and amount to be paid to beneficiaries. At the end of 2022, Bolsonaro's government replaced the Family Allowance Program with the Brazil Allowance Program (*Auxílio Brasil*).

Given its volume of resources, coverage, generosity, and potential impact on income and poverty, the World Bank defined the Emergency Allowance as one of the "soundest social protection responses across the globe to COVID-19" (World Bank, 2021a, p. 9). It is still early to understand the impact of the Emergency Allowance on poverty alleviation and inequality. However, a recent evaluation provides an initial understanding. Lazzari et al. (2022) used a novel database from household surveys to analyze the effectiveness of emergency policies implemented during the initial seven months of the pandemic. The authors observed an increase in poverty among employers and formal workers but a decrease among vulnerable groups, which can be explained by the Emergency Allowance. Without the Program, such vulnerable groups would have experienced a significant reduction in labor earnings and increased unemployment or inactivity. Considering individuals below the poverty line (R$ 261 / US$ 49.43 per month), Brazil had 10.97% before the pandemic, decreasing to 4.63% in September 2020 as an effect of the Emergency Allowance (Neri, 2021). However, during the first three quarters of 2021, the number of individuals living below the poverty line increased to 16.1% as financial support was suspended. This figure was higher than in the pre-pandemic

period, meaning that in the early months of 2021, an additional 25 million individuals lived in poverty. The new Brazil Allowance Program alleviated this scenario, but it is still worrisome.

In addition to federal financial support, subnational governments created cash transfer programs without coordinating with the federal program or other state and municipal programs. Other strategies included vouchers, food stipends, food parcels, and meal distribution, but they were restricted to short-term emergencies. For instance, the government of Santa Catarina waived electricity bills, and the government of Mato Grosso provided food parcels (*cesta basica*) to poor families. One of the consequences of this uncoordinated mix of national, state, and local policies was that people living in different states were entitled to different social benefits. It is difficult to assess the impact of these programs because Brazil has 27 states and more than 5,000 municipalities with no single information system to register policies implemented in these jurisdictions. This makes understanding the effects of the Emergency Allowance even more complicated. Future comparative, qualitative studies might help to understand the impact of these subnational policies.

A major problem with the Emergency Allowance was that its implementation bypassed SUAS's structure. Individuals who received the Emergency Allowance did not need to enroll in *CadÚnico*, an instrument by which municipal social assistants register and monitor these beneficiaries, developing a closer relationship with them. To facilitate the inclusion of new families, the federal government developed an online app called "ExtraCad." This system was necessary, given the uncertainty about SUAS's capacity to operate during the pandemic as most of its services require face-to-face interactions and because of other impediments due to social distancing (World Bank, 2021b). However, the new system distorted the Program. Although the Emergency Allowance targets families, not individuals, the number of households with one individual increased by 100%. This means that more than one person in the same household received the benefit as there was no change in the demographics or fertility rate to explain such an increase (Fernandes & Watanabe, 2022). The distortion can be attributed to the government's inadequate communication about the program and its faulty design and monitoring strategy. Without *CadÚnico* registration data, subnational governments were restricted in their capacity to tackle inequalities (Lima-Silva et al., 2020; Segatto et al., 2022).

Brazil's generous social policies were uncoordinated with public health interventions. Several studies have identified that social policy initiatives alone are insufficient in mitigating the social consequences of the pandemic (Greer, Jarman et al., 2021; Greer, King et al., 2021). They need to be accompanied by and coordinated with public health measures, including regulations on testing, social distancing, and mask-wearing.

6 Conclusion

This chapter illustrates how the COVID-19 pandemic exacerbated inequalities in Brazil. Studies in health and education inequalities suggested great variation in the impact of the pandemic among different jurisdictions and socioeconomic groups. Brazil's strongest response was in social assistance policy, which relied on a conditional cash transfer structure to expand benefits to vulnerable populations. Yet, its design and monitoring systems were inadequate, which had consequences for many families receiving benefits. The inadequate registration of households affected subnational governments because they rely on the Emergency Allowance database (now Brazil Allowance Program) to formulate policy.

Social inequalities have multifactorial causes, and it is not our aim to point to its determinants. Previous studies suggest that Brazil's pandemic response was controversial at best. The federal government adopted a denialist approach to the pandemic with uncoordinated and poorly designed policies (Fonseca, Nattrass, Arantes, et al., 2021; Segatto et al., 2022). This affected the extent to which health and social policies could curb (or compensate) the devastating effects of COVID-19.

Any crises that affect health and education, especially in low- and middle-income countries, have a pronounced impact on the domestic economy and the fabric of society. Brazil's economy is challenged by low productivity and a shortage of highly qualified professionals. It is, therefore, vulnerable to further dislocation of a curve that is already skewed toward a less balanced distribution (World Bank, 2016). A chronically underfunded and understaffed school system, where the digital divide remains a permanent challenge (Cardozo Sarli & Elora Fernandes, 2021), tends to be on the brink of chaos when schools closed due to the pandemic and no reliable alternative was offered to the disenfranchised segments of society. Instead of inclusion, the current social and digital divide tends to increase to unacceptable levels.

Notes

1. World Bank database available at https://data.worldbank.org/indicator/SI.POV.GINI?locations=BR (accessed October 16, 2022).
2. Being the latter frequently secondary to structural deficiencies of the health information systems.
3. Exchange rate R$ 5.20. "Monitoramento dos Gastos da União com Combate à COVID-19" https://www.tesourotransparente.gov.br/visualizacao/painel-de-monitoramentos-dos-gastos-com-covid-19 (accessed September 22, 2022).
4. Private health insurance covers 25% of the population, mostly through employment benefits packages. People with private health insurance are also entitled to use the public healthcare system, which they usually do to cover high-cost drugs and treatments they are not entitled to under their private contracts.
5. Key normative acts of the Ministry of Citizenship during the pandemic can be accessed here: https://www.gov.br/cidadania/pt-br/acoes-e-programas/Covid-19/MC_Cartilha_Coronavirus.pdf (accessed October 5, 2020).
6. The ICT in Education survey is conducted by the Regional Center for Studies on the Development of the Information Society and the Brazilian Network Information Center since 2010. It investigates access to, use and appropriation of information and communication technologies in the educational community, especially by students and teachers, in regular education schools.
7. In addition, municipal social assistance services refer individuals to other services (e.g., job searching, alcohol and child abuse prevention, community relations, and policies, especially health care and education) through *CadÚnico*.

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CHAPTER 5

The Coronavirus Pandemic and Inequality in Italy

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1 Introduction[1]

Italy was the first country in Europe to be hard-hit by the SARS-CoV-2 virus pandemic, and its initial response to the daily increasing numbers of cases and then deaths brought it to the international media and government arena (e.g. the daily news on the COVID-19 cases), attracting, often unduly, criticism (De Maria, 2020; Pisano et al., 2020).

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The spread of the virus, especially during the first wave, was concentrated mainly in the Northern regions of Italy: Lombardy, Veneto and Emilia-Romagna (OECD, 2021a). The COVID-19 pandemic hit hard an area of Italy which is both wealthier, healthier, and with a more advanced and—in many ways—better healthcare system than the rest of Italy (OECD, 2021a; Bosa et al., 2021a, 2021b, 2020; Ghislandi et al., 2020). However, it spread quickly to all other areas, in a context of pre-existing inequalities between the North and the Centre/South of the country. To better understand the complex and far-reaching effects of the COVID-19 pandemic and Italy's response to the emergency on both health and socio-economic inequalities, it is important to have a picture of these pre-existing inequalities in the country.

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Italy has, in fact, a long history of large disparities in wealth, health and socio-economic development between the Northern and the Central/Southern regions of the country, termed the "*Questione meridionale*" or "*Southern problem*". An analysis by Putnam (1994) highlighted how the large differences in performance can be related to differences in civic engagements, deeply rooted in historically different governing systems. The "southern problem" is still considered the biggest unresolved issue in Italy and, despite the great development and specific policies addressed to find a solution to it, the economic and social differences between North and South have persisted or even increased in recent years (Pescosolido, 2019; Davis, 2012).

The last major economic crisis in the late 2000s, which increased both absolute and relative poverty and unemployment levels, widened income inequality both between regions and between social groups within regions (Ferrè and Ricciardi, 2015). As in most OECD countries, the so-called middle-class was particularly affected by the recession: social mobility decreased dramatically, and wealth became increasingly concentrated.[2]

New forms of inequalities have also emerged. During the last three decades, after having been for centuries a country of migrants, Italy gradually became a multi-ethnic country. Today, almost 1 in 10 citizens were born outside Italy (ISTAT, 2021b). Despite Italy ranking higher in terms of integration policies compared to other European countries, both regular and undocumented migrants are still frequently subject to various types of legal and economic constraints that often translate into deep socio-economic and health inequalities (MIPEX, 2020).

Finally, intergenerational inequalities have also increased over time: social mobility has decreased to a low level as compared with other countries, while inequalities in opportunities in both employment and wealth have increased over time favouring the older generations (Forum Delle Diseguaglianze, 2019). All these forms of inequality are also usually more prominent in the poorer Southern regions of the country.

The rest of the chapter is organized as follows. We start by summarizing the main features of the Italian National healthcare system in Sect. 2 explaining some of the key dimensions of existing socio-economic and health inequalities before the pandemic outbreak. Section 3 reports on the main published evidence of the impact of the pandemic on socio-economic inequalities, health, and access to health care. This section also describes the main interventions introduced by the Italian government to mitigate the impact of the pandemic on the economy and individual

households. It focuses on the impact of lockdowns, occupational inequalities and on how the health risks of COVID-19 were distributed. Similar to the work of Blundell et al. (2020), we relate these to some other existing dimensions of inequality, namely, geography, socio-economic status, age, gender, and migrant status. We report on the impacts of the crisis on employment opportunities and the ability to work and describe the main interventions introduced by the Italian government to mitigate the impact of the pandemic on the economy and individual households. Following Wilkinson and Pickett (2010) and Pickett and Wilkinson (2015), we then compare regional inequalities in health and healthcare access and use considering not only regional inequalities in absolute levels of income and wealth but also the range of inequality within regions between the richest and poorest individuals Sect. 4 concludes by discussing the policy implications of our findings.

2 The Institutional Context and Socio-Economic Inequalities Before the Pandemic Outbreak

The Italian National Health Service (*Servizio Sanitario Nazionale*, SSN) was founded in 1978 (Law number 833/78) on principles of universal and equal access to all healthcare services for all citizens, including legal foreign residents.[3] The SSN is a tax-based system, funded through both corporate and value-added tax revenues collected centrally by the national government and then distributed to 19 regional governments and 2 Autonomous Provinces of Bolzano and Trento.

Since the early 1990s, the Italian regions have been granted powers to plan, organize and finance healthcare services locally, de facto transferring power from the central government to the regions. The 2001 constitutional reform introduced an essential healthcare benefits package (defined as *Livelli Essenziali di Assistenza*, LEA), guaranteed to all citizens, and a soft requirement to balance regional health budgets. However, since its inception and despite its founding principles, the Italian SSN has always been characterized by historic and long-standing inequalities in health, access to healthcare services, and their quality, with a perceived and often realized better quality of care in the Northern wealthier regions compared to the poorer Central and Southern regions (Toth, 2014). Across the country, pre-COVID-19 geographical disparities were also observed in quality of hospital services (e.g. Wang et al., 2020; Nuti et al., 2012, 2015).

The decentralization stressed disparities also in terms of healthcare expenditure and financial and fiscal stability, with many regions failing to keep a balanced budget and requiring bailing-out assistance from the Central government, only three years after the constitutional amendment (Toth, 2014). Financial bail-outs are only granted after the production of detailed recovery plans, outlining "strategic actions to reduce costs and balance the budget while maintaining the essential levels of care and the quality of care" (Ricciardi and Tarricone, 2021). This led to an overall improvement in healthcare performance, although Southern regions continue to score substantially lower than Northern regions in meeting standards as assessed by the Central government evaluations, and this is accompanied by increasing patient mobility from the Southern to Northern facilities.

Healthcare spending has continued to increase but at a slower pace than GDP (OECD, 2021a), with GDP and healthcare spending per capita still lower in the Southern regions (Ricciardi and Tarricone, 2021).

Before the pandemic outbreak, per capita income was higher in Northern industrialized regions, with the same regions also showing lower levels of income inequality as measured by the Gini index (Fig. 1, Table 1). A similar North–South gap appears when considering the percentage of households at risk of poverty (Fig. 1) as well as most indicators related to the Sustainable Development Goals (SDGs) (ISTAT, 2021a). Among OECD countries, Italy has the largest regional disparities in unemployment rates (9% vs 7% of EU average in December 2021) and educational attainment rates. Dropout rates were 11% in the North in 2019 and higher in Southern regions, on average 16.3%, with the exceptions of Abruzzi and Molise (8%) (OECD, 2020, 2021d).[4]

In terms of health and health inequalities since 2000: life expectancy has improved and all regions were in the top 20% healthiest OECD regions, with only the exception of Campania and Sicily (Southern Italy) (OECD, 2021a). However, regional inequalities in self-reported health status have emerged over time (Franzini and Giannoni, 2010). At the national level, life expectancy at birth increased by 2.5 years between 2005 and 2019, reaching the remarkable level of 83.2 years in 2019 (Table 4). However, some interregional variations were observed in 2019, with a gap of almost 3 years between the highest life expectancy in Trentino-Alto-Adige and the lowest in Campania. Similarly, in terms of life expectancy at 65 years old, which was equal to 21 years in 2019, there was a gap between the Northern and Southern regions (Table 4).

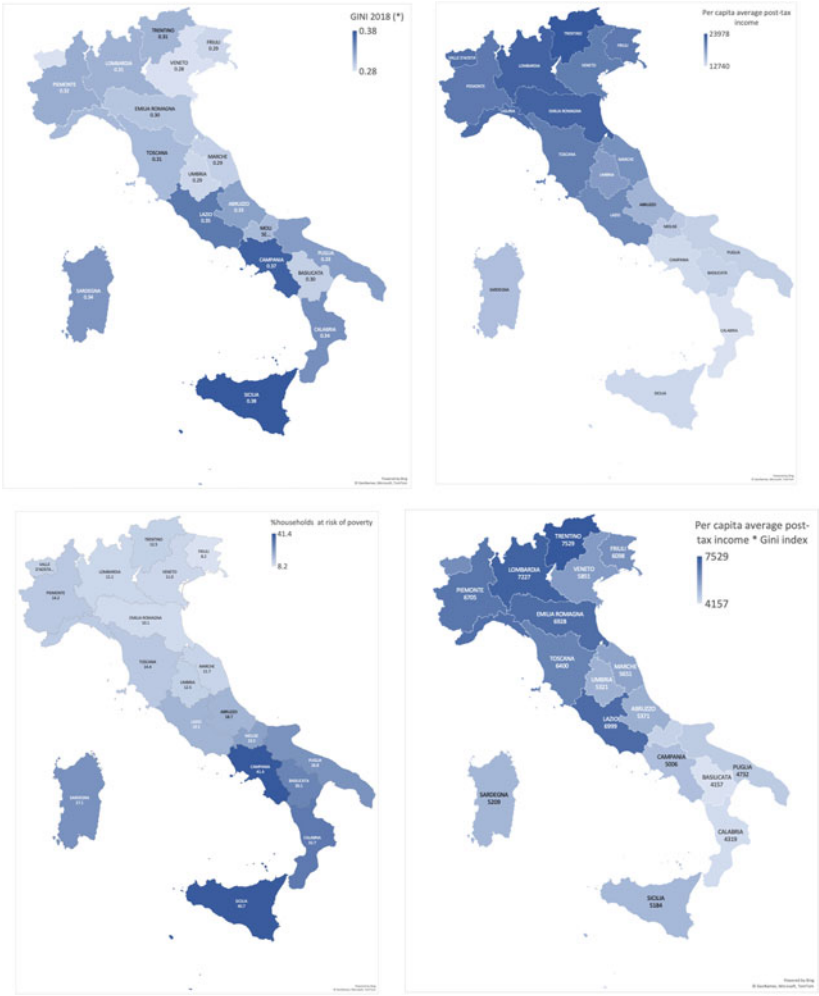

Fig. 1 Four Measures of Inequality in Italian Regions before the pandemic (2018–2019): (**a**) Gini coefficients for regions, 2018, (**b**) per capita post-tax income by region, (**c**) percentage increase in rate of poverty by region), and (**d**) per capita average post-tax income * Gini coefficient by region (*Source* ISTAT [2021a], Table 1)

Table 1 Main decrees in support of the economy and their budget

Measures	*Date*	*Budget (Current billion EUR)*
Cura Italia Law Decree	17th March 2020	25
Liquidità Law Decree	8th April 2020	400
Rilancio Law Decree *n. 34/2020*	19th May 2020	55
Agosto Law Decree	14th august 2020	25
Ristori bis Law Decree	28th October 2020, 10th November 2020	5.4
Sostegni and Sotegni bis Law Decree	25th May 2021	72

Source IMF (2021)

In terms of gender health inequalities, in 2019, overall life expectancy for women (85.4 years) was over 4 years higher than life expectancy for men (81.1 years) (ISTAT 2022b). However, some regional differences persisted, despite narrowing slightly between 2010 and 2019 (OECD, 2021a). For example, in the Southern region of Campania, both men and women have a lower life expectancy: Italian men have, on average, 2.2 years lower life expectancy than men born in the Central region of Umbria, and women have 2.7 years lower life expectancy compared to women born in the Northern Autonomous Province of Trento (OECD, 2021a).

Another related important metric to consider is life expectancy in good health or free from disability.[5] In Italy, healthy life expectancy at birth ranges from 49.7 years in Calabria to 65 in Trentino-Alto Adige (see Table A1 in the appendix). The national average was 58.6 years in 2019. If we limit the observation to the population over 65 years of age, approximately 10 years are spent on average without limitations in daily activities at the national level. This figure ranges from 11.3 in Trentino to 7.8 years in Sicily (see Table A1 in the appendix).

Most of the Southern regions report consistent differences of 3–5 years lost to preventable deaths compared with Northern and Central regions. Before the pandemic, the major causes of preventable deaths were most frequently inadequate primary prevention, with risk factors related to unhealthy habits more prevalent in Southern regions, where rates of obesity/overweight, and sedentary lifestyles are higher and where lower

per capita income also negatively affects a healthy lifestyle and ultimately health (Ricciardi and Tarricone, 2021).

Finally, income-related health inequality has been relatively low in Italy but has favoured the higher income groups (Wagstaff and van Doorslaer, 2000; van Doorslaer and Koolman, 2004), with recent evidence of an increase over time in this disparity (OECD, 2019). Income-related inequalities in healthcare utilization also have increased over time (OECD, 2019) in terms of access to and utilization of diagnostic tests and specialist visits (Masseria and Giannoni, 2010; Giannoni, 2010; Glorioso and Subramanian, 2014). The pro-rich inequity in specialist visits also appears across regions, because richer regions are better-endowed (in terms of health facilities) (van Doorslaer and Jones, 2004). Evidence is mixed regarding equity of access to primary care visits. Primary care was found either favouring the worse-off (Atella et al., 2004), fairly distributed (van Doorslaer, Koolman, and Jones 2004; van Doorslaer and Masseria, 2004; Bago d'Uva and Jones, 2009; Glorioso and Subramanian, 2014) or pro-rich (Masseria and Giannoni, 2010). There was low or no inequity in inpatient hospital care (van Doorslaer, Koolman, and Jones 2004; Masseria and Giannoni, 2010; Masseria and Paolucci, 2005). Prevention and early diagnosis are unequally distributed in favour of the richest population groups, with the highest levels of inequity found among people in good health (Glorioso and Subramanian, 2014). Income-related inequity in healthcare access, proxied by unmet needs for medical and dental visits, emerged over time, although initially without a clear North–South gradient (Giannoni, 2010). However, after the 2008 economic recession, income-related horizontal inequalities in access to medical care emerged and were higher in the South (Citoni et al., 2021). Just before the pandemic outbreak, in Italy only 2% of the population was known to have unmet needs, mainly because of costs and waiting times; however, the proportion was 5% for the lowest income class (quintile) vs. 1% for individuals belonging to the highest quintile. However, percentages in the poorest Southern regions were almost twice as high as in the richer regions of the North (OECD, 2021a, see also Citoni et al., 2021).

The 2008 global economic crisis also affected Italy's vertical equity in health financing. Revenues from progressive sources of health financing decreased, while the relative weight of regressive sources, such as indirect taxation, increased; out-of-pocket payments for health care were also a problem before COVID-19, leading to unmet demand for health care

for financial reasons, particularly in the Southern regions (Citoni et al., 2022). These changes in the health financing mix, coupled with increasing income inequality, changed the Italian health financing system, which had been progressive up to the early 90s, (Wagstaff et al., 1992, 1999), to a regressive system in 2015, with inequity levels higher in the poorest Southern regions (Citoni et al., 2022).

3 The Impact of the Pandemic

Income Inequality, Gender Gap, Intergenerational Differences and Poverty During the Pandemic

Since the beginning of the pandemic, income inequality, the gender gap, intergenerational differences and poverty have all worsened dramatically worldwide due to the economic crisis triggered by business closures, travel restrictions and "stay at home" policies (Deaton, 2021). The connection between measures to contain the spread of the virus and inequalities during the pandemic has been widely addressed in the literature (Adams-Prassl et al., 2020; Angelucci et al., 2020; Blundell et al., 2020; Brewer and Tasseva, 2020; Chetty et al., 2020; Deaton, 2021; Stantcheva, 2022). However, as the pandemic is still ongoing, most of the analysis is related to forecasts and estimates based on indexes (Barbieri et al., 2022; Clark et al., 2020; Palomino et al., 2020; Bonacini et al., 2021a; Gambacorta et al., 2021), analyses of past pandemics (Carillo and Jappelli, 2020; Furceri et al., 2020, 2021; Emmerling et al., 2021; Galletta and Giommoni (2020); Sayed and Peng, 2021) and surveys conducted during the first wave of the COVID-19 pandemic (Carta and De Philippis, 2021; Cerqua and Letta, 2022; Gambacorta et al., 2021; Stantcheva, 2022). Most of these studies depart from addressing the effects of social distancing and lockdown on the spread of the virus (direct effect), to assessing whether such measures have also had additional economic repercussions (indirect effects) including effects on economic growth, unemployment, income inequality and poverty. These studies on Italy have been of two types. The first type of study focused on the consequences of the pandemic in terms of income inequality, gender gap and poverty. The second, more specifically, examined the effectiveness of the social insurance programmes put in place to support income losses associated with business closures.

The Impact on Employment

In Italy, it has been estimated that, during the first wave of the pandemic (March–May 2020), employment fell by around 3% and that the crisis caused a 19.5% decrease in business births and a 7.5% increase in business deaths (see, e.g. Cerqua and Letta, 2022). The level of unemployment at the start of the pandemic (January 2020) was 9.7% which fluctuated throughout the following months, decreasing in March-June 2020 below the pre-pandemic level and increasing afterward. However, in the second half of 2021, unemployment was below the pre-pandemic level. A similar unemployment pattern has been experienced by the 15–24 years old population (ISTAT, 2022a). In terms of job loss, at the beginning of the pandemic; it was rather equally split among Italians by gender. However, there was a difference between EU citizens and non-EU citizen workers. Among the former, the majority losing their jobs were females (62%), while among the non-EU workers, the majority were male (57.9%) (*Ministero del Lavoro e Delle Politiche Sociali*, *Banca d'Italia*, and ANPAL, 2022). Finally, the individuals mainly affected by unemployment were those between 24 and 44 years of age, and individuals characterized by lower skill levels.

The effects of the pandemic were also reflected in the gender employment gap. Recruitment collapsed at the start of the pandemic, and only in December 2021 did the recruitment level go back to being on par with the pre-pandemic trend. However, official data (*Ministero del Lavoro e Delle Politiche Sociali*, *Banca d'Italia* and ANPAL, 2022) highlight that the upturn favoured male workers, as female recruitment was well below the pre-pandemic level. In January 2019, unemployment rates for females and males were 11.4 and 9.7%, respectively, which became 10.5% and 8.8% in June 2020, and 10.3% and 8.4% in November 2021, depicting an unemployment decrease that continued to favour males. Further analysis highlights that, while there has been a decline in the number of jobseekers particularly among females (ISTAT, 2022a), the workforce has been decreasing through the years, also reflecting an ageing population. Finally, Hupkau and Petrongolo (2020) reflecting on gender differentials in employment during the pandemic recognize that working from home (WFH) was easier for some female-dominated sectors, such as teaching, compared to the typical male-dominated sectors, such as construction. But this, of course, does not help explain the persistent gender gap in unemployment favouring males.

At the start of the pandemic, Italy had the lowest level of telework in Europe and the possibility of WFH has been seen as the opportunity for a cultural shift in Italian society, where caring and housekeeping responsibilities are still gender-based (Bonacini et al., 2020 and 2021a). In 2020, 13.7% of the population worked from home (+9% compared to 2019), of which 12.3% were males and 15.7% were females. In terms of regional distributions, 15.9% of the population working from home was located in the North-West, 13.3% in the North-East, 15.4% in the Centre, and 10.1% in the South (ISTAT, 2021b). Despite WFH being associated with an increase in average labour income (Bonacini et al., 2020 and 2021a), this increase is not equally distributed among employees. On average, individuals who are male, older, at least high-school graduates and highly paid are favoured by the opportunity to work from home (Aina et al., 2021a; Bonacini et al., 2020, 2021a, and 2021b), which is worsening the gender gap, the intergenerational gap, the educational gap and the pay gap among workers.

WFH has indeed forced men to increase time spent on child care (+51% compared to pre-COVID) and housework (+40% compared to pre-COVID-19) but women have nonetheless embraced a larger share of the load due to school closings and more people eating all their meals at home (+68% and + 61%, respectively) (Del Boca et al., 2020). The gender disparities in workload at home have been greater in the South (+70%) compared to the North (+61%) (ISTAT, 2021a). A potential consequence of these unequal shares is the decline in employed rates for women (aged 25–49) who take care of preschool children versus childless ones (ISTAT, 2021a).The differential between women with childcare responsibilities and those without showed up in the North-West (−2.2%) and the North-East (−2.1%) which was affected as much as the South (−2.1%), but far more than the Centre (−1.4%) of the country.

Between 2019 and 2020, there was a general decline in occupational rates (percentage of the population employed) except for the main islands (Sicily and Sardinia) which experienced a surge in employment for the specific demographic group, women aged 25–49. By contrast, official statistics indicate that the employment of women with preschool children in the North-East has continuously declined since 2015, while the other macro areas of the country (North-West, Centre, and South) recorded a slight increase in their 2019 employment (ISTAT, 2021a). These figures by themselves are not sufficient to provide a clear explanation. Such additional factors as changes in the proportion of childless women, also need

to be investigated. However, the cultural expectation that mothers are the main child providers and this is hindering their access to employment certainly applies. This situation was also clearly exacerbated during the pandemic when nurseries and primary schools were closed due to lockdown and restrictions on people movements prevented families with young children from benefiting from the support of grandparents.

Finally, the last consideration in the discussion of employment is the group of individuals "Not in Employment, Education or Training" (NEET). Despite the small increase in the number of NEET aged 15–34 from 2019 to 2020 (+1%), the total proportion is still very high at 25% in 2020, with the situation exacerbated in the South (34%) and less dominant in the North (18%) and with a considerable split nationally between women (29%) and men (21%) classified as NEET (ISTAT, 2022b). According to Aina et al. (2021b), the probability of being NEET significantly increased during the pandemic in Italy, but heterogeneously between age cohorts and geographic regions. The most affected categories have been young people (aged 25–34) and those living in the North-West. Women have been more affected than men, especially those experiencing motherhood and living in the South. Investment in education (including active policies conducted at the regional level such as training courses) reduces the probability of being NEET as the individual would be classified as engaged in education, but the risk of becoming NEET and being trapped in this status is particularly high for the age-group 25–34 and for Southern young individuals especially because of slow school to work transition and poorest labour market conditions. Moreover, Aina et al. (2021b) also find that foreigners and one-parent families are more likely to be NEET, and consequently more likely to become poor (Ministero del Lavoro e Delle Politiche Sociali, 2021), while active participation in civil society significantly reduces the probability of being NEET.

The Impact on Poverty and Social Insurance Benefits

In 2020, the total number of Italians in poverty rose to 2005 levels with more than 2 million families (+333 thousand, compared to 2019), more than 5 million people (+1,009 thousand compared to 2019) and more than 1 million minors (+4% compared to 2019) living in poverty (ISTAT, 2021c). There was a higher increase in poverty between 2019 and 2020

among families with non-Italian members and living in the North of the country. (Ministero del Lavoro e Delle Politiche Sociali, 2021).

Income inequalities have led to a non-negligible increase in poverty (Brunori et al., 2020), which forced the government to adopt measures to support the economy and the labour market. Regarding the effectiveness of the social insurance benefits put in place to support income losses, both Gallo and Raitano (2020) and Carta and De Philippis (2021) use microsimulations to analyse the cushioning effects exerted by the government to offset income inequality due to the pandemic. Carta and De Philippis (2021) found that, in the short term, the social insurance benefits to sustain Italian households worked effectively on average, but long-run effects will depend on how long the government will be able to support the economy with safety nets and on how long the market will take to reabsorb the workforce currently not employed in the sectors most hard-hit by the crisis. Gallo and Raitano (2020) found that, on average, workers' income loss approximately halved (from −21.5 to −11.8% in the worst scenario of a pandemic) when emergency benefits are considered, whereas the drop in household incomes declined by about 2/3 when emergency benefits targeted to workers and minimum income schemes are considered (from −19.8 to −6.1% in the worst scenario of a pandemic). Even with the governmental support, low-income individuals faced worse labour market outcomes and suffered higher psychological costs compared to highly educated and white-collar workers (Galasso, 2020).

Regarding the effectiveness of the social insurance benefits put in place to support income losses associated with business closures, using administrative data from *Campione Integrato Delle Comunicazioni Obbligatorie* (CICO), Casarico and Lattanzio (2020) found that before the pandemic, workers employed in non-essential activities were in majority men, younger than 35 years old, located in the North of the country and with lower levels of education. When looking at the change in hiring's and separations and decomposing them by age, gender, region, type of contract (open-ended or temporary), education level and sector (essential vs non-essential activities), they find that from the ninth week of the year (beginning of March 2020, outbreak of the pandemic) there was a pronounced decrease in hiring's and voluntary terminations. At the same time, firings and quits rapidly increased but then dropped significantly as soon as the government introduced firing freeze policies (17 March

2020), reflecting the easing of access to short-time work compensation schemes.

Menta (2021) and Cantò et al. (2021) focus on income distribution and poverty rates and find that poverty increased more intensively for young individuals and women and that the lockdown at the beginning of the COVID-19 crisis (March–May 2020) implied a loss of original income (−0.89%). As a consequence, governments lost substantial amounts of income tax revenue (−0.15%) and social insurance contributions (−0.28%), reducing their financial burden on the individuals who experienced an income loss. Despite additional resources transferred as state benefits (+0.45%), the loss of disposable income for families was around 5%. Both income inequality, measured by the Gini and the Atkinson indexes, (+0.006 and + 0.010, respectively), and the poverty rate (+4% in the overall population, + 7% among the children), increased during the first wave of the pandemic. Confirmation of the positive effects of the social insurance benefits are found by Clark et al. (2020) who find that at the start of the pandemic the income inequality increased but once the *ammortizzatori sociali* (a form of social insurance benefits) was introduced, it mitigated the impact that lockdown and other restrictions would have otherwise had.

Measures Adopted by the Italian Government to Mitigate the Impact of the Pandemic on Employment and Socio-Economic Inequalities

The seriousness of the COVID-19 pandemic, the lockdown measures introduced to contain the spread of the virus, and it is soon to be realized knock-on effects on the Italian economy, all contributed to convincing the government that important spending programmes to support the economy could not be avoided, despite the limited room for manoeuvring through public interventions. These interventions were introduced for several different sectors of the economy. Through a series of Law Decrees, the government introduced several measures to support businesses, self-employed workers and other professionals.[6] At the same time, a prohibition on dismissals relying on either collective or individual redundancy was introduced in March to be active for firms with more than 250 employees until April 2022 (2021 Budget Law n. 234, 2021). In terms of income and family support, spending was increased significantly, especially in the initial stage of the pandemic. The list of interventions relevant

Table 2 Main policies by areas

Area	*Policy Measure*	*Legal basis*
Business	Grants for SMEs	Law Decree n. 34/2020 (*Rilancio*)
	Corporate income tax credits	
	Social security contributions reductions	Law Decree n.104/2020
	Tax deferrals	Law Decree n.137/2020
	Contingent liabilities	Law Decree n. 41/2021 (*Sostegni*)
Income/Families	Emergency income subsidy	Law Decree n. 73/2021 (*Sostegni bis*)
	Layoff (CIG *Cassa Integrazione*)	
	Allowance for self-employed	
	Extraordinary Parental Leave	
Labour market	Ban to redundancies	Introduced on March 17, 2020, still ongoing for some sectors

is reported in Table 1, while in Table 2 we show the policies separately by areas (business, income support, labour regulation).

Although the importance of the overall intervention (and the budget allocated) makes it unique in the history of Italian public finance, its size, when compared to other EU countries such as Germany or the UK, was rather limited. Indeed, according to the IMF, during the period March 2020-July, 2021 Italy spent around €150 billion in non-health-related areas, against the €340 billion of Germany and the £270 billion of the UK. For the same interventions, the USA spent around 5 times the per capita budget of Italy (IMF, 2021).

From the point of view of business, public interventions were of two different types: general aids and tax deferrals and postponement of payments liability. General aids were introduced to increase liquidity and support consumption, which is of vital importance for self-employed workers and professionals. For example, non-refundable grants were immediately introduced for individuals whose business/self-employed work generates up to €5 million and who recorded at least a 33% drop in revenues in April 2020 compared to April 2019 (Italian Ministry of Economics and Finance, 2022). Tax deferrals and contingent liability measures were aimed at reducing the lockdown-related economic burden, thus putting companies in the position to restart whenever possible.

Despite these measures, the economic crisis caused by the pandemic hit Italian firms very hard, leaving many observers to wonder whether the

government support policies were indeed enough. According to ISTAT, over two-thirds of Italian firms, especially small-size firms, reported a significant reduction in before-tax revenues in 2020 (ISTAT, 2021b) Moreover, around 73,000 small companies closed in 2020; and only 25% of the pandemic-related economic losses were covered by the interventions (CGIA, 2020). At the same time, while contingent liabilities in the form of guarantees aimed to unlock more than €750bn for families and companies were to be allocated, according to the IMF, the total contracted guarantees summed up to only one-fourth of the figure announced (IMF, 2021).

However, the economic crisis, experienced by many businesses, might have translated into an even larger economic downturn if a combination of two policies had not been implemented: (i) a ban on redundancies, imposed on all firms in March 2020; (ii) the introduction of income support policies for employees in both the formal and informal markets, and the self-employed. The ban on redundancies did not require that companies had to pay salaries to workers even if inactive. Rather, this measure forced companies to postpone any downsizing decisions to a post-emergency period, reducing the panic and, even more importantly, the shrinking of consumption following a possible wave of redundancies leading to workers being let go in the middle of a pandemic. The key family income support measures are summarized in Table 3.

Health and Healthcare Inequality During the Pandemic

COVID-19 affected individuals in different ways according to gender, age or presence of underlying conditions (Citoni et al., 2021). In terms of age and gender, we know from a recent report by the Italian National Health Institute (ISS—Istituto Superiore di Sanità) that 138,099 SARS-CoV-2 patients have died in Italy from the beginning of the surveillance to January 2022, the mean age of deaths was 80 years (median = 82, range 0–109, IQR (1st quartile = 74; 3rd quartile = 88), with the majority of deaths occurring among men (56.4%) (ISS, 2022). In Italy, men are dying from COVID-19 at a higher rate than women in all age groups, (Marconi, 2021), except for those over 90 years old, but that is only because 72% of the Italian population over 90 years are women (ISS, 2022).

There was an estimated reduction of 1.2 years in life expectancy between 2019 and 2020 (from 83.6 to 82.4). This reduction was higher in the North, as COVID-19 predominantly affected this area of the

Table 3 Family income support measures

Family income support measure	*Who*	*Amount*	*Time*	*Legal Basis*
Emergency income subsidy (*Reddito di Emergenza*)	Households	€400–€840 per household (depending on household's size, age and presence of people with disabilities for two months	Provided for two months, with possibility of extension for other three months in 2020 and for other seven months in 2021	Law 34/2020, May 2020 Law Decree n. 104/2020 Law Decree n. 137/2020 (*Sostegni)* Law Decree n. 41/2021 (*Sostegni bis)* Law Decree, n. 73/2021
Layoff (*Cassa integrazione -CIG*) Furlough measures (*Assegno ordinario*)	Employers to help pay salaries	Salaries of employees who were affected by the pandemic because of reduced working hours or inactivity	Available for max 40 weeks in 2021	Budget Law 2021 Law Decree n. 73/2021 (*Sostegni bis*)
Extraordinary parental leave (*Congedo parentale straordinario*)	Parents who couldn't work because of school closures (2020) or because of COVID-19-related issues affecting their children (infection, self-isolation, etc. (2021)	Up to 50% of income	Available for a maximum of 30 days in 2020 and for the lengths of absence from work due to children's infection/self-isolation in 2021	Law Decree, 2020 (*Cura Italia*) Law Decree n. 41/2021 (*Sostegni)* Law Decree n. 73/2021 (*Sostegni bis*)

country (OECD, 2021a), which has resulted in a narrowing of the North–South gap in life expectancy. Despite the pandemic, Italy remains a nation with one of the highest life expectancies in the EU (OECD, 2021a). In terms of socio-economic characteristics, and similar to other European countries, Italy's lowest income individuals are more likely to report health conditions such as chronic diseases (diabetes, hypertension, chronic respiratory conditions) that make them more vulnerable to COVID-19 and to have problems in accessing health care (Blundell et al., 2020). Moreover, in the case of Italy it was found that income inequality as measured by the Gini index had an independent and more powerful effect on life expectancy than per capita income and education (De Vogli et al., 2005). Therefore, we expect that the pandemic will have disproportionately affected these individuals, thus increasing income-related inequity in health, and in access and use of healthcare services.

Figure 2 shows the shift in the life expectancy in males and females free from disability at 65 years of age which was obtained by fitting a regression, using regional data for 2019–2020 (Table A1).

Before the pandemic, quality of life in Italy was found to be lower for people with a low level of education (having only elementary or lower

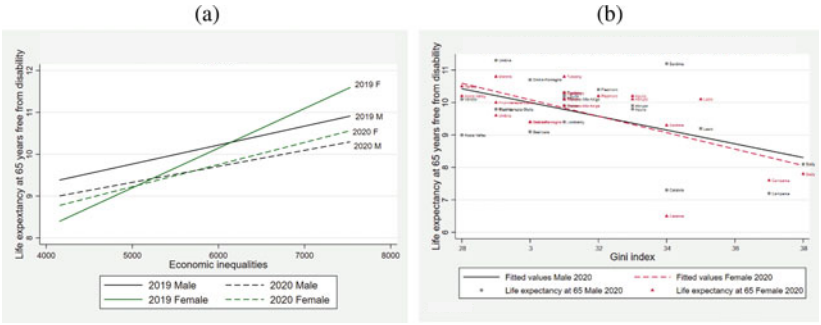

Fig. 2 Life expectancy free from disability at 65 years for male and female vs. **a** economic inequality 2019–2020 and vs **b** Gini index in Italian regions (the lines in the figure are the fitted values from a linear regression of life expectancy at 65 years free from disability for male and female in the 21 Italian regions vs. a measure of income inequality. The latter is the product between per capita post-tax income and the Gini coefficient in the 21 Italian regions. Data are reported in Table A1 in the Appendix) (Data *Source* ISTAT [2021a] [2021b] [2021d])

middle school licence), low income, retirees and housewives (Scalone et al. 2015; Savoia et al. 2006). A recent study conducted on the self-assessed quality of life during the pandemic found similar results (Finch et al. 2022). Similarly, Long et al (2021) reported that the health-related quality of life of the Italian population does not seem to have been affected, on average, by the COVID-19 pandemic (Long et al., 2021). The only remarkable dimension of concern is the age gradient on mental well-being, with younger persons reporting worse mental well-being than older persons (Meregaglia et al. 2022). Figure 3 compares the findings of the two studies measuring the EuroQoL5D on the Italian population: the one published in 2015 by Scalone and colleagues and the one published in 2021 by Ardito and colleagues. Although the two studies adopted different methods of population sampling (the 2015 study focusing on a sole region while 2021 is a national survey) the dramatic changes that occurred in the depression dimension led us to warn about the mental health conditions of young people.

One of the indirect effects of COVID-19, and an unintended consequence of the lockdown measures imposed, has been the emergence of mental health conditions, among previously unaffected people, and the worsening of pre-existing mental health conditions. A recent study by

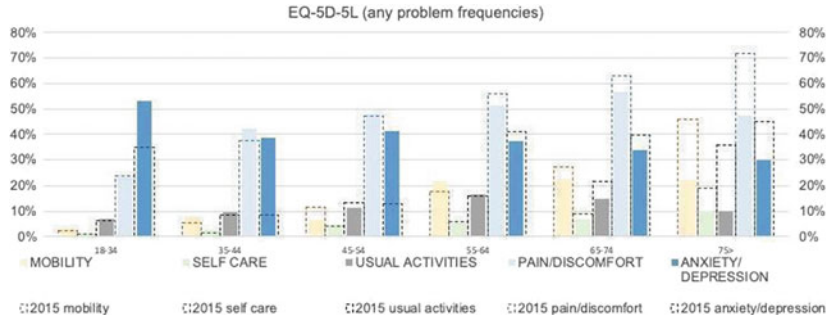

Fig. 3 Frequency of problems (any level) by age class and EQ-5D-5L dimensions (Comparison between frequencies of any problem according to five dimensions of health-related quality of life as measured by the EQ-5D-5L in 2020 [Meregaglia et al., 2022] and in 2014 [Scalone et al., 2015]. The survey in 2020 was administered online to a representative sample of the national Italian population, the one in 2014 was performed through phone interviews with a representative sample of the population living in the Lombardy Region)

OECD stated that Italy ranked first among 15 OECD countries in terms of the proportion of the total population at risk of depression, which rose to 40% in 2020 from a low of 9% in 2019, and which was substantially higher than the 27% OECD average (OECD, 2021d). Loneliness and feelings of being left out of society grew in Italy as the pandemic progressed, with the share of the population at risk of anxiety reaching 30%, compared to the 26% OECD average (OECD, 2021d). Nevertheless, during this period, the share of people in Italy with very low life-satisfaction ratings was below the OECD average (OECD, 2021d).

Another indirect (negative) effect of the pandemic on health outcomes was the worsening of obesity and levels of physical inactivity. During the period 2019–2020, the share of the overweight and obese adult population rose from 44.9% to 45.8% (ISTAT, 2021a). This has been ascribed to lockdowns and social contact restrictions. A study based on the European data (the SHARE survey) found that being male, being a resident of Italy, and socio-economic factors (low income and education, being unemployed) and living in a rural or small town), increased the probability of older people (>50) being inactive during the pandemic (Angelova, 2021).

One group of fragile populations, that should not be forgotten, is immigrants, who are more exposed to inequalities in health (Giannoni et al., 2016) and access to health care, particularly those who are non-EU citizens and undocumented migrants (MIPEX, 2020). Historically, wide regional inequalities between migrants and others in the use of hospitalizations have been observed (see, e.g. Giannoni et al., 2012), despite migrants being entitled to access healthcare services in Italy, thanks to a combination of both national and regional policies, and to Italy ranking slightly above-average among EU 15/ OECD countries (MIPEX, 2020) with respect to guaranteeing basic healthcare access to migrants. However, the documentation required to access health care can be complicated for both legal migrants and asylum seekers (MIPEX, 2020) and this may affect their utilization. Recent research based on epidemiological characteristics of COVID-19 cases in non-Italian nationals registered by the national surveillance system showed that migrants from countries with low and medium human development indices are subject to a higher risk of hospitalization and ICU admission, and higher case-fatality compared to native Italians (Fabiani et al., 2021).

The Effect of the COVID-19 Pandemic on Healthcare Provision

The COVID-19 pandemic forced countries to undertake major reorganizations of their healthcare systems, including the introduction of some forms of healthcare rationing (Arnault et al., 2021). European countries experienced a partial or complete disruption in the provision of about 40% of essential hospitals healthcare services, i.e. preventive, emergency and oncological care; while specialist, dental and physiotherapy care were generally suspended, and non-emergency elective care rescheduled (Arnault et al., 2021; WHO, 2020; Søreide et al., 2020).

It is expected for these temporary changes to have a long-lasting effect on Italian patients' health, severity of health conditions at presentation, e.g. patients being diagnosed with later stage-cancers, and potentially deaths. Further, it is expected for these changes to affect differently diverse groups of the population, with those in lower-income groups and/or lower socio-economic status being impacted disproportionally more. A recent study, based on Share survey data on European aged over 50, showed that economic deprivation was a strong predictor for reporting forgone or denied health care among people aged 50 + during the health crisis in Europe, with Italy reporting above-average values, compared to other European countries, concerning forgone and denied care, and average values in terms of postponed care (Smolic et al., 2021).

Finally, substantial regional variations in terms of healthcare provision and utilization, a potential reflection of Italy's decentralized healthcare system (see Sect. 1), are to be expected, also when assessed in terms of regional per capita income and income inequality, both across and within regions. This will be the focus of the following section.

Regional Variations in Healthcare Provision and Income Inequality

Data from a report of the Italian Healthcare Regional Agency (AGENAS and Laboratorio MES, 2021) show that there have been remarkable reductions in most non-COVID-19 hospitalizations for both elective and urgent care as well as for preventive care. Focusing the attention on regional variations in the delivery of a set of hospital and preventive public healthcare services, which took place in the first year of the pandemic (2020), and comparing them to the level of care provided in 2019. In particular, this section reports regional variations in healthcare utilizations for urgent hospitalization (e.g. time-dependent diseases), psychiatric

hospitalization, elective hospital inpatient care and screening. These values are compared with (a) per capita income level and (b) income inequality (as measured by the Gini index) among the Italian regions. The data source for income and income inequality is the National Institute of Statistics (ISTAT, 2021c). Both for the pre-COVID-19 and COVID-19 period, regional income data are the latest available: 2018. The data are reported in Table A2 in the Appendix.

Urgent Hospitalizations

We found that reduction rates in urgent hospitalizations (those related to time-dependent diseases or hospitalization that could not be scheduled responding to an urgent need) were higher in Southern regions with lower levels of per capita income (Fig. 4a, Table A2 of the appendix). This might signal the persistence of inequalities (favouring the Northern regions when considering absolute (per capita) income levels. Moreover, reductions in urgent hospitalizations appear to be lower in regions with less unequal income such as Friuli-Venezia-Giulia and the province of Trento, both in the North of Italy and higher in more unequal regions such as Campania and Sicily in the South. However, no clear-cut pattern emerges with respect to relative income measures (Gini index), as reductions were high also in less unequal Southern regions such as Basilicata and Molise (Fig. 4b, Table A2).

During the first wave of the pandemic, De Rosis et al. (2021) reported that the overall sentiment of fear of the Italian population towards the SARS-CoV-2 virus was rather homogeneous across the Italian regions. However, the recovery capacity, in terms of capacity to translate the national recommendations into regional strategies, as well as the overall reaction of regional governments to cope with the pandemic, were rather different across territories (Bosa et al., 2020, 2021a, 2021b; Agenas, 2021). In particular, a survey conducted in January 2021 highlights the fact that on average 62% of Italian citizens avoided some form of healthcare treatment and that 56% did so because of fear of contracting the virus (Mes-Lab, 2021), and the rest because of a lack of services or the difficulty in accessing services, with some variation across Italian regions. This suggests that a potential further factor affecting regional variations in the delivery of urgent hospital care may be the differential capacity of regions to promptly guarantee access to these services.

Psychiatric Hospitalizations

Inpatient psychiatric services were also affected by the pandemic, with average reduction rates in utilization up to about 35% (Table A2). Mental

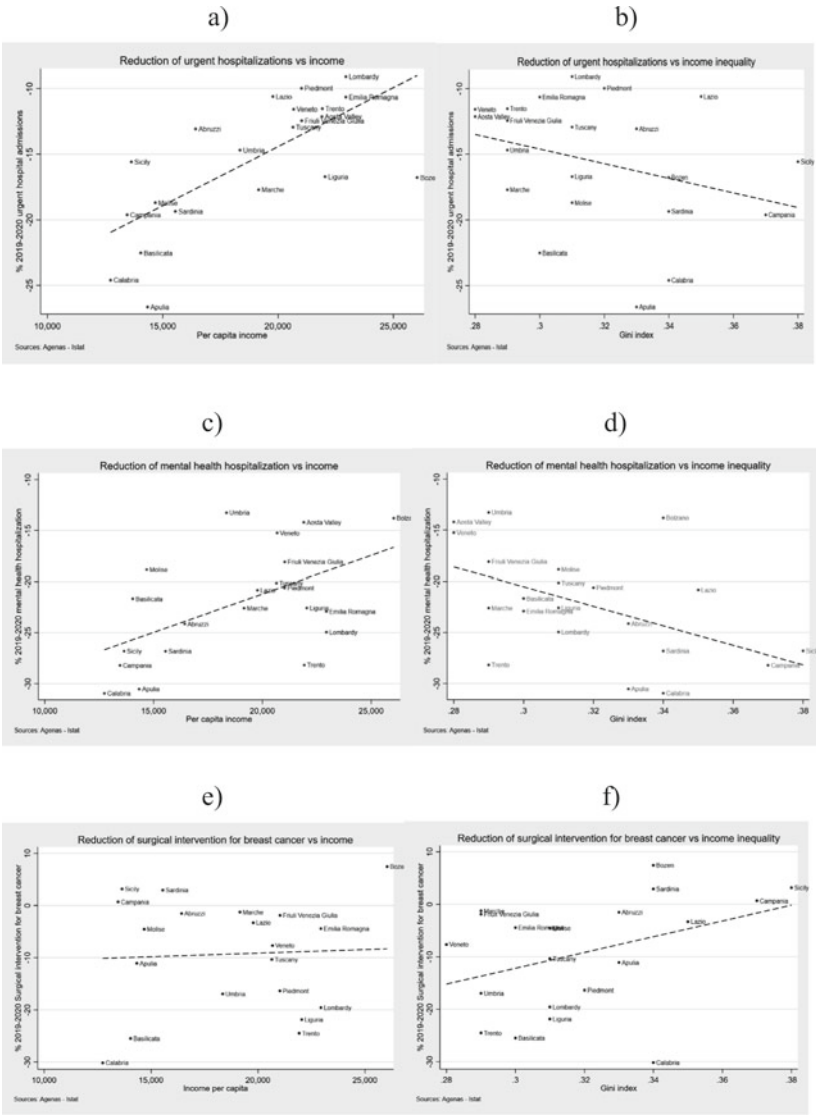

Fig. 4 Regional hospitalizations variations during the pandemic and income inequality Urgent hospitalizations during 2020–2019 vs. **a** per capita income and **b** income inequality; Hospitalizations for mental health conditions during 2020–2019 vs. **c** per capita income and **d** income inequality; Regional variations in surgical volumes for breast cancer during 2020–2019 vs. **e** per capita income and **f** income inequality (*Data Source* Agenas [2021] ISTAT [2021a], [2021b], [2021d], [see Table A2])

health hospitalization rates vary considerably across regions following the North–South economic divide both in absolute and relative terms (Fig. 4c-d). For instance, Liguria (Northern region) registered 10 times the hospitalization rate of Apulia (Southern region) (Table A2). The international literature on mental healthcare utilization reports large gaps and variations in mental health treatments, with some of them related to the stigma associated with a mental health diagnosis, or to missed diagnosis (Mack et al., 2007; Holman, 2014; Foster, 2021).

Elective Hospital (Inpatient) Admissions

In all regions non-COVID-19-related elective hospitalizations decreased on average by 26%, as a direct response to the Central government request to shut down all elective hospitalizations, unless they were non-deferrable during the first months of the pandemic (Table A2). The highest reductions were recorded in the Northern regions, which also were the centre of the pandemic outbreak. Lombardy recorded the highest reduction at 33.8%, followed by Liguria (32.2%) and Piedmont (27.5%), Emilia-Romagna (24.1%), and finally Veneto (19%). In the South, planned hospital inpatient admissions decreased between 30% in Basilicata and 18% in Sardinia (Fig. 5, Table A2). A similar pattern occurred for elective surgical interventions, but even with higher reductions on average (28%) (Fig. 5, Table A2).

Unlike urgent non-COVID-19 hospitalizations and mental health hospitalizations, in the case of elective hospitalizations and planned surgery there is no clear-cut pattern relating healthcare services to per capita income or income inequality. Basilicata, one of the poorer Italian regions, showed the highest reductions in both types of services (37 and 39%, respectively) (Fig. 5, Table A2). However, on average reductions were higher in the North-West (37% for planned surgery and −30.4% scheduled hospitalizations), with the highest COVID-19 positive cases (Fig. 5, Table A2).[7] In contrast, some highly unequal Central and Southern regions showed lower reductions with less interregional variation: for example, Lazio (21% planned surgery and scheduled hospitalizations) and Molise (19.5% planned surgery; 21% scheduled hospitalizations) had very similar reductions in scheduled hospitalizations and planned surgery (Fig. 5, Table A2). A factor that may well have contributed towards the greater reductions in scheduled hospitalizations and planned surgery in the Northern regions is the reduced in-flow of patients from the Southern regions seeking treatment in the North, brought about by the centrally imposed lockdown measures.

Similarly, there is no evidence of a North–South divide looking at regional variations in volume of surgical treatment for breast cancer

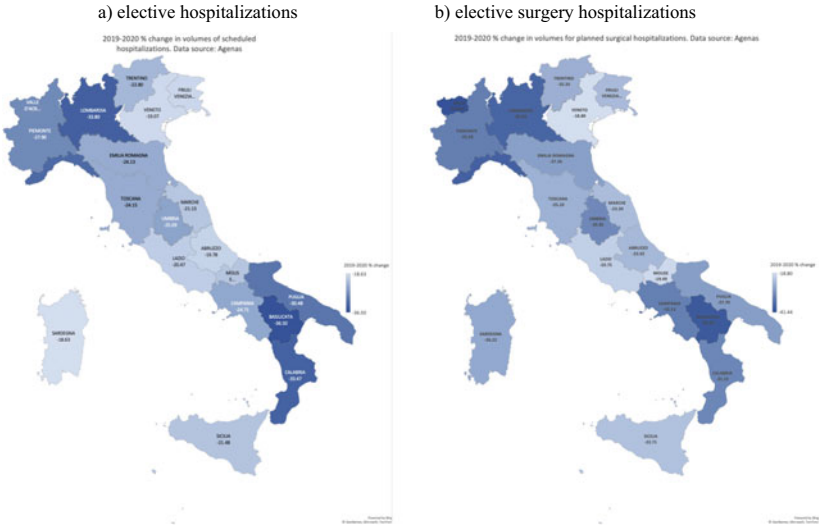

Fig. 5 2019–2020 Variations in elective hospitalizations and surgery in Italian Regions: **a** elective hospitalizations; **b** elective surgery hospitalizations (Data *Source* Agenas [2021] [see Table A2])

during 2020–2019 vs. per capita income, while a pattern emerges considering income inequality (Fig. 4f and 4g). Differently from the other services analysed above, reductions in caesarean section hospitalizations, which are among the most used indicators to measure the quality of maternal care, were near zero in Italy (0.43%) (Table A2). Thus, the pandemic seemed to not have an impact on the level of care provided. In general, the reductions did not appear to be related to the distribution of absolute levels of per capita income or income inequality (Table A2).

Screening

All main screening programmes were heavily affected by the pandemic, with high reductions recorded in cervical screening (43%), mammography (40%), and colorectal screening (48%) at the national level. Reductions peaked in the North-West area (up to 73% in Lombardy for colorectal screening) and the South (87% in Calabria for colorectal screening), being on average 2–3 times higher than in the North-West and Central areas. However, there is no clear income-related North–South gradient (Table

A2). Other non-observed factors may be associated with the observed variations, such as regional differences in supply levels, differences in the pandemic outbreak timing and severity of the pandemic across regions, and related policy responses (local lockdowns). This overview of regional variations in healthcare provision in relation to income inequality is only a descriptive analysis and no causality can or should be inferred because of the potential occurring of an ecological fallacy of using aggregated data to infer individual-level behaviour, and because we have several potential sources of heterogeneity that we did not control for.[8] Further work is needed to explore causal relationships and the role of factors, other than income, in explaining such variations in healthcare utilization, both across and within the Italian regions.

Differences in Attitudes Towards Vaccination

Finally, like other European countries, Italy accelerated the national vaccination campaign from the beginning of 2021 as the main way out of the pandemic, while continuing to implement other measures to protect its population and reduce pressure on its hospitals (OECD, 2021d; Mancino et al., 2021). Looking at regional inequalities in vaccinations, The COVID-19 Symptom Survey, which is conducted by the Delphi Group in partnership with Facebook Data for Good, is one of the largest COVID-19 data collection efforts worldwide and provides data for Italy both at the national level and for a representative group of regions (128,349 respondents in January 2022). The data reported by the John Hopkins COVID-19 Behaviours Dashboard (available at Babalola et al., 2021), show that there is regional variation in attitudes towards vaccination. Looking at vaccine acceptance, the percentage of respondents that reported "yes definitely" or "probably" choosing to get vaccinated was 96% at the end of 2021. No clear North–South gradient in attitudes towards vaccination emerged. The lowest values were found in the North-West (e.g. 90% in Trentino-Alto-Adige), while the highest were found among some Central regions (Lazio 95.2). Among the Southern regions, the situation was mixed, with Apulia and Sicily higher (96%), while others like Campania below the national average (93%).

At the end of 2021, the percentage of respondents who answered that they have been vaccinated with a COVID-19 vaccine was 94%. Once again, there was variability among regions, in the Northern area Lombardy reported the values above the national average (97%), while others were below the average (Liguria 93% and Trentino-Alto-Adige 86%); Southern regions showed values below the average (Campania

92%), 96% reported having received two doses at the end of 2021. Once again, regional values (not reported) did not show a clear North–South Gradient. The percentage of unvaccinated individuals planning to get vaccinated was 24% (global median 30%). However, this proportion was lower in the North (17% in Friuli-Venezia Giulia, 20% in Emilia-Romagna and 22% in Lombardy), while increasing in the Central area (26% in Lazio) and reaching the highest values in Campania (31%) and Apulia (34%) in the South. Vaccine hesitancy was driven by concern about side effects (60%), whereas 31% reported "don't know if the vaccine will work" and 29% reported that they did not believe they needed a vaccine, with values close to the national average for most regions. Regarding barriers to vaccination, 7% reported they could not get the type of vaccine wanted, 7%, that they had difficulty travelling to the site and 5% reported technical website or phone difficulties. Once again, regional values (not reported) did not show a clear North–South gradient.

A more uniform situation was found regarding vaccinations for health workers, 98% to 99% were covered in most regions surveyed. Among those who were not vaccinated, 11% reported they will definitely or probably be vaccinated. From a recently introduced new part of the survey, the proportion of respondents (among those who have been already vaccinated or have tried to be vaccinated) who reported at the beginning of 2022 (January–February) available appointment locations as a barrier to getting the vaccine, was approximately 4%. Again, no clear north–south pattern emerged.

In the south, Sicily showed lower values (2% approximately on average), while Campania reached 7%, similarly to Lombardy in the North. On the other hand, among those who have been vaccinated or have tried to get vaccinated, only 2.6% reported to have faced "other" as a barrier to getting the vaccine. The Northern regions showed values below the national average (Lombardy 1.81%), while some regions in the South like, e.g. Campania (4%) and Sicily(3.4%) reported higher values.

Looking at socio-economic inequalities, despite Italy reaching high levels of vaccination coverage at the national level, during the first months of the campaign, the widest in recent history, some inequalities in access to vaccinations occurred, because the information was not given in a clear way and also because in some regions the reservation could be done only through the website platforms, limiting elders and other groups such as the migrants and other Italians with no or low digital education. Such issues were then smoothed thanks to the involvement of the GPs, the pharmacy, and specific areas that were put in place in some regions to help citizens, especially the elderly (Tuscany).

Despite a relative lack of evidence due to the pandemic still ongoing, some socio-economic inequalities in not getting vaccinated emerged in

some areas. For instance, at the end of 2021 in the Lazio region, 88.1% of the population was fully vaccinated, and 10.3% were not vaccinated; however, compared with those with a university degree, residents with a high-school degree had an odds ratio (OR) of 1.29 (95% CI: 1.27–1.30), and subjects with a junior high or primary school attainment had an OR = 1.41 (95% CI: 1.40–1.43) (Cesaroni et al., 2022). On the other hand, despite the digital divide and the difficulties at the beginning of the campaign, some best practices in tackling migrants' inequalities regarding access to vaccinations emerged in some regions (PICUM, 2021). In Apulia, Campania, Sicily, and Veneto undocumented migrants both EU and non-EU, could book their vaccines online since the start of the national vaccination campaign, and were then quickly followed by other regions like Friuli-Venetia-Giulia and Tuscany. Rome municipality (Lazio) had set up ad-hoc facilities also for irregular migrants in collaboration with local NGOs, as did Veneto; however, most initiatives were not systematic and nationally driven and were mostly based on local NGOs support (PICUM, 2021).A recent study based on Share survey data on Europeans aged over 50, showed that economic deprivation was a strong predictor for reporting forgone or denied health care.

Given that the pandemic is still ongoing and more evidence is needed, we could not analyse the impact of COVID-19 vaccination policies on inequality. However, overall, health inequalities emerged between vaccinated and non-vaccinated individuals affected by COVID-19. The Integrated COVID-19 Surveillance System coordinated by the National Institute of Health reported that most people who died after completing the vaccination course had a high level of clinical complexity, significantly higher than people who could not benefit from the effect of the vaccine due to early contagion or because they had not even started the vaccination course at the time of infection (ISS, 2022). And it is known that regional and socio-economic inequalities emerged in attitudes towards vaccination.

4 Conclusions

The COVID-19 pandemic occurred in an income-unequal country as Italy's North–South divide was still existent. Although the COVID-19 outbreak was higher in the richest areas of the North of Italy, the whole country suffered from increasing socio-economic and health inequalities. Italy's structural challenge—the significant divide across regions on age, gender and productivity and the high levels of public debt-have been aggravated by the COVID-19 crisis (OECD, 2021b). Not only did the

pandemic affect the overall health status of the population, with a reduction in life expectancy and an increase in mortality, but it also exacerbated already existing inequalities: mortality rates were higher for men than for women, widening the life expectancy gap between these two groups. Before the pandemic, Italy was a country with a growing elderly population, and one that experienced higher levels of access to health care, higher than did the younger generations. However, COVID-19-related mortality and prevalence rates were higher among the elderly population, and access to care was difficult, particularly among those living in care homes. Conversely, the incidence of mental health conditions, such as anxiety and depression, and thus the demand for mental health care, has increased, particularly among the younger generations, and this has been met by a substantial lack of public policies supporting access to mental health care such as psychological support services. Thus, there is an urgency for this unmet need and demand to be addressed. Regarding the variations in hospitalizations experienced in the months after the initial pandemic outbreak, our analysis shows that the COVID-19 pandemic did have a negative impact on access to health care, especially for some types of services.

During the pandemic, access to acute care services was negatively associated with both per capita income and a measure of income inequality: regions with a higher per capita income and lower-income inequality were those with the lowest reductions in access to certain specialized services. These findings mirror the North–South divide previously discussed. However, for other types of services, such as scheduled hospitalizations and preventive care, we found no clear-cut evidence of a North–South divide. Variations in the quality of service provided to treat COVID-19-related illness during the first year of the pandemic do not appear to be associated with income inequalities. Vaccination campaigns were effective in reaching high levels of coverage of the whole population. However, this was coupled with variations among regions in attitudes towards vaccination, but there is no evidence that these variations reflected a North–South division. As some evidence of socio-economic inequalities during the first period of the vaccination campaign is emerging for some areas of the country, further work should aim at explaining such variations.

We found some evidence of the worsening of inequalities in both health and access to health care for some fragile population groups, such as the elderly and the migrants. There is a need for more evidence

regarding gender inequalities in access to health care, given the higher mortality rates for men than for women. Moreover, the pandemic deepened gender inequalities in employment opportunities, due to lockdown restrictions and the return of women to child-caring roles, which resulted in structurally higher unemployment rates for women in Southern Italy.

The crisis has highlighted the urgent need to address both pre-existing and newly emerging forms of inequality. Particularly at the beginning of the pandemic, most economic and social policy responses were targeted at those social groups who were most disadvantaged and with a higher probability of having their situation worsened by to the pandemic (such as the poor and the unemployed). However, it is difficult to draw conclusions about the impact of the policies implemented. At the time of writing, it is still too early for this assessment to take place. Moreover, measures implemented to mitigate the impact of the pandemic on employment and income, while important, have been limited in terms of overall budget if compared with other European countries.

However, within these limits, the general approach of public policy has been rational in trying to support both the supply and the demand sides of the economy. Some initial evidence is emerging that recently introduced public policies, e.g. the social insurance benefits, were effective incounteracting the impact of the lockdown measures and other restrictions and that these probably contributed to avoiding a further increase in income inequality. After years of public cost-containment policies, the next generation European Union funds and the linked national recovery and resilience public investment plan have been targeted to foster economic growth and overcome the structural geographic, socio-economic and health divides. This is a concrete chance to reduce inequalities, at various levels, in the future. Much of the effects of the pandemic crisis on inequalities will also ultimately depend on the post-pandemic economic growth the country will experience. According to the OECD (2021c), the recovery is expected to benefit from supportive fiscal policy, and a gradual rise in employment should support steady consumption growth. This will, however, crucially depend on the effectiveness of the measures that will be introduced within the National Recovery and Resilience Plan, and on the capacity to improve public investment governance, particularly in terms of coordination and implementation across the different levels of government.

Appendix

Table A1 Life expectancy and income inequality in Italian regions

Region	*Life expectancy free from disability at 65 years*				*Income and income inequality*		
	Male 2019	*Male 2020*	*Female 2019*	*Female 2020*	*Per capita average post-tax income (a)*	*Gini index (b)*	*Per capita income *Gini (a*b)*
Southern regions							
Abruzzi	9.6	9.9	9.8	10.1	16,426	0.33	5371.3
Basilicata	9.5	9.1	8.3	9.4	14,044	0.3	4157.02
Calabria	9.6	7.3	7.3	6.5	12,740	0.34	4318.86
Campania	8.7	7.2	8.8	7.6	13,456	0.37	5005.63
Apulia	9.8	9.8	8.7	10.2	14,338	0.33	4731.54
Sardinia	9.6	11.2	9	9.3	15,548	0.34	5208.58
Sicily	8.8	8.1	6.9	7.8	13,641	0.38	5183.58
Central regions							
Emilia-Romagna	11.3	10.7	9.8	9.4	22,942	0.3	6928.48
Lazio	10.8	9.2	8.8	10.1	19,772	0.35	6999.29
Marche	10	9.8	11.5	10.8	19,156	0.29	5651.02
Molise	11.1	9.9	9.4	10.1	14,678	0.31	4550.18
Tuscany	10.9	10.3	10.4	10.8	20,645	0.31	6399.95
Umbria	9.5	11.3	11	9.6	18,350	0.29	5321.5
Northern regions							
Friuli-Venezia Giulia	10.2	9.8	11.6	10	21,027	0.29	6097.83
Liguria	10.1	10.2	11.1	10.3	22,041	0.31	6876.79
Lombardy	10.8	9.4	10.7	10.3	22,943	0.31	7227.04
Piedmont	9.9	10.4	11.7	10.2	21,018	0.32	6704.74
Trentino-Alto Adige	10.9	10.1	11.9	9.9	23,977,5	0.31	7528.93
Aosta Valley	11.4	9	12.1	10.2	21,900	0.28	6175.8
Veneto	10.2	10.1	10.6	10.5	20,675	0.28	5851.02

(a) Last available year (2018); (b) Income computation including imputed rents. *Source* ISTAT (2021a), (2021b), (2021d)

Table A2 Regional hospitalizations variations during the pandemic and income inequality

Area/Region	*Income and income inequality*			*2019–2020 variations in volumes (%) (c)*								
	Per capita average post-tax income (a)	*GINI Index (b)*	*Per capita average post-tax income* Gini index (a*B)*	*Urgent hospitalizations*	*Scheduled hospitalizations*	*Hospitalizations with psychiatric diagnosis*	*Day hospital hospitalizations*	*Planned surgical hospitalizations*	*Surgical volumes for breast cancer*	*Cervical screening*	*Mammography screening*	*Colorectal screening*	*Percentages of caesarean section on total birth deliveries*
North West:													
Piedmount	21018	0.32	6705	−9.98	−27.90	−20.60	−28.57	−32.28	−16.37	−55.60	−45.00	−51.67	−0.26
Aosta valley	21900	0.28	6176	−12.13	−27.79	−14.21	−44.15	−41.44		−23.70	−51.80	−74.80	−1.14
Lombardy	22041	0.31	7227	−9.09	−33.80	−24.95	−36.60	−36.83	−19.56	−72.80	−47.20	−73.90	−0.42
Liguria	22041	0.31	6877	−16.71	−32.24	−22.57	−27.81	−37.71	−21.87	−57.30	−56.20	−69.40	0.19
North East:													
Trentino Alto Adige	20851	0.29	5974	−12.01	−19.21	−16.67	−21.57	−21.25	−4.78	−38.90	−21.10	−25.05	−0.67
Veneto	20675	0.28	5851	−11.58	−19.07	−15.25	−20.37	−18.80	−7.68	−39.50	−25.10	−25.60	−0.61
Friuli Venezia Giulia	21027	0.29	6098	−12.44	−19.35	−18.09	−22.77	−23.69	−1.88	−38.30	−17.10	−24.50	−0.73
Emilia Romagna	22942	0.30	6928	−10.65	−24.13	−22.90	−27.35	−27.36	−4.44	−38.00	−16.70	−13.50	−0.44

Area/Region	*Income and income inequality*			*2019–2020 variations in volumes (%) (c)*								
	Per capita average post-tax income (a)	*GINI Index (b)*	*Per capita average post-tax income* Gini index (a*B)*	*Urgent hospitaliza-tions*	*Scheduled hospitaliza-tions*	*Hospitalizations with psychiatric diagnosis*	*Day hospital hospitaliza-tions*	*Planned surgical hospitaliza-tions*	*Surgical volumes for breast cancer*	*Cervical screening*	*Mammography screening*	*Colorectal screening*	*Percentages of caesarean section on total birth deliveries*
Central:													
Toscana	20,645	0.31	6400	−12.94	−24.15	−20.13	−24.98	−25.10	−10.36	−21.40	−20.00	−36.20	−1.63
Umbria	18,350	0.29	5321	−14.69	−25.09	−13.27	−33.49	−31.85	−16.95	1.80	−9.10	−0.20	0.57
Marche	19,156	0.29	5651	−17.71	−21.13	−22.59	−29.66	−23.30	−1.25	−39.10	−36.50	−20.80	−0.12
Lazio	19,772	0.35	6999	−10.61	−20.47	−20.82	−21.99	−20.75	−3.31	−50.70	−45.90	−61.70	−0.13
South:													
Abruzzo	16,426	0.33	5371	−13.07	−19.78	−24.13	−31.72	−23.92	−1.53	−38.90	−52.80	−19.30	−0.66
Molise	14,678	0.31	4550	−18.70	−21.26	−18.85	−33.38	−19.49	−4.55	−27.80	−41.10	−59.70	0.00
Campania	13,456	0.37	5006	−19.62	−24.71	−28.21	−33.82	−32.13	0.0.68	−60.20	−56.10	−78.60	−0.27
Apulia	14,338	0.33	4732	−26.64	−30.48	−30.54	−40.67	−27.70	−11.09	−49.10	−48.70		−0.13
Basilicata	14,044	0.30	4157	−22.52	−36.50	−21.66	−33.55	−39.25	−25.48	−74.00	−43.20	−67.90	−0.48
Calabria	12,740	0.34	4319	−24.60	−33.47	na	−38.98	−31.12	−30.18	−47.31	−63.30	−87.10	−1.24

(continued)

Table A2 (continued)

Area/Region	*Income and income inequality*			*2019–2020 variations in volumes (%) (c)*									
	Per capita average post-tax income (a)	*GINI Index (b)*	*Per capita average post-tax income* Gini index (a*B)*	*Urgent hospitaliza-tions*	*Scheduled hospitaliza-tions*	*Hospitalizations with psychiatric diagnosis*	*Day hospital hospitaliza-tions*	*Planned surgical hospitaliza-tions*	*Surgical volumes for breast cancer*	*Cervical screening*	*Mammography screening*	*Colorectal screening*	*Percentages of caesarean section on total birth deliveries*
Sicily	13,641	0.38	5184	−15.58	−21.48	−26.81	−29.52	−22.71	3.17	−44.80	−44.90	−61.00	0.00
Sardinia	15,548	0.34	5209	−19.36	−18.63	−26.82	−24.52	−26.22	2.94	−49.10	−55.60	−67.60	−0.36
Italy	18,310	0.32	5737	−15.53	−25.03	−21.53	−30.27	−28.09	−9.18	−43.24	−39.87	−48.34	−0.43

(a) Last available year (2018) *Source* ISTAT (2021a), (2021b), (2021d); (b) Income computation including imputed rents *Source* ISTAT (2021a), (2021d); (c) *Data Source* AGENAS (2021)

Notes

1. Although all authors contributed to the chapter writing, it is possible to attribute the introduction to MG, MV and AC and section 2 to MG, AC and OC. In section 3, GM and IMB contributed to the review of the socioeconomic inequalities during the pandemic while looking at its impact on employment, poverty and social insurance benefits; MC and SG contributed to the review of the main policies adopted by the Italian Government to mitigate the impact of the pandemic; MG, MV and OC reviewed the evidence on health and healthcare inequalities; MV provided the data, MG conceived and MG and MV carried out the analysis of regional variations in healthcare provision and income inequality during the first period of the pandemic; MV, SN and MG commented on the results; and MG, MV and GM reported on variations in attitudes towards vaccinations. All Authors contributed to section 4, Conclusions.
2. The Gini coefficient on the distribution of household net wealth in Italy was 0.64 in 2016. The average wealth was €143,000 in 2016, one the highest in the world; historically, this was because most Italians are home-owners and have a very low level of private debt and a high propensity to save (Forum Delle Diseguaglianze, 2019). The ratio between personal net wealth and per capita GDP in Italy was 1:7 in 2016, the highest among France and UK (1:6), Germany (1:5), and the USA (1:4) (Forum delle Diseguaglianze, 2019).
3. Legal foreign residents were included at a later time, and since 1998, irregular immigrants are also granted access to urgent and essential services (MIPEX, 2020).
4. In Italy, compulsory education implies finishing 10 years of schooling between 6 and 16 years old.
5. Although the estimate of healthy life expectancy at birth was obtained from subjective measures (based on the number of individuals answering "well" or "very well" to the question on perceived health of the ISTAT survey "Aspects of daily life"), it should be stressed that this measure is strongly correlated with mortality, chronic diseases, disability, and health consumption, as well as capturing the variability of the effects that different pathological events produce on the quality of life of individuals (Crialesi et al., 2017).
6. See Law Decree n. 137/2020 and n.149/2020, Law Decrees Ristori and Ristori bis, respectively; Law Decree 34/2020, Law Decree Rilancio; DL 104/2020, Law Decree Agosto; Law Decrees 41/2021 and 73/2021, Law Decrees Sostegni and Sostegni bis, respectively.
7. See also Bertolaccini et al. (2022).
8. We also checked that using other measures of poverty, such as the proportion of households at risk of poverty, does not change the picture

concerning results obtained by using the Gini index and per capita post-tax income. Data is available upon request from the Authors.

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CHAPTER 6

The Coronavirus Pandemic: Ethiopia

Gisella Kagy and Denat Negatu

1 Introduction

The coronavirus has disrupted livelihoods in Ethiopia in a multitude of ways and deepened existing inequalities. While official records show the spread of the virus through Ethiopia has been low compared to many high-income countries and the mitigation measures enforced were relatively mild compared to other countries, the health and economic impacts of the coronavirus pandemic are widespread throughout Ethiopia.

This disruption has been felt more acutely for vulnerable populations in rural areas, such as women and girls, where access to education and formal employment opportunities has been limited. Examining the coronavirus pandemic in Ethiopia shows that the confluence of other pressing

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issues in low-income countries, such as a pre-existing high disease environment, weak existing healthcare infrastructure and civil conflict make responding to the coronavirus pandemic and mitigating its impacts even more difficult.

2 Ethiopian Context

Ethiopia is the second largest country in Africa in terms of population with over 112 million people in 2019 (World Bank WDI Population, 2022a). The overall GDP in 2019 was almost 96 billion USD (World Bank WDI GDP, 2022b). The country is classified as a low-income economy, and in 2019 GDP per capita was $855 USD (World Bank WDI GDP per capital, 2022c).[1]

The country has 9 distinct regions, each with their own local capital. The capital city, Addis Ababa, is the major urban center in the country with an estimated population of 4.6 million in 2019. There are many languages spoken throughout the country, with Amharic being the most predominant.

Based upon the most recent large socioeconomic indicators available from 2015/2016, slightly more than half of men are literate, 64%, and roughly half of all women are literate, 48% (Statistical Agency of Ethiopia, 2017). Child malnutrition remains a problem throughout the country as 42% of children aged 5–59 months are classified as stunted (Statistical Agency of Ethiopia, 2017). The infant mortality rate in 2019 was 37 per 1,000 live births. This is similar to other low-income countries, but high compared to higher income countries such as Japan where infant mortality was 2 per 1,000 live births (World Bank, 2019a). Access to formal financial institutions is low throughout the country, with only 22% of adults having accounts at formal financial institutions (Statistical Agency of Ethiopia, 2017).

Agriculture (crop and livestock) are an important component of the Ethiopian economy. Of the five major crops (maize, wheat, barley, sorghum, teff), production is mainly for consumption as sales only account for 8–20% of crops produced (Statistical Agency of Ethiopia,

[1] The World Bank categorizes countries with GNI per capita lower than 1,045 current USD as low income (World Bank New World Bank country classifications by Income Level, 2022).

2017). Recently, Ethiopia has pursued an export-oriented industrialization strategy to boost economic growth, increase the number of formal jobs and transition the economy away from agriculture. This strategy has increased Foreign Direct Investment in the country and has created many formal, low-skill wage jobs. A high-profile example of this is the Ready-Made Garment (RMG) industry. In 2019, 7.9% GDP came from exports (World Bank WDI Exports of goods and services, 2019b).

HealthCare System

The Ethiopian HealthCare system is dominated by the public sector as most health centers, clinics, and hospitals are funded by the government. Standard treatments from public healthcare institutes are typically affordable. In addition, if individuals fall below a specific poverty line medical treatment and medication are provided for free. However, there exists a large urban rural divide in terms of access to modern health care. Only major cities have hospitals and access to modern quality health care. Ethiopia faces many co-existing health concerns such as a high prevalence of diarrheal disease, HIV/AIDS, and Malaria (WHO, 2020).

Socioeconomic and Health Inequalities Before the Coronavirus Pandemic

Prior to the coronavirus pandemic socioeconomic and health inequities existed along many dimensions. A key dimension is geography, specifically an urban and rural divide in terms of access to quality health care, education, and employment opportunities. Child malnutrition rates are higher in rural than in urban areas (Statistical Agency of Ethiopia, 2017) and access to the tools needed to engage with distance learning while schools were closed were close to non-existent in rural areas (World Bank Group, 2020).

3 How the Coronavirus Pandemic Unfolded and Policy Responses

The first case of the coronavirus was recorded in Addis Ababa on March 13, 2020 (WHO, 2020). This first case was attributed to a traveler from Japan, and the first approximately 30 cases were from individuals who had

a travel history to Asia and those that had contact with the infected individuals. Figure 1 details the number of daily cases reported in Ethiopia over time. Official statistics show that Ethiopia ranked 33 out of 58 in terms of cases per million when compared to other African countries (Oxford Policy Management, 2021). The true spread and prevalence of the virus is largely unknown as testing was limited and a pre-existing weak healthcare system means many may not have sought professional care. Testing to determine if an individual had the coronavirus was only available in major urban centers such as Addis Ababa, Bahir Dar, Adama and Dessie, and even then, was quite uncommon. An average of 1000 tests were conducted a day in the first few months of the pandemic.

On April 8, 2020 the government of Ethiopia released a State of Emergency Proclamation, in an effort to control the spread of COVID-19 and mitigate its impact (Council of Ministers Regulation 2020). The State of Emergency lasted six months. Included in this proclamation was a list of prohibited activities such as public group gatherings, shaking hands, and visiting detainees in prison. At this time social distancing measures, as well as limiting capacity on public transportation and in restaurants, were implemented and encouraged. Notably, the Ethiopian government did not order strict lockdown measures, such as those implemented in the United States or Europe that prohibited non-essential businesses from

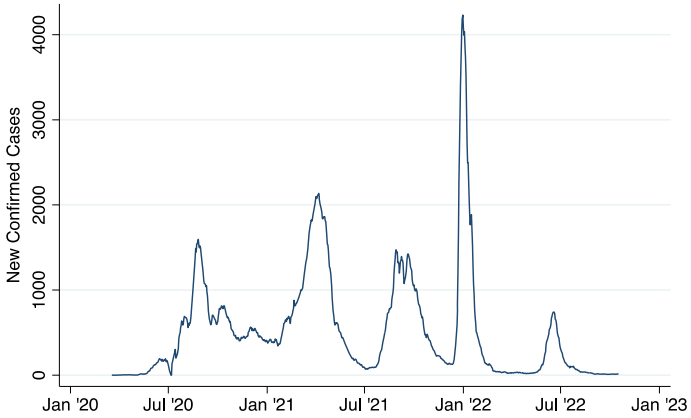

Fig. 1 Daily new confirmed COVID-19 cases: 7-day rolling average (*Source* Johns Hopkins University CSSE COVID-19 Data)

operating in-person. People were encouraged to not to leave their house starting April 8th, but this recommendation was not followed by much of the population.

In an effort to protect workers, the State of Emergency Proclamation prohibited employers from terminating employment contracts. Workers in basic service industries such as electricity, water, and telecommunications were prohibited from resigning. It was also prohibited to evict a lessee or increase rent without the lessee's consent. Due to the pandemic, schools were closed. They did not reopen for approximately 8 months. There were no large-scale subsidy programs put forward to assist individuals during the pandemic, either in-kind, or cash.

Vaccinating individuals against the coronavirus has taken time and faced challenges. The first challenge was vaccine availability due to low supply from the global Covax scheme. Currently, vaccine hesitancy among individuals limits vaccine take up. As of October 2022, 37.5 people per 100 have been vaccinated with at least one dose (WHO COVID-19 Tracker, 2022).

Several research studies have shown that since the start of the pandemic, individuals in Ethiopia are well-informed about the coronavirus and ways to prevent the spread of the virus.

4 Effects of the Coronavirus Pandemic

Health Impacts of the Coronavirus Pandemic

As of October 2022, the number of COVID-19 cases reported since the start of the pandemic in Ethiopia is approximately 494,000 and the number of deaths is 7,572 (WHO US COVID-19 Dashboard, 2022). For comparison, the number of deaths in the United States attributed to the coronavirus as of October 2022 is over one million (WHO US COVID-19 Dashboard, 2022). Compared to the rest of the world, Ethiopia has fared better both in terms of the number of cases and number of deaths.

In addition to the direct health impacts of the coronavirus, several channels of indirect health effects have become apparent. As the number of COVID-19 cases and hospitalization rates rose, healthcare facilities as well as healthcare personnel were stretched thinly across the country. Furthermore, the prohibition of face-to-face schooling delayed the graduation of a large number of medical students who would have joined the workforce, further putting a strain on the healthcare system. As a result,

other health services including maternal, newborn and child health care were put on hold.

Economic Impacts of the Coronavirus Pandemic

The coronavirus pandemic has significantly impacted certain sectors of the Ethiopian economy. Specifically, GDP in the service sector, industrial sector, and agriculture sector shrank by 21.9%, 14%, and 4.7%, respectively (Aragie, Taffesse, and Thurlow, 2021). However, total GDP did not shrink below its 2019 levels in either 2020 or 2021. In 2021, GDP was 111 billion (in current USD), and GDP per capita was $943 USD (World Bank WDI GDP per capital, 2022c). Annual GDP growth and annual GDP per capita growth were positive in both 2020 and 2021; however, the growth rates were significantly lower than growth rates prior to the pandemic.

Given that much of the Ethiopian economy is linked to the global economy, even though there were no strict local lock down measures, the global economic downturn impacted Ethiopia. In high-frequency data collected by the World Bank between April and May 2020 on a representative sample of individuals in Ethiopia, 55% of respondents reported that their household income had decreased. Several studies have corroborated this finding that at the onset of the pandemic there were major employment and income losses (Oxford Policy Management, 2021).

Recent studies have shown that employment and income has steadily climbed back to pre-pandemic levels for many (Oxford Policy Management, 2021). However, inequities persist in the type of employment that individuals now have. World Bank research suggests that many individuals are now employed in lower-quality jobs, including temporary work and self-employment. There has been a shift toward working in the agricultural sector, and away from the formal higher paying wage jobs (Oxford Policy Management, 2021).

As a case study, several papers have looked specifically at the RMG industry in Ethiopia. This labor-intensive industry is export-oriented and relies on key consumer markets such as the United States and Europe. Many workers in the RMG industry are young unmarried women who have migrated from rural to urban areas for work (Meyer et al., 2021). The sharp global economic downturn in 2020 led to the cancelation of garment orders which jeopardized many of these low-skill low-paying

jobs. Surveys show that average production volumes decreased by 56% (Mengistu et al., 2020).

Research from surveys with women who worked at RMG factories in Ethiopia detail the extent of the economic toll of the pandemic. Using data collected via phone surveys between May and July 2020, an estimated 40% of respondents had a change in employment status between January 2020 and May 2020 (Meyer et al., 2021). When individuals are no longer working at an RMG, they tend to migrate away from the urban areas and back to rural areas. It appears as though migration is a key way for individuals to economically cope with the effects of the coronavirus pandemic, as food insecurity is higher in urban areas and lower in rural areas (Meyer et al., 2021).

Further research by Meyer, Hardy, Witte, Kagy, and Demeke (2022) shows that even one year after the start of the global pandemic, employment rates, and overall well-being of workers in the RMG industry remains lower than prior to the pandemic. Specifically, workers who were relatively new prior to the pandemic seem to have fallen into persistent unemployment (Meyer et al., 2022). This finding highlights the unequal impacts of the economic consequences of the pandemic, as more vulnerable groups appear to be suffering longer term.

Educational Impacts of the Coronavirus Pandemic

Several studies have found that the coronavirus pandemic has negatively impacted access to education (Oxford Policy Management, 2021). Schools began reopening in October 2020, after closing in March. During this period of closure, reports indicate a large urban rural divide in terms of access to online or distance learning. Only 12% of children in rural households indicated any form of engagement in distance learning (World Bank, 2020). The poorest households are those most unable to support online or distance learning. The closure of schools brought on by the pandemic has exacerbated existing inequalities in access to education within Ethiopia, particularly between urban and rural populations and higher and lower-income households.

5 Compounding Crises

Alongside the coronavirus pandemic has been an ongoing civil conflict in Ethiopia. The conflict has caused severe health and economic damages,

with the brunt of the impact being experienced in the rural areas of the country. The current conflict has impacted the economic environment in Ethiopia, making it difficult to disentangle the effects of the pandemic and the effects of the conflict. While the civil conflict has deep historical roots, a deterioration of the conflict started in the Fall of 2020 and has been ongoing. Direct impacts of the conflict include businesses that have been damaged in rocket attacks (Paul, Ringstrom, & Bavier, 2020) where some areas of the country have been forced to suspend production. Furthermore, the impact has resulted in a loss of livestock and harvest in several areas in the country both due to regions being an active conflict area and due to lack of individuals tending to farms. Some young working individuals have left their jobs and daily activities to join the conflict.

In November 2021, the United States announced that it would suspend Ethiopia from the African Growth and Opportunity Act (AGOA), which enables duty-free access to the US market for several goods (Naumann, 2021). This decision was in response to the conflict and reported human rights abuses. While the lasting impacts of this decision are unknown, they are likely to be substantial as AGOA covered almost all of Ethiopia's exports (Naumann, 2021).

Concurrently with these crises, Ethiopia is facing high inflation. Inflation was approximately 20% in 2020, a 5% jump from 2019 (Inflation rates in Ethiopia, 2021). Along with the conflict and the COVID-19 crisis, during the past two years, Ethiopia was affected by deadly floods, drought, and locust outbreaks in various parts of the country. While floods affected the central region of the country including Addis Ababa, the drought and locust outbreaks severely damaged rural livelihoods.

6 Conclusion

The examination of inequalities in Ethiopia during the coronavirus pandemic makes clear the multitude of concerns facing the country. The coronavirus pandemic, civil conflict, rising inflation, and climate change challenges are all facing Ethiopia simultaneously, making it impossible to isolate the effects of the pandemic. Evidence from various research studies completed throughout the pandemic show that pre-existing inequalities between rural and urban areas and high and low-income households are becoming more ingrained as these challenges persist. More nationally, representative data is necessary to understand the true scope of

how inequities have changed in Ethiopia as a result of the coronavirus pandemic.

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CHAPTER 7

The Impact of COVID-19 on Household Welfare in the Comoros: The Experience of a Small Island Developing State

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1 Introduction

The COVID-19 pandemic took the world by surprise and has claimed more than 6 million lives (as of October 2022). Since the COVID-19 pandemic was first identified in December 2019, more than 100 countries

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worldwide resorted to either full or partial economic and social lockdowns. These interventions are detrimental to socio-economic activities at the macro-level and at the micro-level (Dunford et al., 2020). The question of the best-possible curtailment measures or responses at the country and global levels has attracted controversial and ongoing debates (Van, 2021). The controversy around curtailment measures revolves around the trade-off between saving lives and prioritizing the economy. An emerging consensus is that the level of preparedness to deal with the health emergency that came from COVID-19 was below standard (Sathyamala, 2020).

The pandemic is estimated to have had profound socio-economic impacts. The lack of a cure for the virus, the different variant or mutation episodes, and the nature of its contagion necessitated the use of non-medical interventions. Policymakers resorted to national lockdowns and international travel restrictions, resulting in the worst economic downturns experienced in decades (Dunford et al., 2020). The colossal uncertainty directly from the COVID-19 virus coupled with the distortion in market and socio-economic activities has had ripple effects on the labor market. The macro-level effects will have implications at the household and individual levels. The cost of suppressing the spread of the pandemic and the intricacy of the economic shutdown add to the challenges of policy responses in unprecedented times.

Although African countries had relatively lower infection rates at the outset, the health impacts were predicted to be more severe due to the inadequate health care systems. As such, they resorted to similar curtailment measures (national lockdown, social distancing, and international travel restrictions)as those observed in developed economies. Within Africa, the Comoros provides a particularly insightful case study in evaluating national lockdown measures on socio-economic outcomes for several reasons. Firstly, by April 18, 2020, a month after the World Health Organization declared COVID-19 a global pandemic, the Comoros and Lesotho were the two countries in Africa that were still virus-free (Lone and Ahmad, 2020). The Comoros's proactive measures led to the restriction of social activities following the President's address on March 16, 2020. Furthermore, the national government enacted a complete national lockdown on March 23, 2020, over a month before the first confirmed case of COVID-19 on May 1, 2020. Thus, the Comoros is a typical example of a developing country in Africa that resorted to strict lockdown measures with low confirmed cases of COVID-19.

Secondly, households and individuals in developing countries are susceptible to shocks that have an adverse impact on their livelihood. Changes in commodity prices, climate-related shocks (drought and floods) as well as idiosyncratic shocks (illness and death) have a negative impact on economic status, especially for the poor (Dercon 2002). In addition, the Comoros is one of the poorest countries in Africa (World Population Review, 2021)[1] and its geographical location increases its vulnerability to climate change shocks. The country was still recovering from Cyclone Kenneth, experienced in April 2019, when the COVID-19 pandemic hit and consequently led to lockdown measures (World Bank, 2020). The tourism sector is one of the country's major contributors to economic activities and income generation, thus exposing the country to a decline in economic growth as a result of lockdown measures. Therefore, this analysis can guide future responses to similar economic shocks and crises that necessitate lockdown measures, especially for African countries.

Finally, it has been previously found that research on the African continent tends to be skewed to a few countries. The evidence base for local policymakers in neglected countries or "research deserts" is relatively small. Porteous (2020) documents statistics on economic research in Africa and shows that 87% of all published economics journal articles account for one-third of African countries and are highly skewed toward five countries.[2] The distribution is uneven and accounted for only 16% of the continent's population. It is evident that the Comoros falls within the forgotten 21 countries that have an average number of publications of 0.2 per country (Porteous, 2020). Heterogeneous characteristics (socio-economic and political) can limit external validity across countries, especially in Africa. Even before the pandemic, as highlighted above, the Comoros had one of the highest poverty rates in the world. It is also partiucularly vulnerable to natural disasters and climatic shocks. It is thus important to understand how the pandemic has affected a small island state like the Comoros, which is already facing several development challenges but with a narrow evidence base. Our unique data consisting of pre- and post-pandemic observations provides an opportunity to make a meaningful contribution. To the best of our knowledge, this analysis is the first evaluation of the welfare consequences of the COVID-19 lockdown in the Comoros in a robust manner.

This chapter aims to quantify the impact of direct lockdown measures on household welfare in the Comoros, a poor developing country and specifically an understudied developing country. The unexpected outbreak

of COVID-19 coincided with data collection for the Harmonized Survey on Living Conditions of Households (EHCVM), lending itself to a quasi-natural experiment in which households interviewed prior to the lockdown could be considered as the control group and those interviewed after the lockdown as the treated group. First, this chapter presents descriptive statistics, followed by ordinary least squares and probit regression analysis to control for key correlates of household welfare. It then aims to obtain causal estimates using the propensity score matching technique by exploiting the timing of the 2020 survey. Finally, we use detailed information on household and individual characteristics pre and post the COVID-19 lockdown to ascertain the changes in expenditure, poverty, and the distributional impact on household expenditure. We also examine the channels through which COVID-19 impacts household welfare, such as asset ownership and labor market outcomes. Furthermore, we extend our analysis to assess the evolution of our indicators as the period after the lockdown elapses. This analysis informs on the immediate impact and the dynamism in the recovering trend of household welfare indicators post-COVID-19 lockdown.

The chapter finds a negative impact of COVID-19-induced national lockdown on household expenditure, thereby leading to an increase in poverty. The negative effect is prominent within the first three months after the lockdown, with a somewhat sluggish recovery. The result appears to be driven by a loss of employment as evidenced by a decline in the share of working household members. Nevertheless, there was no significant impact on monthly salary for those that remain employed. Exploring the effect of the COVID-19 lockdown on coping mechanisms, we find a negligible impact on asset ownership. Our evaluation suggests that the sale of assets is a welfare mitigating strategy for Comorian households during the lockdown was limited.

The remainder of this chapter is structured as follows: the following sections outline the relevant literature, context, and data description. Section 4 discusses the empirical methodology and Sect. 5 presents the key results while the final section highlights the policy implications and concludes.

2 Literature Review

The emerging empirical literature on the economic impact of the COVID-19 pandemic curtailment measures (national lockdown) has

relied heavily on aggregated macro-level models and data. Atkeson (2020) evaluates the use of the SIR model to determine the lockdown measures associated with a less severe economic downturn and low contagion of the virus. The author's application of the model to the United States predicts social distancing of 12–18 months (in the absence of a vaccine) as the best measure, compared to a strict national lockdown. The relevant research to understand the impact of the COVID-19 pandemic on income, consumption patterns, and the labor market has been at the macro-level and focused on the United States and the United Kingdom. The emphasis has been on the effectiveness of mitigation policies on household and labor market structure (see, Piyapromdee and Spittal, 2020; Brewer and Gardiner, 2020). The heterogeneous impact of the COVID-19 pandemic on employment patterns and welfare outcomes is reflected in severe consequences for workers in low-income jobs, social, and flexible work in Japan (Kikuchi, Kitao and Mikoshiba 2020). In the developing country context, Schotte et al. (2021) estimated a reduction in employment with an adverse impact on the informal sector for Ghana as a result of stringent lockdown measures. Summer, Hoy and Ortiz- Juarez (2020) evaluate the potential short-term impact of the COVID-19 pandemic on global poverty incidence. They report a substantial increase in global poverty that might delay achievement of the Sustainable Development Goal of ending poverty by 2030.

The intensity of the spread of the COVID-19 infection has been more severe for developed countries than developing countries. However, the same curtailment measures as national lockdowns, social distancing, and curfew used in developed countries have also been implemented in developing countries. Furthermore, the macro-level evidence has predicted age-specific and school closure policies in developing countries as the best for curtailing the contagion of the virus from young to old and providing only a modest economic downturn (see, Alon et al., 2020).

Our first contribution to the literature is to provide an empirical analysis of the impact of COVID-19 beyond aggregated economic indicators. It presents a robust causal empirical analysis of the COVID-19 lockdown measures on household welfare in a developing country based on micro data on household expenditure and labor market outcomes. It further informs on the economic cost of lockdowns for households, which can be used as a yardstick in measuring the impact of macro-level policies against micro-level welfare consequences.

Evaluations of past pandemics like HIV have shown negative impacts on economic growth and labor market outcomes (see Dixon, 2002 and Arndt and Lewis, 2001). An emerging strand of the literature has begun to investigate the effects of the COVID-19 pandemic on the economic livelihoods of households in developing countries. The research has heavily evaluated the economic lives of the poor using phone surveys on retrospective household welfare indicators (see, Ceballos et al., 2020, Egger et al., 2021 and Schotte et al., 2021, among others). In extension, the empirical estimation has focused on the poor, agricultural, or rural areas to understand the impact of the COVID-19 lockdown on the economic livelihoods and global food system (see Gupta et al., 2021; Janssen et al., 2021; Rönkkö, Rutherford and Sen 2021; Swinnen and Vos 2021). Gupta et al. (2021) evaluate the impact of the COVID-19 pandemic on economic outcomes of the poor and vulnerable households living in rural areas in India. They used a micro-level survey on weekly financial data for households in the high remittance regions and found a negative impact on household income. The adverse effect was exacerbated by the increasing interest rate on cash loans and reduction in remittances.

Households and individuals in developing countries are often faced with a variety of shocks that can affect household livelihoods. Changes in commodity prices, climate-related shocks (drought and floods) as well as idiosyncratic shocks (illness and death) have an adverse impact on their economic status, especially for the poor (Dercon 2002, 2004). However, rarely have economic activities been distorted through strict lockdown policies such as those used in the curtailment of the COVID-19 outbreak. National lockdowns restrain households and individuals from engaging in their daily socio-economic activities and distort or cause a complete cessation of both market and non-market activities. National lockdown measures that prevent physical contact with others outside a household may distort the usual coping mechanisms observed in developing countries in mitigating welfare consequences or render them useless or impractical. Household welfare coping mechanisms like borrowing from family members and other informal risk-sharing strategies (local money lenders) and microfinance are limited or not accessible during a national lockdown (Townsend, 1994). Analysis of the impact of COVID-19 on the poor in Bangladesh using daily dairies on socio-economic activities showed variable but significant adverse effects on the poor (Rönkkö et al., 2021). The evidence highlighted the use of cash reserves and reduction in non-food expenditure as coping mechanisms during the pandemic.

The second contribution of this chapter is to go beyond assessing the effects of the pandemic on the economic lives of the poor and captures a broader impact on household welfare status and labor market outcomes of households vulnerable to falling into poverty and those holding precarious employment. Moreover, accounting for the impact of the pandemic on household welfare, which is not solely limited to the already poor, will provide policymakers evidence on the types of pro-poor policies that will not only elevate households from poverty but prevent susceptibility to poverty or reduced welfare. It is thus necessary to evaluate how the pandemic impacts household livelihoods in developing countries and the coping mechanisms employed, regardless of individuals' economic status.

Finally, to the best of our knowledge, this chapter is the first in empirically analyzing the COVID-19 lockdown measures on micro-level individual and household welfare, poverty status and labor market outcomes for the Comoros. It will inform on the thin micro-literature on pandemic shocks on household welfare in a developing country context and specifically for small island developing states. The analysis will provide an understanding of the effect of the pandemic on the Comoros, which falls in the "forgotten countries" category in terms of economic research (Porteous, 2020). This chapter will go beyond a descriptive assessment of COVID-19 on the socio-economic status of households. The research aims to causally estimate the lockdown impact using a detailed door-to-door household survey conducted in two phases before and after the lockdown implementation in the Comoros. An understanding of the mechanisms through which the lockdown can affect the welfare coping strategies of households is important. As such, this chapter examines the impact of the pandemic on the expenditure, poverty status, asset and livestock ownership, and labor market outcomes of individuals and households in the Comoros.

3 Contextualization and Data Description

The COVID-19 virus was reported in the Comoros in May 2020 as the world battled with the outbreak, which was declared a pandemic by the World Health Organization on March 11, 2020. The Comoros was still recovering from the devastating cyclone Kenneth that had hit the country in April 2019 when the first COVID-19 case was recorded in May 2020. The Comoros is a densely populated country with approximately 465 inhabitants per km^2 (World Bank, 2020) and is susceptible to higher

contagion given the nature of the virus. The measures enacted by the government encompassed sensitization from the president on March 16, closure of schools and universities on March 20, and restrictions to international and interisland movements on March 23, 2020. These measures were implemented before the first confirmed case on May 1, 2020, and aimed to reduce the potential spread of the virus.[3] The proactiveness of the government saw a national "state of preparedness" curtailment plan drawn and announced to the public on April 3, 2020. A curfew between 20:00 to 05:00 was implemented and this was later relaxed to from 23:00 to 04:00 in July 2020. As of August 26, 2021, there were 4,055 confirmed cases with 147 related COVID-19 deaths in the Comoros. The majority of the reported deaths took place between December 2020 and March 2021. The low confirmed cases suggest the national lockdown measures may have slowed the rate of contagion.

The geography and location of the Comoros encourage tourism and interisland trade, which are major aspects of the country's economy. Hence, the national lockdown had a high potential to increase vulnerability and worsen the economic status of households. According to the World Bank, in 2017, the Comoros's estimated annual GDP growth rate was 3.82 percent, and the growth trajectory has been declining and stood at 1.97 percent in 2019. As such, the country's per capita rate of growth was low and averaged 1 percent between 2016 and 2019, with consequences for household welfare. The pandemic led to a contraction of GDP growth of 0.1 percent in 2020. Early imposed lockdowns and social-distancing measures slowed the spread of the virus but weakened economic activity due to mobility restrictions and the suspension of international travel, resulting in a drop in tourism receipts. Demand and supply effects related to external trade hit the Comoros's main earning sectors, particularly trade-related services such as restaurants, hotels, and transport.

The empirical analysis of the COVID-19 outbreak's impact on household welfare was undertaken using the 2020 Harmonized Survey on Living Conditions of Households (EHCVM) for the Comoros. The survey was conducted by the National Institute of Statistics and Economic and Demographic Studies and the World Bank and was collected between January and September 2020.[4] Figure 1 provides the timeline of the survey and the relevant COVID-19 intervention policies in the Comoros.

Due to its timing, the survey provides informative data pre- and post-Covid-19 lockdown on household socio-economic status and characteristics. The survey was conducted across the four islands that make up the Union of Comoros and was therefore representative nationally as well as of the four (4) regional locations (Moroni, rest of Ngazidja, Ndzuwani and Mwali). We use the lockdown announcement date as a natural treatment or cut-off date for identifying households surveyed pre- and post-COVID-19 lockdown measure. The sample distribution of interviews covered before and after the COVID-19 lockdown in the Comoros is provided in Table 11 in the appendix. A total of 11,712 individuals belonging to 2,150 households were interviewed before the national lockdown. The sample for the main regions in the Comoros, Ngazidja and Ndzuwani, accounted for 39% and 42% of the responses, respectively. The post-COVID-19 interview sample was 17,480 individuals belonging to 3,414 households but presented a similar regional distribution as the pre-COVID-19 sample.

Our identification strategy to assess the impact of the national lockdown measure on household welfare explores the proactive measure of the Government of Comoros's lockdown policy that came into effect on March 23, 2020 (see Fig. 1). Our evaluation uses as a treatment variable a dummy that takes the value 1 if a household was surveyed after March 23, 2020, and 0 otherwise.

In validating our treatment effect, it is worth noting that the COVID-19 effect could come from the direct contagion of the virus or through the curtailment measures implemented by the national government. First, on the effect of contagion, we do not know from the survey whether individuals suffered from COVID-19, and thus this cannot be estimated in our analysis. Nevertheless, the Comoros was one of the last countries with lowest records of infection from the virus.[5] According to the World Health Organization's recorded COVID-19 cases, the Comoros accounted for only 4,038 of the 207 million worldwide cases of COVID-19 by August 15, 2021. The number of confirmed cases in the Comoros was only 0.46% of the country's population. Second, curtailment measures are expected to have restricted and distorted socio-economic activities and markets. Hence, our treatment indicator using the dummy variable of national lockdown is a good approximation of the impact of COVID-19 curtailment measures on household welfare. It is acknowledged that the knowledge of COVID-19 was already in circulation after the President of the Comoros addressed the nation on March

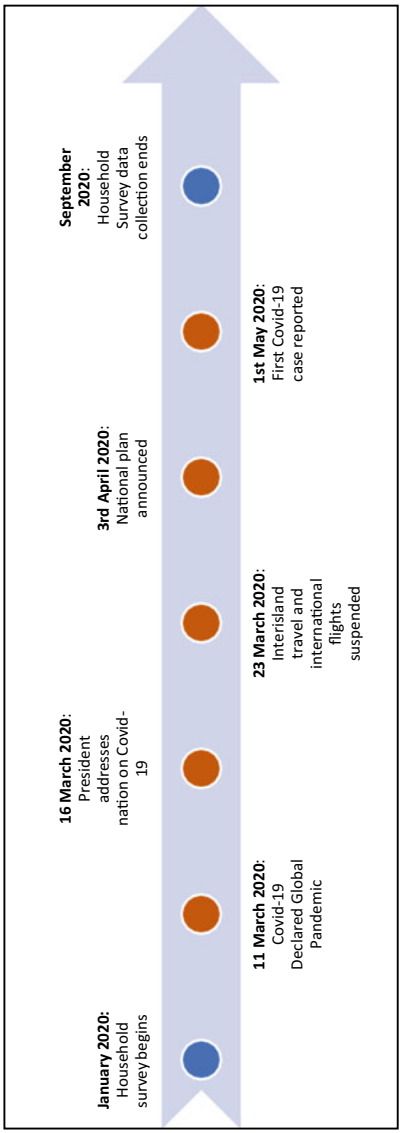

Fig. 1 Timeline of the EHCVM survey and COVID-19 response

16, 2020. Therefore, we may have reason to believe there may be anticipatory effects as people changed their behavior in response to the news. As such, we test the sensitivity of our analysis using the date the president addressed the nation as an alternative treatment cut-off date.

The household survey data used for analysis (EHCVM 2020) contain information on household aggregated consumption expenditures in nominal terms and the monetary value of household assets. They provide extensive household and individual welfare indicators used in estimating objective and subjective poverty measurements and labor market outcomes. The aim of this chapter is to empirically estimate the impact of the COVID-19 pandemic on household expenditure, asset value and ownership, poverty status, and labor market outcomes in the Comoros. To achieve the above, the chapter analyzes the impact of the virus curtailment measures at both the household and individual levels. The household-level analysis explores total per capita household expenditure, asset accumulation, and poverty. We construct the log of household per capita consumption expenditures from the estimated consumption expenditure for a given household. We extend our analysis by constructing monetary and non-monetary outcome measures for household asset accumulation. The monetary measure captures the log value of total assets owned by the household. The non-monetary household welfare metric includes the total count of assets owned by a household, the different types of assets, and the total count of livestock ownership.[6] Our last household measure considers poverty status using both objective and subjective measures. The objective poverty status is a binary variable that takes the value 1 if a household is below the national poverty line and 0 otherwise.[7] The subjective poverty measures are three separate binary variables taking the value 1 if a household self-reports as "living averagely well," "living in difficulty," or "living rich" according to their socioeconomic standards, respectively, and 0 otherwise. The binary subjective measures come from a categorical subjective measure of poverty. The motivation for creating binary subjective poverty measures is to ensure comparable estimation techniques and interpretations to the objective poverty measure.

Panel A of Table 1 presents summary statistics for our selected household outcome variables. The pre- and post-COVID-19 conditions are different across the welfare outcomes, which could be the impact of COVID-19 itself or the difference in samples interviewed before and

after the COVID-19 restriction. The log of per capita household expenditure shows a decline after the COVID-19 restrictions came into effect. Similarly, the different number of assets and number of livestock ownership show a decline after the lockdown. Not surprisingly then, household objective and subjective poverty measures are higher in the post-COVID-19 lockdown period.

In addition, we explore continuous and binary measures of labor market outcomes at the household and individual levels. The continuous outcomes include the share of working individuals in the household, the number of daily working hours, and the log of total monthly salary. The binary labor market outcomes include individuals in any employment and formal sector employment. Panel B of Table 1 represents the summary statistics regarding household and individual labor outcomes. The COVID-19 lockdown measure shows a negative correlation with labor market outcomes. The increase in the proportion of workers in formal employment and employment in the agricultural sector is noteworthy. By contrast, the proportion in the trade and service sector show a reduction. Table 12 in the appendix provides a detailed breakdown of employment across sectors. The employment sectoral distribution shows a high proportion of the employed in agriculture and the service sector.[8]

Figure 2 shows the mean distribution of selected outcomes pre- and post-COVID-19 lockdown month. Per capita expenditure shows an immediate reduction in April, which is a month after the COVID-19 lockdown, with a slight recovery in the second month (May) but still below the January 2020 average (two months pre-COVID-19 lockdown).

The poverty rate exhibits an increase after the COVID-19 lockdown and only starts falling in August/September 2020. The total hours worked per day also indicate a decreasing trend after the COVID-19 lockdown, increasing after three months but still below the pre-COVID-19 hours. Hours worked are observed to decline, but some evidence of recovery in July. Similarly, the employment rate is observed to recover in July before declining again. The unemployment trend shows variation but generally increases after the implementation of the COVID-19 restrictions, albeit with some recovery in July.[9] The level of discouragement post-COVID-19 increases until the fourth/fifth month. The differences observed across outcome variables among households interviewed before and after the COVID-19 restriction are only descriptive in nature, and these two groups of households are not necessarily comparable. As such,

Table 1 Summary statistics for household- and individual-level outcome variables by COVID-19 status

	Full	*Control*	*Treatment*	*Difference*	*Standard error*	p-*value*
Panel A Household Welfare Outcomes						
Log expenditure per capita	13.23	13.26	13.21	−0.05***	0.01	0.00
Asset Type						
Phone	0.88	0.91	0.86	−0.05***	0.00	0.00
TV	0.58	0.59	0.57	−0.01*	0.01	0.09
Motorcycle	0.02	0.03	0.02	0.00**	0.00	0.05
Car and/or truck	0.05	0.06	0.05	−0.02***	0.00	0.00
Bicycle	0.01	0.01	0.01	−0.01***	0.00	0.00
Radio	0.20	0.22	0.18	−0.04***	0.01	0.00
Furniture	0.95	0.96	0.94	−0.02***	0.00	0.00
Small appliances	0.36	0.41	0.32	−0.08***	0.01	0.00
Large appliances	0.36	0.37	0.35	−0.02***	0.01	0.00
Total number of different assets owned	6.76	7.04	6.54	−0.50***	0.05	0.00
Total number of assets owned (count)	11.79	12.26	11.44	−0.83***	0.09	0.00
Current value of all assets owned	469160	546326	416422	−129904***	11160.84	0.00
Log of value of assets	12.18	12.29	12.09	−0.20***	0.02	0.00
Livestock Ownership						
Has livestock	0.28	0.31	0.27	−0.04***	0.01	0.00
Total number of different livestock	0.39	0.43	0.36	−0.06***	0.01	0.00
Total number of livestock in herd owned by household	1.80	1.72	1.88	0.16	0.17	0.35
Household Poverty Status						
Objective Poverty: Poor	0.45	0.42	0.47	0.05***	0.01	0.00
Objective Poverty: Multidimensional poverty index	0.39	0.38	0.39	0.01***	0.00	0.00
Subjective Poverty: I live well	0.24	0.27	0.23	−0.04***	0.01	0.00

(continued)

Table 1 (continued)

	Full	*Control*	*Treatment*	*Difference*	*Standard error*	p-*value*
Subjective Poverty: I live poorly	0.31	0.30	0.32	0.02***	0.01	0.00
Subjective Poverty: Rich social rank	0.32	0.34	0.31	−0.03***	0.01	0.00
Panel B: Labor Market Outcomes						
Household Outcome						
Share of working individuals in household	0.30	0.31	0.29	−0.02***	0.00	0.00
Individual Outcomes						
Daily hours worked	7.66	7.56	7.72	0.16**	0.08	0.03
Employed	0.49	0.51	0.47	−0.04***	0.01	0.00
Unemployed	0.05	0.05	0.04	−0.01	0.00	0.18
Discouraged worker	0.10	0.09	0.11	0.01**	0.01	0.04
Formally employed	0.22	0.21	0.23	0.02**	0.01	0.02
Works in agriculture sector	0.34	0.31	0.37	0.06***	0.01	0.00
Works in industry sector	0.13	0.13	0.12	−0.01	0.01	0.33
Works in trade sector	0.05	0.06	0.05	−0.02***	0.01	0.00
Works in services sector	0.48	0.49	0.46	−0.03***	0.01	0.01
Log salary	11.08	11.06	11.09	0.03	0.04	0.43
Sample size	**29,192**	**17,480**	**11,712**			

Note "Difference" captures the raw difference between the post-COVID-19 sample (treatment) and the pre-COVID-19 sample (control)
Statistical significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

it is important to check household and individual characteristics across these two groups of households.

The survey data provide important individual and household characteristics like age, gender, marital status, location of settlement, educational attainment, access to basic amenities, and other household demographics. Table 2 presents summary statistics of these characteristics by COVID-19

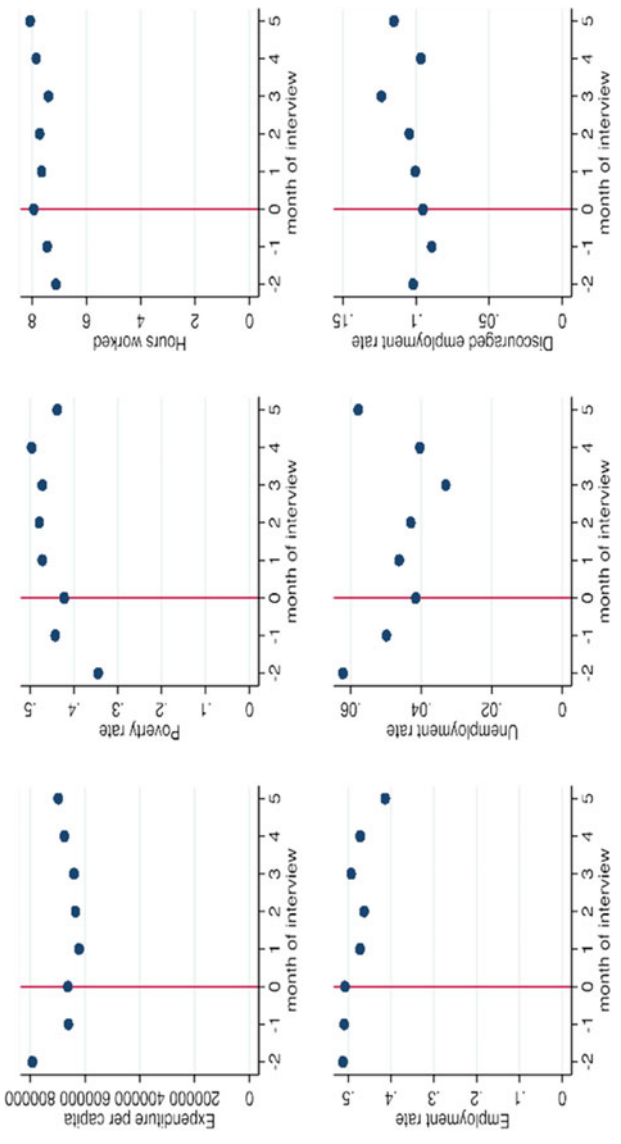

Fig. 2 Distribution of household welfare indicators and labor market outcomes across the month of interview (*Note* The zero (0) reference line denotes the Covid-19 lockdown month (March 2020) in Comoros. We positioned the x-axis to reflect the time trend of the interviews before and after the treatment variable (Covid-19 lockdown month). Hence, the scale reads from left of the reference line as January 2020 (−2), February (−1) and to the right as April (+1) to August/September (+5). The observations for August and September 2020 interviews were pooled together given their small sample sizes, hence the absence of (+6) that would have corresponded to September 2020)

status. The regional distribution shows no difference between the pre- and post-COVID-19 samples for the rest of Ngazidja, the main island, which accounts for 40% of the total sample. About 43% of the sample is resident in Ndzuwani Island, the second largest in the Comoros, with observed differences between the treatment and control groups. The individual demographics are similar for pre- and post-COVID-19 except for the literacy rate, which is higher for the control group. There are some differences in household access to basic amenities and dwelling features between the pre- and post-COVID-19 samples. Additionally, there is evidence of a higher dependency ratio in the pre-COVID-19 sample and a higher percentage of female household heads in the post-COVID-19 sample. The characteristics of household heads are similar across the two groups except for literacy rate.

The analysis of the summary statistics indicates a negative association of COVID-19 with household- and individual-level welfare indicators. However, a comparison of observable characteristics between treatment and control groups suggests that these may be driving the observed differences. Therefore, the objective of this chapter is to go beyond the descriptive association in a bid to evaluate the causal impact of COVID-19 on household welfare in the Comoros. The empirical strategy discussed in the next section will use household and individual characteristics as control variables to identify the causal impact of COVID-19 on welfare and labor market outcomes.

4 Empirical Methodology

Descriptive Regression Estimations

We first explore descriptive econometric analysis examining the impact of the COVID-19 lockdown measure on household and individual welfare indicators and labor market outcomes. We specify three models of the correlates of continuous indicators of household welfare. The first captures the COVID-19 treatment related to the exact month the national lockdown came into effect, and the last two evaluate the time-elapsed variation in interview month relative to the start of the national lockdown.

$$\text{welfare}_i = \beta_0 + \beta_1(\text{Post}) + X_i + \theta_j + e_i \tag{1}$$

Table 2 Summary statistics of household demographics and individual characteristics by COVID-19 status

	Full Sample	*Control*	*Treatment (COVID-19)*	*Difference (T- C)*	*Standard Error*	p-*value*
Individual Characteristics						
Male	0.48	0.48	0.48	0.00	0.01	0.87
Age	25.19	25.09	25.24	0.15	0.25	0.56
Literate	0.64	0.66	0.63	−0.03	0.01	0.00
Location and Settlement Type						
Moroni	0.11	0.12	0.10	−0.02	0.01	0.00
Rest of Ngazidja	0.40	0.39	0.40	0.00	0.01	0.72
Ndzuwani	0.43	0.40	0.45	0.05	0.01	0.00
Mwali	0.07	0.09	0.05	−0.03	0.00	0.00
Urban	0.32	0.35	0.29	−0.07	0.01	0.00
Household Characteristics						
Amenities						
Water Access	0.86	0.83	0.88	0.05	0.00	0.00
Sanitation Access	0.59	0.58	0.60	0.02	0.01	0.00
Electricity Access	0.84	0.85	0.83	−0.02	0.00	0.00
Dwelling Features						
Improved Roof	0.99	0.99	0.99	0.01	0.00	0.00
Improved Wall	0.48	0.48	0.48	0.00	0.01	0.85
Improved Floor	0.81	0.81	0.81	−0.01	0.01	0.14
Other characteristics						
Female-Headed	0.34	0.31	0.35	0.04	0.01	0.00
Dependency Ratio	1.12	1.14	1.10	−0.03	0.01	0.01
Polygamous	0.07	0.06	0.07	0.00	0.00	0.30
Single-Headed	0.10	0.10	0.11	0.00	0.00	0.24
People per Room	2.37	2.48	2.30	−0.19	0.02	0.00
Head's characteristics						
Age	45.76	45.92	45.66	−0.26	0.17	0.13
Literate	0.75	0.78	0.73	−0.06	0.01	0.00

(continued)

Table 2 (continued)

	Full Sample	*Control*	*Treatment (COVID-19)*	*Difference (T- C)*	*Standard Error*	p-*value*
No Education	0.59	0.58	0.59	0.01	0.01	0.08
Primary	0.12	0.13	0.12	−0.01	0.00	0.01
Educ lower secondary	0.10	0.10	0.11	0.00	0.00	0.31
upper secondary	0.06	0.07	0.06	−0.01	0.00	0.03
Tertiary	0.13	0.12	0.13	0.00	0.00	0.52
Samples	**29,192**	**17,480**	**11,712**			

Note "Difference" captures the raw difference between the post-COVID-19 sample (treatment) and the pre-COVID-19 sample (control)
Statistical significance: *** p < 0.01, ** p < 0.05, * p < 0.1

$$\text{welfare}_i = \beta_0 + \beta_1(\text{Post} * \text{months elapsed}) + X_i + \theta_j + e_i \tag{2}$$

$$\begin{aligned}\text{welfare}_i = {} & \beta_0 + \beta_1(\text{Post}) + \beta_2(\text{Post} * [\text{1 to 3 months elapsed}]) \\ & + \beta_3(\text{Post} * [\text{more than 3 months elapsed}]) + X_i + \theta_j + e_i\end{aligned} \tag{3}$$

where: welfare_i is a continuous variable that represents a variety of indicators of welfare measures (i.e., log of per capita household expenditure, related asset ownership indicators, and livestock ownership) for household i or individual i; Post is a dummy variable that indicates whether the interview occurred after the COVID-19 lockdown measure to curtail the outbreak of the pandemic; *monthselpased* is a continuous variable capturing the total count of months that elapsed from the month of the national lockdown; the other important explanatory variables 1 to 3 months elapsed and more than 3 months elapsed are dummy variables representing samples that were interview between 1 to 3 months and more than 3 months after the month of the national lockdown month, respectively; X_i is a vector for the i_{th} household and individual that includes covariates relating to, among others, age, gender, marital status, and educational attainment, and is further comprised of household dependency ratio, access to basic amenities, dwelling features, and

settlement type; θ_j represents location fixed effects; and e_i represents a random idiosyncratic error term. The estimations from models 1, 2, and 3 are important for understanding the overall and monthly variation of the effect of COVID-19 on our selected welfare outcomes. The estimators of interest are β_1, β_2, and β_3 which provide the average impact of the COVID-19 lockdown measures and the variation of the effect over time elapsed from the lockdown month on our selected welfare indicators. Pandemic outbreaks have dynamic effects on socio-economic indicators; hence, an understanding of the evolution of the effect after a curtailment measure is key for policy analysis. The above equations are estimated by ordinary least squares regression analysis with robust standard errors.

In addition to the continuous measures of household welfare indicators, we also use binary (0/1) poverty measures for households. The estimation of the COVID-19 impact on household poverty (both objective and subjective) is obtained from the probit model specification as follows:

$$\text{prob}[\text{poverty}_i = 1] = \phi(\beta_0 + \beta_{1post} + X_i) \tag{4}$$

where $\phi(.)$ is the cumulative distribution function operator for the standard normal; poverty_i is a binary variable that represents whether a household or individual is below the national poverty line or the three subjective poverty measures computed from self-assessed economic status as living in difficulty, living well, and living rich, respectively; and post_i and X_i are the variables for the COVID-19 lockdown measures and the related poverty determinants as defined in Eq. 1. Our probit model estimation does not consider the month-elapsed variables from the national lockdown, as the interpretation of interaction marginal effect from probability model estimation lacks theoretical justification and entails computational difficulties (Williams, 2012).

In addition to the analysis of welfare indicators, we explore the effect of COVID-19 on household and individual labor market outcomes. Labor market outcomes can be separated into continuous and binary measures. The continuous labor market outcomes of interest include the share of working members in the household, the total hours worked, and the log of total monthly salary. The first outcome is a household-level variable, and the last two are individual-level outcomes. The relevant estimation technique follows the forms specified for models 1, 2, and 3 above, with

continuous measures of the labor outcomes replacing the welfare indicator on the left-hand side of the specifications. The estimation provides the average effect for post-COVID-19 and time-elapsing effect on the labor market outcomes for households in the Comoros.

The estimation follows an Ordinary Least Squares (OLS) regression analysis. In addition, our labor market binary outcomes (employed and formally employed) are estimated for model 1 only using Probit estimation analysis. The aim of this evaluation is to provide an understanding of the mechanisms through which the associated government lockdown measure during the pandemic affected the general welfare.

Causal Impact Estimation: Propensity Score Matching

The above analysis provides an initial descriptive empirical outlook of the estimation of the impact of COVID-19 on welfare, poverty, and labor market outcomes for the Comoros. In order to estimate a causal impact of COVID-19 on our selected outcome variables, we expand our analysis using the propensity score matching (PSM) technique. The PSM methodology allows for the estimation of the average treatment effect of COVID-19 on household and individual welfare, poverty status, and labor market outcomes. Given that the analysis uses observational data for one time period, the PSM approach is appropriate in an attempt to causally identify the key effects of interest.

The PSM approach simulates a random allocation of households and individuals into treatment and control groups based on their estimated propensity scores. The propensity score estimation in the PSM empirical approach begins with an estimation of a treatment assignment equation using a logistic regression model. The case of the COVID-19 government lockdown measure is unique as it provides a natural demarcation of households and individuals interviewed pre- and post-lockdown. The treatment assignment equations empirically predict the probability that a household or individual is in the post-COVID-19 sample (the treatment group). The logistic model includes sets of household and individual covariates that are not necessarily informed by economic theory and may comprise polynomial and interaction terms. The motivation behind the logistic specification is the need to achieve strong predictions of treatment and control group allocation probabilities and effective covariate balancing in the matching procedure. The model estimates are used to

compute the propensity scores on which the households and individuals from the two groups are subsequently matched. In specifying the logistic regression, the included explanatory variables should not be predetermined by the treatment variable (COVID-19 lockdown measure) but should be correlated with the outcome variables (welfare indicators and labor market outcomes). The included covariates in the treatment equation are the same welfare determinants used in Eqs. 1, 2, and 3. The above consideration limits potential concerns on the internal validity of the approach. The crucial identifying assumption is that, conditional on the input variables, the assignment to the treatment group (post-COVID-19 lockdown sample) and the control group (pre-COVID-19 lockdown sample) can be simulated as random and independent of the treatment. This is the conditional independence assumption (CIA) (see Heckman, Ichimura and Todd, 1997; Smith and Todd, 2005; among others for details on the PSM technique). The assumption overcomes the problem of counterfactual simulation in natural experiments using observational data, and the matching quality can be assessed through the distribution of the included covariates after matching.

The estimation of the average treatment effect subjects the treatment and control groups to a common support which eliminates the possible bias from non-overlapped observations from the two groups. The kernel density matching technique is used for matching purposes. However, an extension to the use of other matching technique will be evaluated in the robustness section. After the implementation of the matching exercise, the uninfluenced explanatory variables for the treatment and control groups should exhibit a similar distributional pattern. A satisfactory outcome is achieved only if the households assigned to the treatment and control groups provide identical observations in terms of the marginal distributions of the input variables. If this balancing property is satisfied, this implies that no measured confounder bias remains. The property is assessed using several different diagnostics. These include the standardized bias approach suggested by Rosenbaum and Rubin (1985), which measures the distance in the marginal (or unconditional) distributions of the input variables between the control and treatment groups prior to and after matching. In addition, t-statistics and variance ratios (i.e., F-tests) for each variable included in the treatment assignment equation are also used to determine if there are statistical differences between the means and variances (of the continuous input variables) after matching.

In investigating the balancing property, the logistic treatment assignment model is also re-estimated using the set of matched data. The expectation is that with good matching, the regression model's pseudo-R2 should be close to zero, and the corresponding Likelihood Ratio Test (LRT) for the overall statistical significance of the logistic regression model should yield a low value. We also use Rubin's B and R statistics (see Rubin, 2001), which provide a set of criteria for comparing the distribution of the propensity scores between the treatment and control groups. These latter two test statistics indicate whether the regression-based procedure adequately eliminates any measured confounder bias using an appropriate set of confidence intervals.

Once the balancing property is satisfied, we continue with the estimation of the treatment (post-COVID-19 sample) impact by computing the weighted average difference between the post-COVID-19 units and the average of the pre-COVID-19 counterfactual units in the control group.

The standardized weights are calculated on the magnitude of differences in the propensity scores between the individual treated units and the compared control units. The average treatment effect on the treated (ATT) is computed for our data to inform on the causal impact of COVID-19 on selected welfare indicators and labor market outcomes.

5 Empirical Results

The empirical results are presented and analyzed, starting with the descriptive regression results. The first sets of results encapsulate the impact of the three treatment variables capturing the COVID-19 lockdown on (i) household welfare indicators using OLS estimations, (ii) poverty indicators using the Probit estimation, and (iii) labor market outcomes.

Table 3 presents the results of the OLS estimates of the impact of the COVID-19 lockdown on expenditure and asset ownership indicators, both overall average and time-elapsed effect. Table 3 gives an overview of household wealth status using three different but complementary indicators. In the literature, household livestock and assets are viewed as stored wealth or savings accounts for households in developing countries (Andersson, Mekonneh and Stage, 2011). Therefore, it is important to understand the impact of economic shocks like the COVID-19 on household asset and livestock ownership in a context like COVID-19 where restricted movement may limit access to markets. The first panel (A) in

Table 3 represents the results for each of the three models for the log of household expenditure and livestock ownership. The second panel (B) of Table 3 represents the results for household asset status across three different measures.

In Panel A of Table 3, the impact of the COVID-19 lockdown shows an average reduction in household expenditure of 6.8%, with a 3% reduction for each month that elapsed after the lockdown month, *ceteris paribus*. The interaction of our post-COVID-19 sample and the number of months that elapsed shows the effect lingered strongly during the first three months after the lockdown. There is some evidence of recovery, with the magnitude of the negative impact slowly reducing within the first 3 months. The rate of recovery improves post-three months of the national lockdown.

The last six columns of Panel A in Table 3 present the estimation for the household livestock ownership across two measures (different types and total livestock owned) for the three models. The impact of the COVID-19 lockdown was a small decrease in the different types of livestock owned by a household, on average. Nevertheless, there was no significant impact on the total number of livestock owned after the lockdown. The results on the impact of the COVID-19 lockdown on the three household asset ownership measures are presented in Panel B. The number of different asset types owned by households decreased slightly by 0.4 asset counts, on average, after the COVID-19 lockdown policy. The negative impact lingers but becomes even weaker for the months that elapsed after the COVID-19 lockdown policy. In a similar line, the total number of assets owned by a household also declined slightly, with the loss being equivalent to a decline in number by 0.5. The impact on the number of assets lingers within the first three months, with no substantial evidence of recovery after three months. The last three columns of Panel B, in Table 3, represent the COVID-19 impact on the monetary value of total assets for a household, and there was a 16.7% reduction on average, *ceteris paribus*. In addition, for each month after the COVID-19 lockdown, there was a 6.9% reduction in the value of total assets, which translates to a loss of approximately 37,696.5 Comorian francs using the pre-COVID-19 sample mean value. There is no evidence of recovery as the months elapsed after the COVID-19 lockdown policy implementation for the monetary value of asset ownership.

Table 4 represents the result of the Probit regression of household poverty status for both objective and subjective measures. An evaluation

Table 3 Ordinary least square results (Welfare indicators)

PANEL A	*Log of Household Expenditure*			*Household Livestock Ownership*					
				Different Types Owned			*Total Owned*		
	1	*2*	*3*	*1*	*2*	*3*	*1*	*2*	*3*
Post-COVID-19	−0.068***		−0.150***	−0.067***		−0.143***	0.223		0.688*
	(0.006)		(0.011)	(0.008)		(0.018)	(0.178)		(0.412)
Post-COVID-19*months elapsed (continuous)		−0.030***			−0.029***			0.129*	
		(0.002)			(0.002)			(0.078)	
Post-COVID-19*months elapsed (1–3)			0.026***			0.022			−0.094
			0.009)			(0.015)			(0.135)
Post-COVID-19*months elapsed (>3)			0.114***			0.109***			−0.719*
			0.008)			(0.013)			(0.387)
R-squared	0.415	0.420	0.420	0.078	0.080	0.080	0.005	0.006	0.006
Observations	28,902	28,902	28,902	28,902	28,902	28,902	28,902	28,902	28,902

PANEL B	*Household Asset Ownership*								
	Number of Different Assets Owned			*Number of Assets Owned*			*Log Value of Assets Owned*		
	1	*2*	*3*	*1*	*2*	*3*	*1*	*2*	*3*
Post-COVID-19	−0.395***		−0.542***	−0.521***		−1.146***	−0.167***		−0.335***
	(0.042)		(0.086)	(0.076)		(0.157)	(0.017)		(0.035)

PANEL B	*Household Asset Ownership*								
	Number of Different Assets Owned			*Number of Assets Owned*			*Log Value of Assets Owned*		
	1	*2*	*3*	*1*	*2*	*3*	*1*	*2*	*3*
Post-COVID-19*months elapsed (continuous)		−0.144*** (0.013)			−0.206*** (0.023)			−0.069*** (0.005)	
Post-COVID-19*months elapsed (1–3)			−0.136** (0.068)			0.164 (0.123)			0.040 (0.028)
Post-COVID-19*months elapsed (>3)			0.443*** (0.064)			0.919*** (0.120)			0.252*** (0.027)
R-squared	0.297	0.298	0.299	0.286	0.287	0.288	0.242	0.244	0.245
Observations	28,902	28,902	28,902	28,902	28,902	28,902	28,902	28,902	28,902

Note Robust standard errors in parentheses

Statistical significance: *** p < 0.01, ** p < 0.05, * p < 0.1

The controls include head of household and individual member age, education, and marital status; polygamous household; female-headed household; dependency ratio; number of working-age individuals in household; access to water, sanitation, and electricity; improved floor and roof; location (region and urban settlement)

of the objective poverty indicator, measured by households below the poverty line, revealed an 8.1 percentage point increase, on average, post-COVID-19 lockdown. Regarding the subjective poverty measures, the results revealed a 4.7 and 4.8 percentage points reduction for households that self-assessed as living well and as socio-economically rich, respectively. In addition, the estimation showed an increase of 1.7 percentage points for households that self-assessed as living in difficulties. The overall impact of the COVID-19 lockdown measures was an increase in poverty status across the objective and subjective measures.

Table 5 presents the results of the descriptive OLS and Probit analysis on the impact of COVID-19 on labor market outcomes. The outcomes of interest include the share of working individuals in the household and the log of salary for an individual, across the three models using OLS. In addition, the results (marginal effects) of binary outcomes of being employed and being formally employed are highlighted for model 1 estimated by Probit estimation method. The share of working household members decreased by an average of 2.8% after the COVID-19 lockdown, with no significant recovery as the months elapsed and a 0.8% reduction in the share of working members for an additional month after the COVID-19 lockdown measure, *ceteris paribus*. The total individual hours worked reduced slightly by 0.2 hours per day but no significant impact was found as the months elapsed. Similarly, the estimated effect of COVID-19 on individual monthly salary shows no significance across the three models. However, the estimated impact on employment status was a significant 6 percentage points reduction in the likelihood of being employed, while probability of formal employment increased by 2.2 percentage points, on average, *ceteris paribus*.[10]

Table 4 Probit regression analysis results (Poverty status) (Marginal effects)

		Subjective Poverty Outcomes		
	Objective Poverty	*I live well*	*I live in difficulty*	*I am rich*
Post-COVID-19	0.081***	−0.047***	0.017***	−0.048***
	(0.007)	(0.006)	(0.006)	(0.009)
Observations	28,902	28,005	28,005	27,131

Note Robust standard errors in parentheses Estimation by Probit. Marginal effect at means reported Statistical significance: *** p < 0.01, ** p < 0.05, * p < 0.1

Table 5 OLS regression and probit analysis results (Labor market outcomes)

	Continuous Outcomes									*Binary Outcomes*	
	Share of working members			*Total hours worked per day*			*Log salary*			*Employed (Model 1)*	
	1	*2*	*3*	*1*	*2*	*3*	*1*	*2*	*3*	*Total*	*Formal*
Post-COVID-19	−0.028*** (0.002)		−0.038*** (0.005)	0.173** (0.075)		−0.113 (0.153)	0.008 (0.035)		0.078 (0.077)	−0.060*** (0.009)	0.022** (0.011)
Post-COVID-19*months elapsed (continuous)		−0.008*** (0.001)			0.021 (0.022)			0.001 (0.011)		N/A	N/A
Post-COVID-19*months elapsed (1–3)			0.002 (0.004)			0.198 (0.126)			−0.096 (0.061)	N/A	N/A
Post-COVID-19*months elapsed (>3)			0.016*** (0.003)			0.264** s (0.111)			−0.007 (0.057)	N/A	N/A
R-squared	0.186	0.186	0.187	0.062	0.061	0.062	0.176	0.176	0.176		
Observation	28902	28902	28902	8,697	8,697	8,697	1670	1670	1670	8,697	8,697

Note Robust standard errors in parentheses

Statistical significance: *** p < 0.01, ** p < 0.05, * p < 0.1

Share of working members estimation: The controls include head of household and individual age, education, and marital status; polygamous household; female-headed household; dependency ratio; number of working-age individuals in household; access to water, sanitation and electricity; improved floor and roof; location (region and urban)

Other Estimations: The controls include individual age, education, and marital status; polygamous household; female-headed household; dependency ratio; number of working-age individuals in household; access to water, sanitation, and electricity; improved floor and roof; location (region and urban)

Table 6 Average Treatment Effect (ATT) of COVID-19 on household welfare and labor market outcomes

Panel A: Household Indicators	*Impact*
Log expenditure per capita	−0.034***
	(0.008)
Number of different types of asset owned	−0.418***
	(0.059)
Total number of assets owned (count)	−0.596***
	(0.108)
Log value of assets	−0.151***
	(0.023)
Number of different types of livestock owned	−0.111***
	(0.010)
Number of livestock owned	−0.003
	(0.208)
Panel B: Household Poverty Status	
Objective Poverty: Poor	0.036***
	(0.007)
Subjective Poverty: I live well	−0.039***
	(0.006)
Subjective Poverty: I live poorly	0.002
	(0.007)
Subjective Poverty: I am rich	−0.060***
	(0.007)
Panel C: Labor Market Outcomes	
Share of working household members	−0.025***
	(0.003)
Employed	−0.051***
	(0.008)
Formal employment	0.013
	(0.009)
Total hours worked per day	0.199***
	(0.072)
Log salary	0.002
	(0.039)
Sectoral Employment	
Agriculture	0.048***
	(0.011)
Industry	−0.001
	(0.007)
Trade	−0.017***
	(0.005)
Service	−0.029**
	(0.111)

Note The observations across the treatment and control groups for each outcome vary in the estimation in accordance with the available data
Robust standard errors in parentheses
* $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The descriptive regression analysis above shows that some of the negative impacts observed in the raw differences in Table 1 are still statistically significant even after controlling for other characteristics that may be affecting the outcome variables. Specifically, COVID-19 is found to be associated with lower household expenditure, total asset value and ownership, the share of employed household members, and individual-level employment. In addition, both objective and subjective poverty measures are found to be worse.

We now discuss the PSM results of the estimation of the average treatment effect on the treated (ATT) of COVID-19 lockdown on selected household welfare indicators. Table 13 in the appendix presents the logit estimates for the treatment assignment model used to compute the propensity scores for the post-COVID-19 treatment variable. As discussed in the empirical methodology section, the specification of the logistic treatment assignment equation is not motivated by any economic theory and the estimates do not need an economic interpretation. The aim of the treatment assignment equation is to provide a good predictive outcome of the propensity scores for the matching exercise. However, certain conditions need to be satisfied to ensure the ATT is valid and captures the causal impact of COVID-19 on household welfare. First, the estimations were done within the common support, and only seven observations failed to satisfy the common support condition and were excluded from the empirical analysis (see Figure 3 in the appendix for the propensity score distribution for the treatment and control groups).

Second, the matching procedure yielded good balancing quality for the covariates across the different diagnostic checks. The mean and the median-standardized bias estimates are below the required threshold, and none of the individual covariates yields a standardized bias outside of the $\pm$ 5% interval. The variance ratios for the continuous variables for the two groups (treatment and control) lie within the specified 95% confidence intervals. In addition, the pseudo-R^2 values for the logistic regression model re-estimation using the matched data are negligible, and the Likelihood Ratio Test (LRT) values for the overall significance of the regression are statistically insignificant. The estimated Rubin criteria for good balancing on the propensity score are all satisfied and reinforce a good balancing achievement. The full array of statistics and diagnostics for the balancing property is contained in Tables 14, 15 and 16 of the appendix.

Table 6 represents the average treatment effect of the COVID-19 lockdown measure on household welfare indicators, poverty, and labor market outcomes separately. In Panel A of Table 6, the average causal impact on the post-COVID-19 lockdown sample is a 3.3% (i.e., $[e^{-0.034}-1] \times 100$) reduction in household per capita expenditure, *ceteris paribus*. The estimated ATTs also predict a negative, albeit small, impact on household asset ownership status. The number of different assets owned by a household decreased slightly by 0.4, and the total number of assets owned decreased by 0.6 asset counts. A significant negative impact is also observed for the total monetary value of assets within a household, with a 14% (i.e., $[e^{-0.151}-1] \times 100$) reduction as a result of COVID-19 lockdown. The number of different types of livestock owned by a household also decreased slightly by 0.1, but there was no significant impact on the total livestock counts.

Panel B of Table 6 presents the estimated ATT of COVID-19 on the poverty status of a household. The overall impact is an increase in objective poverty by 3.6 percentage points for the post-COVID-19 sample. Subjective poverty analysis supports a general reduction in the proportion of households that self-reported as living well or as rich by 3.9 and 6.0 percentage points, respectively. However, the subjective view of living in difficulty showed no significant impact from the COVID-19 lockdown. The results from Panel A and B of Table 6 represent a substantial loss in household welfare post-COVID-19.

The last panel of Table 6 outlined the ATT for the household and individual labor market outcomes. The share of working individuals within a household decreased by 2.5 percentage points, with an overall 5.1 percentage points reduction in employment rate, on average. There was no significant impact on formal employment as opposed to the estimated 2.2 percentage points increase from the Probit marginal effect. Similarly, there is no significant impact on individual monthly salary. However, the total number of working hours per day slightly increase by 0.2 hours per day (12 minutes per day) post-COVID-19, on average, *ceteris paribus*. The evaluation on the employment sectoral impact of COVID-19 shows a significant 4.8 percentage point increase in the likelihood of employment in agriculture. By contrast, there was a significant reduction in the likelihood of employment in the trade and services sectors by 1.7 and 2.9 percentage points, respectively.

Robustness Checks

The above empirical results provide an overview of the causal impact of COVID-19 on household welfare, individual, and household labor market outcomes. To ensure the robustness of our findings, we first check for internal validity to our preferred estimation using other estimation techniques, namely inverse probability weighting and nearest neighbor matching.

Table 7 shows negative impacts of COVID-19 on welfare indicators and labor market outcomes as observed in our main estimates. The magnitudes tend to be slightly on the lower bound for the PSM estimation. The nearest neighbor estimates are on the upper bound. Nevertheless, the internal validity process affirms the COVID-19 lockdown impact on our selected outcomes, and the magnitudes are broadly consistent with our main findings.

Secondly, we address the concern that anticipatory information regarding the COVID-19 lockdown was already in circulation after the President of the country made an official address to the nation on March 16, 2020. We provide estimates using a binary treatment assignment, which takes the value one if a household was interviewed before the presidential address held on March 16, 2020, and zero otherwise. The preferred estimates are the average treatment effects from the propensity score matching method. However, we extend the analysis and implement the two other matching techniques to validate our estimates internally. Table 8 below represents the average treatment effect of COVID-19 anticipation on our outcome variables across the three estimation methods.

In Panel A of Table 8, the first column highlights the results from the propensity score matching technique. The estimated impact of the COVID-19 anticipation measure is a significant reduction in household expenditure by 4.3% (i.e., $[e^{-0.044}-1] \times 100$), on average, ceteris paribus. In addition, the effect on household asset counts negatively changed by a magnitude of 0.4 units. However, the measure used for anticipation of COVID-19 lockdown is linked with a 14% (i.e., $[e^{-0.151}-1] \times 100$) reduction in the monetary value of assets. There is evidence of a reduced number of types of livestock owned, but the magnitude of change is low, and the number of livestock owned shows no significant change. The anticipation of COVID-19 accounted for an increase in household objective poverty by 4.4 percentage points, on average. Similarly, subjective

Table 7 ATT estimates of COVID-19 impact on household welfare and labor market outcomes using alternative matching methods

	Inverse Probability weighting	*Nearest Neighbor Matching*
Panel A: Household Indicators		
Log expenditure per capita	−0.061***	−0.074***
	(0.006)	(0.008)
Number of different types of asset owned	−0.433***	−0.539***
	(0.042)	(0.057)
Total number of assets owned (count)	−0.572***	−0.702***
	(0.077)	(0.101)
Log value of assets	−0.162***	−0.184***
	(0.017)	(0.022)
Number of different types of livestock owned	−0.089***	−0.098***
	(0.009)	(0.011)
Number of livestock owned	0.028	−0.014
	(0.167)	(0.218)
Panel B: Household Poverty Status		
Objective Poverty: Poor	0.054***	0.063***
	(0.006)	(0.006)
Subjective Poverty: I live well	−0.039***	−0.046***
	(0.005)	(0.007)
Subjective Poverty: I live poorly	0.008	0.006***
	(0.006)	(0.007)
Subjective Poverty: I am rich	−0.057***	−0.067***
	(0.006)	(0.007)
Panel C: Labor Market Outcomes		
Share of working household members	−0.026***	−0.033***
	(0.002)	(0.003)
Employed	−0.049***	−0.047***
	(0.008)	(0.007)
Formal employment	0.022***	0.002
	(0.008)	(0.009)
Total hours worked per day	0.213***	0.200***
	(0.072)	(0.074)
Log salary	0.018	0.023
	(0.038)	(0.039)
Employment Sector		
Agriculture	0.044***	0.041***
	(0.010)	(0.010)
Industry	−0.002	−0.006
	(0.007)	(0.007)
Trade	−0.018***	−0.0161**
	(0.005)	(0.005)

(continued)

Table 7 (continued)

	Inverse Probability weighting	*Nearest Neighbor Matching*
Service	−0.024 (0.011)	−0.0184* (0.011)

Note The observations across regression analysis for each outcome vary in the estimation in accordance with the available data
Robust standard errors in parentheses
*** p < 0.01, ** p < 0.05, * p < 0.1

poverty measures also estimate a reduction in welfare as the proportion of households self-reported to be living well and subjectively rich reduced by a significant 4.2 and 6.6 percentage points, respectively.

Panel C of Table 8 shows the COVID-19 anticipation effect on household and individual labor market outcomes. The results depict a reduction in the share of working-age individuals within a household by 2.8 percentage points, on average. In addition, the probability of employment reduced by 5.4 percentage points, with a slight increase in working hours per day of 0.29 hours for the employed, on average. In addition, the likelihood of employment in agriculture increased by 4.5 percentage points in anticipation of the COVID-19 lockdown while likelihood of employment in Trade and Service sector reduced by 1.8 and 3.4 percentage points, respectively.

The overall impact of the COVID-19 presidential address was a reduction in household welfare, an increase in poverty and worsening labor market outcomes with evidence of increased participation in agricultural activities. Analysis on assets shows that the total asset value declined significantly, but the average number of assets lost was less than one. The small magnitude of decline in number of assets suggests limited sale of assets as a coping mechanism. Additionally, the large decline in reported current value of assets may reflect households' perception or reduced valuation of the worth of their assets given their limited ability to sell them. The other two estimation techniques give internal validity to our analysis as the results are consistent across the different measures.

It is worth noting that our evaluation of the impact of COVID-19 on household welfare and labor market outcomes did not account for the direct contagion of the virus. Due to data unavailability, we were

Table 8 ATT estimates of COVID-19 anticipation on household welfare and labor market outcomes

	Propensity Score Matching	*Inverse Probability Weighting*	*Nearest Neighbor Matching*
Panel A: Household Indicators			
Log expenditure per capita	−0.044*** (0.008)	−0.046*** (0.006)	−0.052*** (0.008)
Number of different types of asset owned	−0.377*** (0.061)	−0.361*** (0.044)	−0.401*** (0.058)
Total number of assets owned (count)	−0.5340*** (0.113)	−0.540*** (0.080)	−0.539*** (0.104)
Log value of assets	−0.151*** (0.024)	−0.159*** (0.018)	−0.175*** (0.022)
Number of different types of livestock owned	−0.095*** (0.011)	−0.082*** (0.009)	−0.085*** (0.011)
Number of livestock owned	−0.018 (0.197)	0.004 (0.157)	0.027 (0.199)
Panel B: Household Poverty Status			
Objective Poverty: Poor	0.044*** (0.007)	0.043*** (0.006)	0.048*** (0.006)
Subjective Poverty.: I live well	−0.042*** (0.007)	−0.041*** (0.006)	−0.041*** (0.007)
Subjective Poverty.: I live poorly	0.007 (0.007)	0.008 (0.006)	0.005 (0.007)
Subjective Poverty.: I am rich	−0.066*** (0.007)	−0.059*** (0.006)	−0.069*** (0.007)
Panel C: Labor Market Outcomes			
Share of working household members	−0.028*** (0.003)	−0.023*** (0.003)	−0.027*** (0.003)
Employed	−0.054*** (0.008)	−0.056*** (0.008)	−0.050*** (0.007)
Formal employment	0.009 (0.009)	0.021** (0.008)	0.000 (0.008)
Total hours worked per day	0.286*** (0.074)	0.259* (0.159)	0.232* (0.161)
Log salary	−0.006 (0.039)	0.017 (0.039)	−0.009 (0.039)
Individual Employment Sector			
Agriculture	0.045*** (0.011)	0.044*** (0.010)	0.039*** (0.011)

(continued)

Table 8 (continued)

	Propensity Score Matching	*Inverse Probability Weighting*	*Nearest Neighbor Matching*
Industry	0.008	−0.006	−0.007
	(0.008)	(0.008)	(0.008)
Trade	−0.018***	−0.019***	−0.017***
	(0.005)	(0.005)	(0.005)
Service	−0.034**	−0.031**	−0.029**
	(0.011)	(0.011)	(0.011)

Note The observations across regression analysis for each outcome vary in the estimation in accordance with the available data
Robust standard errors in parentheses
*** p < 0.01, ** p < 0.05, * p < 0.1

unable to capture the impact of direct case contagion of the COVID-19 pandemic on socio-economic status. Nevertheless, the proactiveness of the Comoros government in enacting a lockdown before the first recorded case alleviated the potential risk of the impact of the virus contagion on household welfare. As noted previously, the recorded number of COVID-19 cases in the Comoros is among the lowest in the world. Thus, impacts from the containment measures as analyzed in this chapter are likely to outweigh direct impacts.

Thirdly, we evaluate the impact of the COVID-19 pandemic on individual household asset types. The disaggregation allows the investigation of what asset is responsible for the negative, albeit small, reduction in asset ownership. It further informs on the role of asset type on the coping mechanism of households due to the COVID-19 lockdown in the Comoros. It is important to note that in the case of the Comoros, it is plausible that there could have been an impact on assets since the existence of a curfew (see context) implies that individuals could have moved around within islands during permitted hours and some trade in assets could have occurred. Table 17 in the appendix shows the ATT effect of both the COVID-19 lockdown and anticipation on the likelihood of ownership of household asset types. The estimates showed a decrease in the likelihood of owning a radio by 4.5 percentage points, while the likelihood of owning a radio declined by 3.1 percentage points. The impact on the probability of ownership of motorcycle and bicycles was negligible (0.7 percentage points) while there was no statistically significant impact on the likelihood of owning furniture. Likewise, the COVID-19

anticipation follows the same pattern with overall low changes in likelihood of asset ownership across the different types. In short, ownership of assets appears to have been only slightly impacted. During COVID-19, especially a month after the lockdown, the market had limited opening hours. It is possible households could have sold assets as markets opened for limited hours hence the decline observed. Nevertheless, magnitude is small, therefore suggesting that in times of crises like COVID-19, markets do not function as well and therefore, households cannot effectively use assets as a coping mechanism.

Finally, our estimates include the possible mitigating effect from support received during the COVID-19 lockdown in the Comoros. The United Nations Development Programme (UNDP) contributed a total of US$10 million to the Comoros COVID-19 pandemic preparedness and response strategy. This has a potential downward bias to our estimated impact. However, an evaluation from United Nations Development Program (UNDP) reveals that delivery of support to the Comoros during the pandemic was limited due to the absence of other international humanitarian agencies to support the three United Nations agencies (UNDP Comoros, 2020).[11] Therefore, the limitations in aid delivery reduce the potential bias stemming from mitigating economic policies at the aggregate level on our empirical estimates. Nevertheless, we acknowledge that our estimates capture the broader effect of the COVID-19 lockdown without separating it from the mitigating impact of economic support.

Extension: The Distributional Impact of COVID-19 in the Comoros

To better understand the welfare consequences of the pandemic and how to mitigate its negative impact, an evaluation of distributional implications is necessary. Our above analysis estimates the average welfare consequences of the COVID-19 lockdown, showing a reduction in household expenditure and increased poverty. Post-pandemic policy formulation aimed at promoting development and reducing poverty can benefit from an assessment of the impacts at different levels of welfare. Table 16 in the appendix presents the raw differences across household expenditure quantiles for the pre- and post-COVID-19 samples. The table shows a negative correlation across the distribution. We therefore investigate the impact of COVID-19 lockdown and its anticipation on the distribution

of household expenditure at different quantiles using the Quantile Treatment Effect (QTT) estimation technique proposed by Firpo (2007). A brief description of the QTT approach in the context of our analysis is provided below.

The QTT represents the differences in the marginal distributions of the potential treatment (post-COVID-19) and control (pre-COVID-19) outcomes between quantiles. Firpo (2007) invoked the above definition to estimate the QTT with an additional strong assumption of homogeneity of the treatment conditional on selected covariates. The relevant restriction imposed in the estimation by Firpo (2007) is the assumption that selection into the treatment is based on observable characteristics. The assumption is simply a re-statement of the exogeneity assumption based on the conditional independence assumption, which implies that the assignment of individuals to either the treatment or control group given a set of observables is random. The assumption is also known as the unconfoundedness assumption in the literature (Robins, 1997) and is used to compute the conditional average treatment effects on the treated (ATT). A similar approach is applied in estimating the unconditional quantiles treatment on the treated (QTT) estimates.

We first estimate a model of the probability of a household being among the post-COVID-19 interviewed households based on the included set of observable variables relative to those in the pre-COVID-19 group. The observable characteristics included should be pre-determined and should not be affected by the COVID-19 lockdown measure but may be associated with household expenditure. The non-parametrically estimated propensity scores predict the probability of a household being in the post-COVID-19 interview samples. The included covariates are similar to those used in the propensity score matching discussed in our principal methodology. Second, we consider the case of the QTT estimation in the context of the Comoros COVID-19 lockdown and its anticipation. Both treatment variables (COVID-19 lockdown impact and COVID-19 anticipation) are defined as a dummy taking the value 1 if a household is interviewed either post-COVID-19 lockdown or after the president's address on COVID-19, and zero otherwise, respectively. Finally, we explore the impact of COVID-19 at different points of the household expenditure distribution. We focus on household expenditure as it provides an outcome that can be observed in understanding household welfare distribution.[12]

Table 9 provides the estimated impacts. The first sets of results show a reduction in household expenditure across the different quantiles. Households in the bottom quantile had a 4.3% (i.e., $[e^{-0.044}-1] \times 100$) reduction in household expenditure due to the COVID-19 lockdown, with a similar pattern in the middle of the distribution. However, the negative impact observed is stronger for households in the upper distribution with a magnitude of 7.4% (i.e., $[e^{-0.077}-1] \times 100$) reduction. Thus, the effect of the COVID-19 lockdown is a reduction in household expenditure distribution with a more substantial impact at the top of the distribution. Similarly, the COVID-19 anticipation indicator also negatively impacts household expenditure across the distribution and the effect increases as we move up the household expenditure distribution, with an 8.5% (i.e., $[e^{-0.089}-1] \times 100$) reduction for the top quantile.

A final extensive analysis includes the disaggregation of some of our main estimates across urban and rural settlements. Our estimation technique follows the PSM approach. Our evaluation matches households within each settlement type (urban or rural) across treatment and control groups and the ATTs generated separately. The results in Table 10 showed a reduction in household expenditure for urban and rural households and an increase in objective poverty by 2.7 and 4.8 percentage points for urban and rural residents, respectively. Interestingly, the proportion of households self-reporting living well reduced by 4.8

Table 9 Quantile treatment effects using log per capita household expenditure

	10th	*20th*	*50th*	*75th*	*90th*
Covid-19	−0.044***	−0.057***	−0.053***	−0.055***	−0.077***
Impact	(0.011)	0.010)	0.010)	0.012)	(0.015)
Observations	28902	28902	28902	28902	28902
Covid-19	−0.042***	−0.056***	−0.064***	−0.065***	−0.089***
Anticipation	(0.011)	(0.010)	(0.010)	(0.012)	(0.015)
Observations	28902	28902	28902	28902	28902

Note Statistical significance: *** p < 0.01, ** p < 0.05, * p < 0.1
Controls in the treatment assignment equation: head of household age, education, and marital status; polygamous household; female-headed household; dependency ratio; the number of working-age individuals in the household; access to water, sanitation, and electricity; improved floor and roof; location (region and urban settlement)

Table 10 Average Treatment Effect (ATT) of COVID-19 on household welfare and labor market outcomes—urban and rural disaggregation

	Urban	*Rural*
Panel A: Household Indicators		
Log expenditure per capita	−0.030***	−0.044***
	(0.014)	(0.009)
Panel B: Household Poverty Status		
Objective Poverty: Poor	0.027***	0.048***
	(0.011)	(0.009)
Subjective Poverty: I live well	−0.009	−0.048***
	(0.012)	(0.008)
Subjective Poverty: I live poorly	0.005	−0.003
	(0.011)	(0.008)
Subjective Poverty: I am rich	−0.078***	−0.050***
	(0.013)	(0.008)
Panel C: Labor Market Outcomes		
Employed	−0.028***	−0.058***
	(0.014)	(0.009)

Note The observations across the treatment and control groups for each outcome vary in the estimation in accordance with the available data
Robust standard errors in parentheses
* p < 0.01, ** p < 0.05, * p < 0.1

percentage points for rural households but no changes for urban households. However, on average, urban households are reporting a higher reduction in self-reported welfare status by 7.8 percentage points.

6 Conclusions

The ongoing research on COVID-19 has predominantly revolved around the macro-economic impact, labor market implications, and mitigating social aids or policies undertaken by developed countries. Yet, the pandemic and the associated lockdown measures were observed across developing and developed countries, regardless of the number of confirmed COVID-19 cases (Dunford et al., 2020). Although overall findings point to reduced economic growth at the macro-level (see Alon et al., 2020), the lockdown policies have a potentially heterogeneous impact on countries' socio-economic and labor markets, providing dynamic outcomes from country to country.

This chapter examines the impact of the COVID-19 pandemic on household expenditure, poverty status, asset ownership, and labor market outcomes for the Comoros, a small island developing country that was already grappling with a recent climatic shock to its economy. We use unique door-to-door household survey data collected during the COVID-19 outbreak in the Comoros, covering the pre-lockdown and post-lockdown periods. The data provide detailed information on household expenditure, asset count and monetary value, livestock ownership, and relevant household and individual labor market outcomes. In addition, the availability of other household and individual characteristics allowed us to address endogeneity concerns in the estimation of the effect of the national lockdown policy on the welfare of households in the Comoros.

We first evaluated the impact of the national lockdown implemented on March 23, 2020, by the Government of the Comoros on our welfare indicators and labor market outcomes. Then, we extended our analysis to evaluate the distributional impact on household expenditure. Our empirical research benefitted from descriptive analysis and causal estimation methods. Our empirical study found a negative effect of the national lockdown on household expenditure, and an increase in the poverty rate. The impact is observed across the expenditure distribution with increasing magnitude at the top of the distribution. Thus, the findings suggest that poverty increased but inequality appeared to have declined. Households were also found to subjectively assess their living status as having experienced difficulties due to the pandemic. These results validate the argument that lockdown measures cause tremendous economic downturns.

Our estimation supports the argument that the mechanism of the impact of the COVID-19 lockdown on household welfare is driven by the breakdown in socio-economic activity and market disruption. Therefore, there is a need to look beyond expenditure or income levels to understand the implications of COVID-19 for households' living standards and poverty status, as well as its distributional impact. The evidence of socio-economic disruption of daily living activities can be assessed through the labor market consequences and the different coping mechanisms households employed during the COVID-19 pandemic to mitigate the unexpected loss in welfare.

Firstly, during the COVID-19 lockdown, there was a natural limitation on spending of household resources; the inability to spend on social functions or hospitality and non-food items was characteristic of the strict lockdown experienced in the Comoros. Nevertheless, the observed decline in household expenditure seems to have been driven by a decline in the share of people employed in a household and individuals in employment leading to a temporal shock in income. Our findings are in close comport with Schotte et al. (2021) as their evaluation provides evidence of a negative impact of the COVID-19 lockdown on employment in Ghana. We did not find evidence of a change in working hours and total salary for those that remain employed. The loss of employment was mostly observed in the service and trade sectors, while there was an increase in employment in agriculture. These results are complemented by the finding that rural households experienced larger declines in their welfare as compared to urban households.

Secondly, existing studies suggest that the COVID-19 pandemic may lead households to resort to unconventional coping mechanisms since the nature of the pandemic rendered typical coping mechanisms such as borrowing from family and friends difficult (see Gupta et al., 2021; Rönkkö et al., 2021). Since in developing studies assets are the equivalents of savings, it is important to examine the impact on assets. Our results showed a small decline in the count of assets and livestock and in the probability of asset ownership. The evidence thus indicates that the ability of households to use assets as a coping strategy may be limited in contexts such as COVID-19. Additionally, the substantial decline in current monetary value of assets may reflect households' perception of the reduced value of their assets in times of crisis.

Furthermore, the analysis also highlighted a pronounced negative impact within three months of the lockdown measure. There is some evidence of recovery post-three months, but welfare indicators remain below pre-lockdown levels. Our findings suggest that the pandemic's negative effect on the Comoros's household welfare status goes far beyond the immediate lockdown period and may be long lasting.

Our study contributes to the understanding of the micro-level impact of national lockdown policies during the COVID-19 pandemic on household welfare in a developing country context where direct impacts from COVID-19 cases may be low but the impacts from disruptions in

economic activity may be large. Development is a holistic process, and an unprecedented shock from a disease outbreak can put pressure on the economic status and goals of developing countries. Small island developing states are particularly vulnerable given their dependence on tourism and external trade. The cost–benefit approach to understanding the trade-off between pandemic curtailment and socio-economic consequences is vital in these cases. During the COVID-19 pandemic, developed and developing countries resorted to the same lockdown measures, regardless of the number of confirmed cases. However, the welfare policies enacted in developed countries like wage security and other income benefits for households are lacking in developing countries. The repercussions for the health sector, deaths, and the potential destruction of trust in governance are policy considerations when considering lockdown measures. Nevertheless, the trade-off between economic gains and managing such crisis can exacerbate vulnerability to poverty.

The pandemic not only stopped economic activities, but the overall outcome for the Comoros was a reduction in welfare and an increase in poverty and limited use of assets as a coping mechanism. In the absence of other possible welfare coping mechanisms when a household is hit by a shock, such as help from families and borrowing from banks or informal lending agents, government safety nets may have mitigated the impact. Our finding that the loss of employmentwas mostly observed in the service and trade sectors suggests that for small island states it is important to ensure that these safety nets are directed at all vulnerable households, not limited to only the poor. This is because vulnerability may be linked to economic sector. Therefore, while pro-poor policies remain important, mitigating the impacts for less poor households in vulnerable sectors will also be important to prevent their falling into poverty. This is an important policy implication that can also extend to disaster preparedness given the susceptibility to natural disasters of small island states. The limited availability of government safety nets and direct welfare-enhancing policies is likely to prolong the negative impact of the lockdown, with a slow recovery for the Comoros.

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Appendix

See Tables 11, 12, 13, 14, 15, 16, 17, and 18.

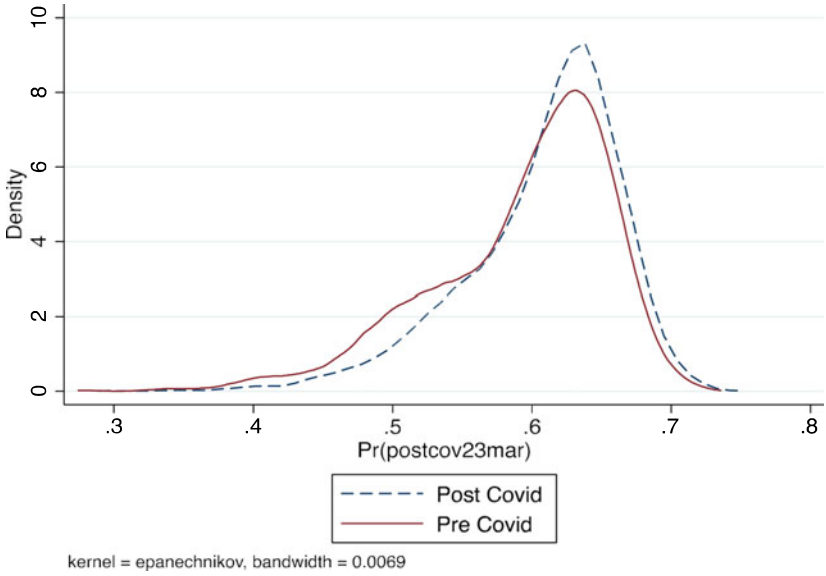

Fig. 3 Post-match distribution of propensity scores across treatment and control

Table 11 Sample distribution of individuals interviewed by region and lockdown measure

	Frequency	*Percent*
Total Pre-Covid Sample	11,712	
Regional Composition:		
Moroni	704	6.01
Ngazidja	5,715	48.8
Ndzuwani	4,476	38.22
Mwali	817	6.98
Total Post-Covid Sample	17,480	
Regional Composition:		
Moroni	2,535	14.5
Ngazidja	6,851	39.19
Ndzuwani	7,277	41.63
Mwali	817	4.67

Table 12 Summary statistics of employment distribution across the four main sectors*

Employment Type	*Freq*	*Percent*	*Cum*
Agriculture and forestry	3,148	33.93	33.93
extractive activities	52	0.56	34.49
Manufacturing activities	429	4.62	39.11
Water, Electricity and Gas	84	0.91	40.02
Construction	606	6.53	46.55
Wholesale, retail and repair	483	5.21	51.75
Hotel and catering	121	1.3	53.06
Transport, auxiliary activities	402	4.33	57.39
Financial activities	176	1.9	59.28
Real estate, rentals and services	70	0.75	60.04
Public administration activities	742	8	68.04
Education	856	9.23	77.26
Health and social action activities	148	1.59	78.86
Sanitation, roads and waste management	11	0.12	78.97
Community activities	72	0.78	79.75
Recreational,and cultural	18	0.19	79.94
Personal service activities	1,349	14.54	94.48
Household activities as an employee	474	5.11	99.59
Activities of extraterritorial organizations	38	0.41	100

Note * The main sectors are agriculture, Industry, Trade, and Service

Table 13 Logit PSM regression for treatment assignment

Variables	*Main analysis-COVID-19*	*Anticipation-COVID-19*
Age of household head	0.030***	0.027***
	(0.006)	(0.006)
Squared age of head of household	−0.000***	−0.000***
	(0.000)	(0.000)
Education of head of household (primary)	−0.094*	−0.036
	(0.050)	(0.051)
Education of head of household (lower secondary)	−0.012	−0.077
	(0.054)	(0.055)
Education of head of household (upper secondary)	−0.114*	−0.181***
	(0.065)	(0.066)
Education of head of household (tertiary)	−0.025	−0.100*
	(0.054)	(0.056)
Marital status head of household (married)	0.333***	0.441***
	(0.075)	(0.076)
Marital status head of household (widowed)	0.298***	0.275***
	(0.101)	(0.102)
Marital status head of household (divorced)	0.346***	0.338***
	(0.095)	(0.096)
Polygamous household	−0.095*	−0.124**
	(0.057)	(0.058)
Number of working-age individuals in household	−0.060***	−0.060***
	(0.008)	(0.008)
Access to water	0.343***	0.358***
	(0.042)	(0.042)
Access to sanitation	0.079***	0.118***
	(0.030)	(0.031)
Access to electricity	0.012	0.084*
	(0.043)	(0.044)
Improved floor	0.005	0.002
	(0.042)	(0.043)
Improved roof	0.594*** (0.160)	0.804*** (0.160)
Location (rest of Ngazidja)	−0.127*	−0.242***
	(0.071)	(0.073)
Location (Ndzuwani)	−0.091	−0.145**
	(0.070)	(0.072)
Location (Mwali)	−0.517***	−0.619***
	(0.090)	(0.091)
Male	0.000	−0.004
	(0.029)	(0.030)

(continued)

Table 13 (continued)

Variables	*Main analysis-COVID-19*	*Anticipation-COVID-19*
Age	0.015***	0.014***
	(0.005)	(0.005)
Squared Age	−0.000***	−0.000***
	(0.000)	(0.000)
Education attainment (primary)	0.090*	0.093*
	(0.053)	(0.055)
Education attainment (lower secondary)	0.079	0.111**
	(0.051)	(0.053)
Education attainment (upper secondary)	0.190***	0.166***
	(0.057)	(0.059)
Education attainment (tertiary)	0.113*	0.085
	(0.058)	(0.059)
Marital status (married)	−0.081	−0.122**
	(0.054)	(0.055)
Marital status (widowed)	0.055	0.056
	(0.105)	(0.108)
Marital status (divorced)	−0.072	−0.078
	(0.097)	(0.099)
Urban Settlement Type	-0.385***	−0.356*** (0.036)
	(0.035)	
Constant	−1.334***	−1.279***
	(0.233)	(0.235)
Observations	21,295	21,295

Standard errors in parentheses *** p < 0.01, ** p < 0.05, * p < 0.1

Table 14 Covariate Balancing Test using post-COVID-19 treatment measure

Variable	*Treated*	*Control*	*%bias*	*t*	*p > t*	*V(C)*
Age of Head of Household	47.98	47.88	0.70	0.57	0.57	1.01
Squared Age of Head of Household	2485.90	2474.80	0.80	0.63	0.53	1.00
Educ. Head of HH (Primary)	0.11	0.12	−1.40	−1.12	0.26	
Educ. Head of HH (Lower Secondary)	0.10	0.10	−0.20	−0.19	0.85	
Educ. Head of HH (Upper Secondary)	0.06	0.06	0.10	0.08	0.94	
Educ. Head of HH (Tertiary)	0.12	0.12	0.60	0.47	0.64	
Marital Status Head of HH (Married)	0.84	0.85	−1.60	−1.30	0.19	
Marital Status Head of HH (Widowed)	0.05	0.05	0.80	0.66	0.51	
Marital Status Head of HH (Divorced)	0.07	0.07	1.00	0.79	0.43	
Polygamous Household	0.07	0.07	−0.90	−0.75	0.45	
Share of working-age in HH	3.62	3.66	−2.00	−1.65	0.10	0.98
Water Access	0.88	0.88	−0.20	−0.20	0.84	
Sanitation Access	0.58	0.57	2.10	1.68	0.09	
Electricity Access	0.85	0.85	0.40	0.33	0.74	
Improved Floor	0.83	0.84	−0.20	−0.20	0.85	
Improved Roof	0.99	0.99	−0.10	−0.06	0.96	
Location (Rest of Ngazidja)	0.52	0.52	−1.50	−1.21	0.23	
Location (Ndzuwani)	0.39	0.39	1.10	0.90	0.37	
Location (Mwali)	0.04	0.04	−0.10	−0.08	0.94	
Individual is Male	0.48	0.48	−0.20	−0.13	0.90	
Age of Individual	33.60	33.39	1.10	0.89	0.37	1.00
Squared Age of Individual	1474.10	1461.70	0.80	0.64	0.52	1.01
Educ. Att. of Individual (Primary)	0.17	0.18	−1.00	−0.83	0.41	
Educ. Att. of Individual (Lower Secondary)	0.19	0.20	−1.00	−0.80	0.42	
Educ. Att. of Individual (Upper Secondary)	0.12	0.11	1.50	1.16	0.25	
Educ. Att. of Individual (Tertiary)	0.11	0.11	1.10	0.89	0.37	
Marital Status of Individual (Married)	0.46	0.46	−0.20	−0.13	0.90	

(continued)

Table 14 (continued)

Variable	*Treated*	*Control*	*%bias*	*t*	*p > t*	*V(C)*
Marital Status of Individual (Widowed)	0.04	0.03	1.30	1.03	0.30	
Marital Status of Individual (Divorced)	0.04	0.04	0.60	0.47	0.64	
Urban Settlement Type	0.29	0.30	−1.20	−1.00	0.32	

Notes * 'of concern', i.e., variance ratio in [0.5, 0.8) or (1.25, 2]; ** 'bad', i.e., variance ratio < 0.5 or > 2

Table 15 Covariate Balancing Test using post-COVID-19 treatment measure-COVID-19 anticipation

Variable	*Treated*	*Control*	*%bias*	*t*	*p > t*	*V(C)*
Age of Head of Household	47.86	47.87	0.00	−0.03	0.98	1.00
Squared Age of Head of Household	2474.20	2473.80	0.00	0.02	0.98	0.99
Educ. Head of HH (Primary)	0.12	0.12	−0.40	−0.32	0.75	
Educ. Head of HH (Lower Secondary)	0.10	0.10	−1.20	−0.99	0.32	
Educ. Head of HH (Upper Secondary)	0.06	0.06	−0.40	−0.31	0.76	
Educ. Head of HH (Tertiary)	0.12	0.12	−0.40	−0.34	0.73	
Marital Status Head of HH (Married)	0.84	0.84	0.00	0.01	0.99	
Marital Status Head of HH (Widowed)	0.05	0.05	−0.80	−0.65	0.51	
Marital Status Head of HH (Divorced)	0.07	0.07	0.00	−0.04	0.97	
Polygamous Household	0.07	0.07	−1.10	−0.95	0.34	
Share of working-age in HH	3.62	3.65	−1.20	−1.05	0.29	1.00
Water Access	0.88	0.88	−0.20	−0.19	0.85	
Sanitation Access	0.59	0.57	3.00	2.53	0.01	
Electricity Access	0.85	0.85	0.80	0.67	0.51	
Improved Floor	0.83	0.84	−0.50	−0.42	0.67	
Improved Roof	0.99	0.99	−0.20	−0.25	0.80	
Location (Rest of Ngazidja)	0.51	0.52	−2.50	−2.04	0.04	
Location (Ndzuwani)	0.40	0.38	2.80	2.34	0.02	

(continued)

Table 15 (continued)

Variable	*Treated*	*Control*	*%bias*	*t*	*p > t*	*V(C)*
Location (Mwali)	0.04	0.05	−0.60	−0.59	0.56	
Individual is Male	0.48	0.48	0.00	0.01	0.99	
Age of Individual	33.53	33.45	0.40	0.37	0.71	1.00
Squared Age of Individual	1471.00	1465.00	0.40	0.32	0.75	1.02
Educ. Att. of Individual (Primary)	0.17	0.17	−0.20	−0.14	0.89	
Educ. Att. of Individual (Lower Secondary)	0.20	0.20	−0.50	−0.44	0.66	
Educ. Att. of Individual (Upper Secondary)	0.12	0.11	0.50	0.44	0.66	
Educ. Att. of Individual (Tertiary)	0.11	0.11	0.00	0.04	0.97	
Marital Status of Individual (Married)	0.46	0.46	−0.20	−0.21	0.84	
Marital Status of Individual (Widowed)	0.04	0.04	0.70	0.62	0.54	
Marital Status of Individual (Divorced)	0.04	0.04	−0.30	−0.27	0.79	
Urban settlement Type	0.30	0.31	−2.20	−1.86	0.06	

Notes * 'of concern', i.e., variance ratio in [0.5, 0.8) or (1.25, 2]; ** 'bad', i.e., variance ratio < 0.5 or > 2

Table 16 Rubin's balancing property diagnostics

	Sample	*Ps R2*	*LR chi2*	*p > chi2*	*Mean Bias*	*Med Bias*	*B*	*R*	*%Var*
Main Analysis	Unmatched	0.03	67.78	0	4.8	4.3	40.6*	0.88	20
	Matched	0.00	20.74	0.90	0.90	0.90	5.70	0.99	0.00
COVID-19 Anticipation	Unmatched	0.02	404.78	0.00	3.30	1.30	28.9*	0.80	100.00
	Matched	0.00	28.85	0.53	0.70	0.40	6.50	0.99	0.00

Note * B > 25%, R outside [0.5; 2]

Table 17 Average Treatment Effect (ATT) of COVID-19 on selected household asset types

Household Asset Types	*Main Impact*	*Anticipation*
Phone	−0.031***	−0.026***
	(0.004)	(0.004)
Television	0.013***	0.015***
	(0.007)	(0.007)
Motocycle	−0.007***	−0.009***
	(0.002)	(0.002)
Car	−0.019***	−0.013***
	(0.003)	(0.004)
Bicycle	−0.007***	−0.004***
	(0.001)	(0.001)
Radio	−0.045***	−0.032***
	(0.006)	(0.006)
Furniture	−0.004	−0.000
	(0.003)	(0.003)

Note The observations across the treatment and control groups for each outcome vary in the estimation in accordance with the available data
Robust standard errors in parentheses
* p < 0.01, ** p < 0.05, * p < 0.1

Table 18 Raw difference in the log of per capita household expenditure between treatment and control by quantiles

Quantiles	*Control*	*Treatment Covid-19*	*Difference*
10th	12.577	12.540	−0.037***
	(0.008)	(0.006)	(0.010)
20th	12.884	12.836	−0.047***
	(0.008)	(0.006)	(0.010)
50th	13.233	13.197	−0.036***
	(0.007)	(0.006)	(0.009)
75th	13.623	13.598	−0.025**
	(0.008)	(0.007)	(0.011)
90th	14.015	13.988	−0.027**
	(0.009)	(0.010)	(0.013)

Note Statistical significance: *** p < 0.01, ** p < 0.05, * p < 0.1
Difference" captures the raw difference between the post-COVID-19 sample (treatment) and the pre-COVID-19 sample (control)
Standard errors in parenthesis

Notes

1. The evaluation was based on gross domestic product as an economic measure and indicated the Comoros to be among Africa's 10 poorest countries.
2. These five frequently researched countries are South Africa, Kenya, Ghana, Uganda, and Malawi.
3.. Before the first confirmed cases, the president addressed the nation on March 16, 2020, on the threat of the COVID-19 pandemic and the implications for social activities and the health sector. A week later, the Government of Comoros implemented prevention measures through suspension of international flights and interisland travel.
4. The survey included a few households interviewed in November 2018 and January 2019 and were excluded from this analysis. The country was struck by Cyclone Kenneth in April 2019. We exclude households prior to this episode to avoid conflating the impact of the cyclone with that of COVID-19.
5. Comoros and Lesotho were the two countries in Africa that were still virus-free (Lone and Ahmad, 2020) by April 2020 a month after the WHO announced the virus a pandemic.
6. Assets include chair, table, bed, mattress, cupboard, carpet, iron, stove, gas cylinder, oven, food processor, fruit press, refrigerator, freezer, fan, radio, TV, DVD, Satellite dish, washing machine, dryer, vacuum cleaner, air conditioner, lawnmower, generator, car, motorcycle, bicycle, camera, camcorder, stereo, landline phone, cell phone, tablet, desktop computer, laptop, printer/fax, video camera, boat, hunting rifle, guitar, piano, building/house, unbuilt land, solar panel. Livestock includes cattle, sheep, goats, rabbits, chickens, guinea fowl, duck, turkey, pigeon, geese, and other poultry.
7. The estimated poverty line used in this analysis is the 2020 national poverty line of 497,957 Comorian francs per person per annum.
8. The service sector includes tourist related activities (hotel, restaurants, recreational, and cultural activities).
9. The descriptive analysis predicts some recovery in household welfare by July. The national government lifted the total lockdown measure in the first week of July. The lockdown lifting was accompanied by a relaxed curfew from 23:00 to 04:00, use of mask in public areas, reduced number in public transport, and opening of some educational institutions.
10. However, after matching, the impact on formal employment is found not to be statistically significant (Table 6).
11. The three United Nations resident agencies were the World Health Organization (WHO), United Nations Children's Fund (UNICEF), and United Nations Development Programme (UNDP).

12. A detailed guide and understanding of the estimation method of the QTT can be found in Firpo (2007). The approach is based on close work on semiparametric estimation of the ATE (see Hahn, 1998; Heckman, Ichimura, Smith, and Todd, 1998). The semiparametric efficiency bounds are estimated as an asymptotic variance of the QTT estimator (Newey, 1990; Bickel, Klaassen, Ritov, and Wellner, 1993).

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CHAPTER 8

Taiwan's Response to the COVID-19 Crisis: Experience and Lessons

Tsung-Mei Cheng

The COVID-19 pandemic erupted in early 2020 and quickly spread across the world. As of the end of July 2022, two and half years of the pandemic saw 6.4 million lives lost and 577.3 million cases reported worldwide.[1] To date the United States, one of the world's richest nations with a per capita income of US$ PPP 76,027 has led the world in both deaths and cases: more than 91.3 million cases and one million deaths.[2] In contrast, Taiwan, an island economy with a population of 23.8 million—7.2% that of the United States' 332.8 million—and a per capita income of US$ PPP 68,730, reported less than 4.6 million cases and 8927 deaths as of July 30, 2022.[3] Overall, Taiwan has fared remarkably well compared to most countries in the entire period since the beginning of the COVID-19 pandemic. Figure 1 illustrates this point in terms of COVID-19 cases

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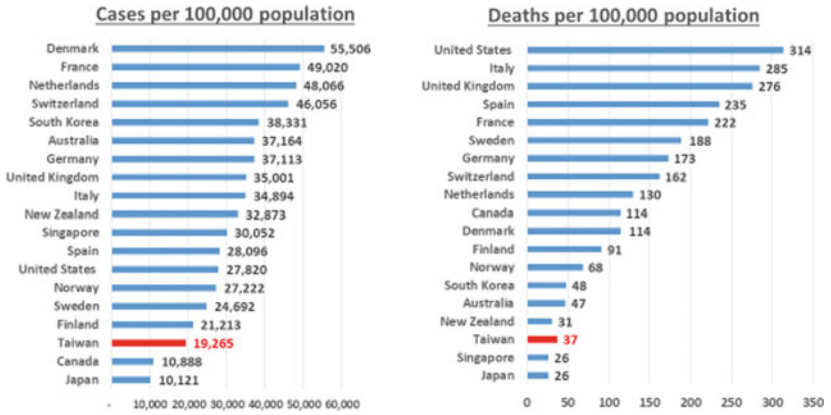

Fig. 1 Total number of COVID-19 cases and deaths per 100,000 population in select OECD countries and Taiwan, January 2020–July 31, 2022 (*Source* CNN tracking Covid-19's global spread. https://www.cnn.com/interactive/2020/health/coronavirus-maps-and-cases/)

and deaths per 100,000 population in Taiwan and comparable OECD countries through July 31, 2022.

Taiwan's COVID-19 outcomes so far are particularly noteworthy considering that Taiwan appears to have newly emerged from an Omicron surge that began in late April 2022, which caused the vast majority of the casualties in cases and deaths Taiwan experienced since the beginning of the pandemic in January 2020. The Omicron surge in Taiwan showed the first signs of easing in late June. June 27, 2022 saw, for the first time since late April when the Omicron surge began, cases fell to the second-lowest level in two months, and deaths, at 91, fell below 100 per day in weeks, a decline of 28% from the day before.[4]

This chapter focuses on Taiwan's experience to date with its COVID-19 crisis. It begins with a brief history of the crisis from its beginning in January 2020 to early August 2022. This is followed by a more detailed discussion on Taiwan's response to its COVID-19 crisis in each of the four phases in the two-and-a-half-year period, with emphasis on the roles played by Taiwan's government, private sector, and the public. This is then followed by a discussion of the impact of the COVID-19 crisis on Taiwan's economy and society. The chapter ends with a discussion of lessons learned.

1 Brief History of the COVID-19 Crisis in Taiwan

In the two-and-a-half years, since COVID-19 first appeared in the world up to July 2022, Taiwan has gone through four distinct phases of its COVID-19 crisis, as follows:

1. Phase I January 2020–Mid-May 2021: Calm. Extremely low cases and deaths
2. Phase II Mid-May 2021–July 2021: Mini-surge with limited casualties in cases and deaths
3. Phase III August 2021–April 2022: Return of calm
4. Phase IV Mid-April 2022–Mid-July 2022: Omicron surge, accounting for the vast majority of cases and deaths since the beginning of the crisis in January 2020.

Phase I January 2020–Mid-May 2021: Calm

In early March 2020, global anxiety was rising following the outbreak of the newly discovered coronavirus named COVID-19, first reported in Wuhan, China on November 17, 2019, and by December 31, 2019, it had already become "a full-fledged outbreak."[5] By early March 2019, seventy-five countries had reported confirmed COVID-19 cases and WHO Director-General Tedros Adhanom Ghebreyesus warned the world about the potential of a COVID-19 pandemic, and raised the pandemic risk from "high" to "very high."[6]

Perhaps unique in the world, Taiwan was prepared for the looming pandemic. As a result, for 16 months from January 2020 through mid-May 2021, Taiwan sustained very few COVID-19 cases and deaths compared to neighboring Japan and South Korea despite its geographic proximity and close cultural and economic ties to China.[7] As of March 3, 2020, two months into the pandemic, Taiwan had just 42 confirmed cases and 1 death, whereas neighboring Japan had 287 cases and 6 deaths, South Korea 4812 cases and 28 deaths; and the world as a whole saw 11,748 confirm cases and 213 deaths.[8]

Taiwan continued its success through April 2021, enjoying a consecutive 16 months of calm with extremely low cases and deaths, as Table 1 shows. During this period, Taiwan was touted across the world as "a poster child of success in preventing large outbreaks and keeping its economy growing at the same time."[9]

Table 1 COVID-19 cases and deaths in select OECD countries and Taiwan as of April 13, 2021

	No. of confirmed cases	*Number of deaths*
Global	137,034,950	2,951,332
United States	31,311,046	563,027
France	5,167,253	99,639
United Kingdom	4,390,797	354,617
Germany	3,040,326	78,924
Taiwan	1057	11

Source Taiwan CDC and John Hopkins CSSE

By mid-April 2021, the true scale of the fruits of Taiwan's COVID-19 policy emphasizing control and prevention became apparent against the backdrop of a world awash in COVID-19 cases and deaths. Table 1 shows COVID-19 cases and deaths in select OECD countries and Taiwan as of April 13, 2021. It is seen that while by then the United States had more than 31.3 million cases and 560,000 deaths, and UK 4.4 million cases and 350,000 deaths, Taiwan had a total of 1057 cases and 11 deaths.

Phase II Mid-May 2021–July 2021: Mini-Surge

Following 16 months of smooth sailing through the sea of COVID-19, Taiwan's COVID-19 defense was breached by a 9-week squall that saw a mini-surge of COVID-19 cases and deaths. A total of 14,103 new confirmed cases were reported in this period, which accounted for 92% of the cumulative total number of cases reported since the beginning of the COVID-19 crisis in January 2020.[10] Deaths rose from 11 as of April 13 to 759 as of July 15, which accounted for a dramatic 99% of all death up to that time.[11] Figure 2 shows the mini-surge in cases in 5-day intervals in this period.

Within weeks, the mini-surge came under control, as seen in Fig. 2, and calm returned. The daily case count for July 15, 2021 was 18, with 6 deaths.[12] Compared to comparable countries that were also experiencing surges in COVID-19 cases and deaths, due largely to the rapidly spreading Delta variant of the coronavirus, Taiwan's cases and deaths from the mini-surge were extremely low. Taiwan's far superior outcomes may at least in part be because the COVID-19 strains that caused its mini-surge in Taiwan were predominantly the original COVID-19 strains and not the Delta variant.

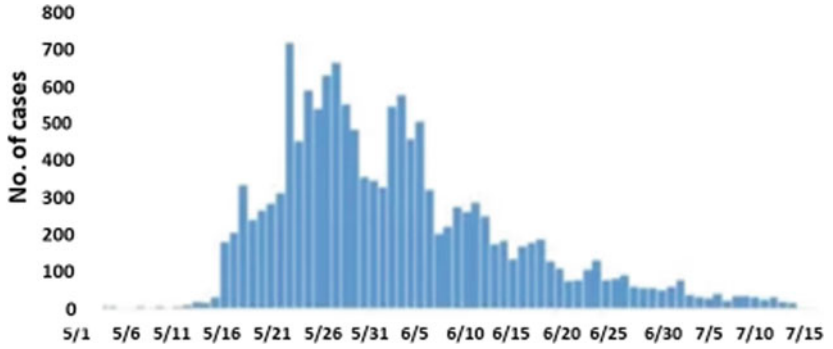

Fig. 2 Trend in the number of confirmed cases from domestic transmission in Taiwan, May 1, 2021–July 15, 2021 (*Source* COVID-19 Central Epidemic Command Center, Ministry of Health and Welfare, Republic of China, Taiwan, 15 July 2021)

At the end of this phase—end of July 2021—Taiwan still had the fewest number of confirmed cases among comparable nations, and the second-lowest deaths per 100,000 population, after Singapore. Figure 3 shows COVID-19 deaths per 100,000 population in Taiwan, select OECD countries, and Singapore as of July 14, 2021.

Phase III August 2021–April 2022: Return of Calm

For 9 months following the end of the Phase II mini-surge, Taiwan once again enjoyed relative peace and calm. The months since September 2021 saw either zero or low single or double-digit numbers of new cases, and deaths also remained extremely low. For example, for 9 consecutive days between September 29 and October 8, 2021, Taiwan reported zero deaths, while the average daily deaths in the United States stood at 1867, with most days exceeding 2000 deaths per day.[13] International data also show sharp contrast between Taiwan and comparable OECD countries. For example, as of October 2021, Taiwan ranked lowest in total number of COVID-19 cases and second lowest in deaths per 100,000 population among comparable OECD countries, as Fig. 4 shows.

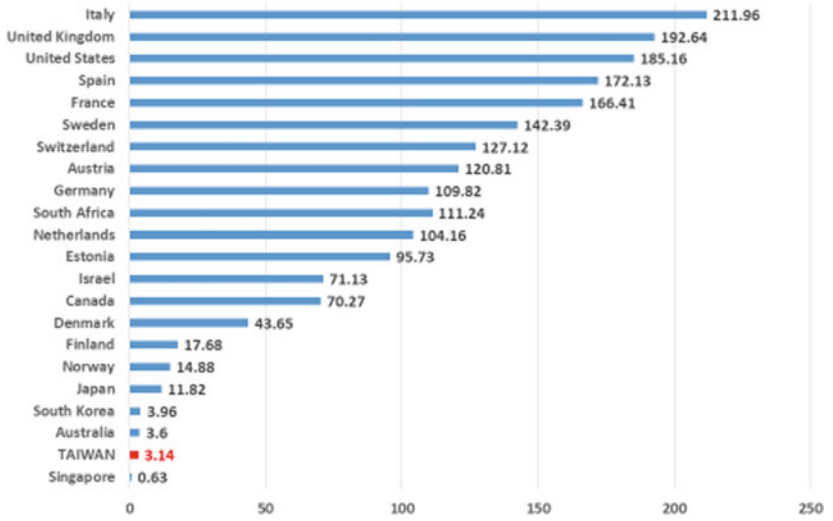

Fig. 3 COVID-19 deaths per 100,000 population in select countries and Taiwan as of 14 July 2021 (*Source* Data based on "Mortality Analyses". Johns Hopkins University Covid Resource Center. Accessed July 16, 2021)

Phase IV Mid-April 2022–July 2022: Omicron Surge and Vast Majority of Cases and Deaths to Date

The calm Taiwan enjoyed after the Phase III mini-surge ended in July 2021 came to a sudden end in mid-April 2022 when the highly transmissible Omicron variant, first reported by the WHO on November 24, 2021, broke through and quickly took hold and spread, as Fig. 5 shows. It is seen in Fig. 5 that in the period between January and early April, the daily case counts showed no peaks, suggesting that the situation was stable: just four deaths occurred in that period. By May 19, Taiwan's cumulative total number of cases had ballooned to 1,070,561, a 40-fold increase since 9 April; and the day that saw 93,000 new confirmed cases, an increase of epic proportions.[14] This increase is especially dramatic if one looks back a mere few months earlier, to December 23, 2021, when Taiwan had a cumulative total of 16,843 cases since the beginning of the global pandemic in January 2020, and to early April 2022 when Taiwan's cumulative total cases had grown by just 10,000 new cases, to 26,836.[15]

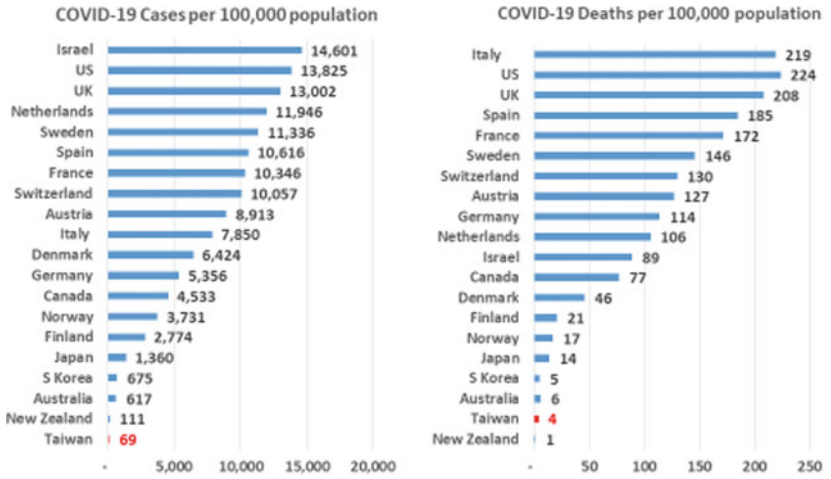

Fig. 4 COVID-19 cases and deaths per 100,000 population in Taiwan and comparable OECD countries as of October 22, 2021 (*Source* CNN health: Tracking Covid-19's global spread. Data based on Johns Hopkins University Center for Systems Science and Engineering. https://www.cnn.com/interactive/2020/health/coronavirus-maps-and-cases/)

By July 17, 2022, the tail end of Taiwan's Omicron surge, the cumulative total number of cases had leapt to 4,264,788,[16] from below 17,000 in Phase III; and cumulative deaths had risen to 8176,[17] from below 900 in Phase III.

Although shocking to the Taiwanese, these numbers remain low relative to those seen in many comparable OECD countries. As of July 17, 2022, Taiwan still ranked 3rd lowest for cases, after Japan and Canada; and 2nd lowest for deaths, after Japan and Singapore, which share the second place ranking, as Fig. 6 shows. The Omicron surge, however, overnight changed Taiwan's enviable status from being an internationally recognized success story in COVID-19 control to being listed on the US CDC's list of "high risk nations."[18]

The Omicron surge showed signs of waning by the end of June 2022, when cases registered new lows—below 30,000/day per government definition—in two-and-a-half months and deaths new lows—below 100/day—in one-and-a-half months. The downward trend continued into July 2022.[19] For example, on July 17, 2022, Taiwan saw 24,325

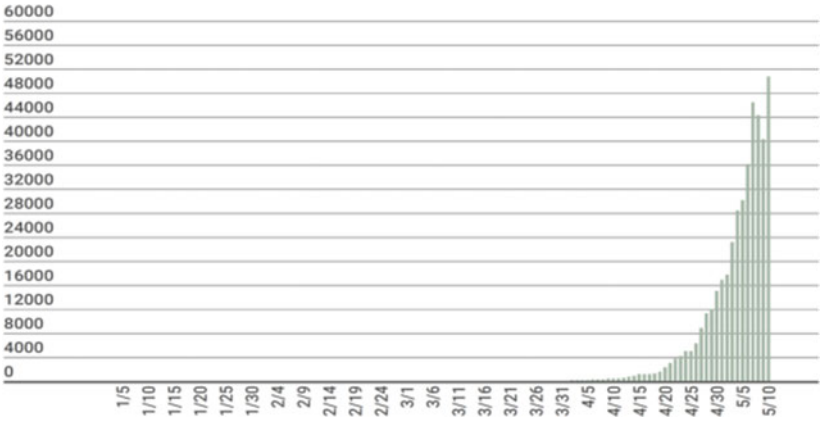

Fig. 5 Taiwan's COVID-19 Omicron surge: Daily cases April 10, 2022–May 15, 2022 (*Source* Taiwan CDC 16 May 2022. https://topic.udn.com/event/COVID19_Taiwan)

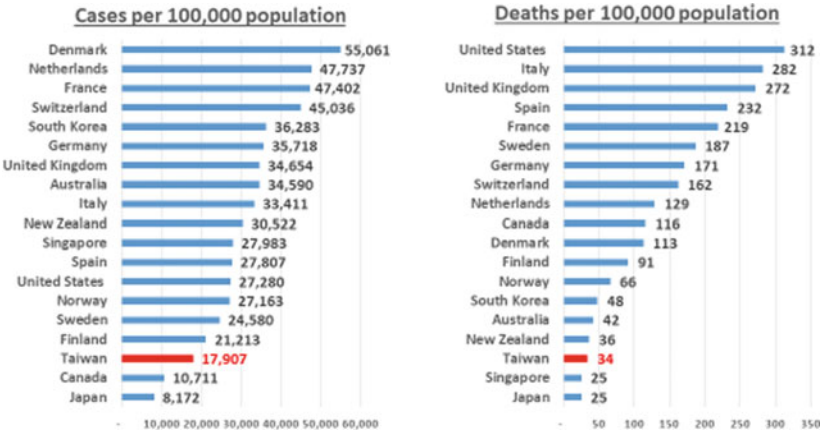

Fig. 6 COVID-19 cases and deaths per 100,000 population in Taiwan and comparable OCED Countries. January 2020–July 17, 2022 (*Source* CNN Global Cases ad Deaths, Tracking Covid-19's global spread. https://www.cnn.com/interactive/2020/health/coronavirus-maps-and-cases/)

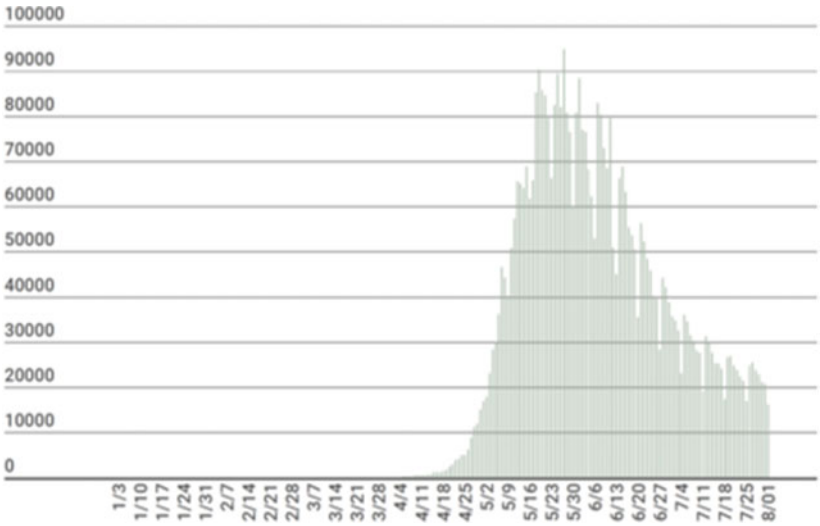

Fig. 7 Total number of cases in Taiwan January 3, 2022–August 1, 2022 (*Source* Newest Covid-19 state *United Daily News*. Taiwan data from Taiwan CDC. https://topic.udn.com/event/COVID19_Taiwan)

new cases, representing a reduction of 12.7% from the previous week, and 73 deaths.[20] Data from Taiwan's CDC confirmed that the Omicron surge had eased as of the end of July 2022.

Figure 7 shows the total number of cases in 2022 (January 3–August 1), and Fig. 8 shows the trend in deaths during the period of the Omicron surge, April 1, 2022, to July 29, 2022.

2 Taiwan's COVID-19 Response: Role of Government, the Private Sector, and the Public

Taiwan's response to the COVID-19 threat in each of the four phases may explain the differences seen in the outcomes in cases, deaths, disruptions to daily life, economic performance, etc. in Taiwan compared to many other countries, as Fig. 1 shows. In contrast to Taiwan, many other countries paid a far higher price in all the areas mentioned above. For example, policy failures, mismanagement, and missed opportunities in the United States have brought about colossal numbers of *preventable* COVID-19

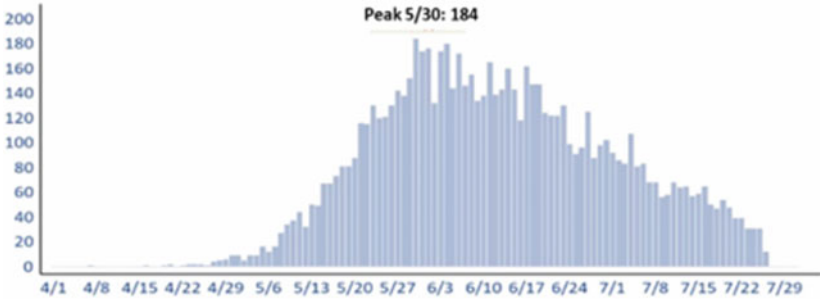

Fig. 8 Trend in deaths (persons) during Taiwan's COVID-19 Omicron surge April 1, 2022–July 29, 2022 (*Source* Taiwan CDC data as of July 30, 2022)

cases and deaths to the tune of tens of millions in cases and hundreds of thousands in deaths. According to a May 17, 2022, National Public Radio report at the time, the United States marked one million deaths from COVID-19: "… scientists suggest that nearly one-third of those deaths could have been prevented if more people had chosen to be vaccinated."[21] This section focuses on Taiwan's response to the COVID-19 crisis in each of the four phases. It will be seen that government policies and measures taken to control and manage the COVID-19 crisis, in tandem with the roles played by Taiwan's private sector and the public, have been largely effective, in spite of the hiccups Taiwan experienced along the way.

Phase I Response: Preparedness

As soon as Taiwan learned of the outbreak in Wuhan, China in late December 2019, the government seized the window of opportunity to take control of the situation, having learned from its painful 2003 SARS crisis, which caught Taiwan completely unprepared. The SARS crisis so shocked Taiwan that, unanimously, Taiwan vowed never again to repeat another SARS-like tragedy in the future.

Wasting no time, the government on January 1, 2020 imposed strict travel restrictions and entry protocols tiered by risk level of countries of incoming passengers. All commercial flights between Taiwan and China were suspended for those to and from four major airports in China: Beijing, Shanghai, Xiamen, and Chengdu; visa approvals for foreigners

who had entered or lived in China, Hong Kong, or Macao in the past 14 days were also suspended. All those entering Taiwan who had transited from airports in China, Hong Kong, and Macao were required to follow the Tier-2 home-based surveillance protocol; and passengers entering Taiwan from Japan, Singapore, Thailand, and Iran were required to observe the Tier-3 14-day self-health management protocol, etc. The government later imposed further travel restriction for travels to and from other countries depending on the seriousness of the COVID-19 situation there.

At the same time, Taiwan's government implemented a comprehensive two-pronged national policy and plan for COVID-19 prevention and control: "Keep the virus out"—keep the coronavirus from entering Taiwan in the first place—and "prevent and control community spread."[22] The government created a Central Epidemic Control Center (CECC), headed by the Minister of Health and Welfare, Shih-Chung Chen, to lead and oversee all COVID-19-related matters. CECC worked closely with Taiwan's Center for Disease Control, the immigration authority, the National Health Insurance Administration, the private sector including media, and the public. CECC held daily news briefings chaired by Minister Chen himself to keep everyone informed of real-time developments, such as number and location of new cases identified, deaths, alerts, and new or changes to existing rules and regulations.

One central measure of the two-pronged plan was a set of strict quarantine and contact-tracing instruments to compliment the strict entry protocols to "prevent" entry into Taiwan of the new virus, and "control" community spread of the new virus. Table 2 provides a summary of the government's detailed tiered entry, quarantine, and contact tracing protocols. Simultaneously, the government also introduced strict mask wearing, social distancing, and hand hygiene practices.

Contact tracing and quarantine in Taiwan have been instrumental in preventing community spread of COVID-19. Making this technically possible is Taiwan's powerful IT and communications technology (ITC) infrastructure, whose interoperable platform enables all government agencies involved in COVID-19 prevention and control access to real-time big data, which in turn provides CECC both a bird's-eye view of the real-time COVID-19 situation and detailed information on all COVID-19-related matters. CECC is thus able to make evidence-informed decisions, plan next steps, implement necessary changes and adjustments to any established anti-COVID-19 measures, etc. The ITC infrastructure also enables

Table 2 Government protocols for Phase-I COVID-19 containment and surveillance

Tier 1 *Home-Based Isolation* *Confirmed contact with infected person(s)* *14 days*	*Tier 2* *Home-Based Surveillance* *Passengers from Korea, China, Hong Kong, Macao* *14 days*	*Tier 3* *Self-Health Management* *Passengers from Japan, Singapore, Thailand, Iran* *14 days*
Check health status twice a day	Check health status 1–2 times a day	Minimize going outside home. Wear face mask at all times when outside home
Must remain at home or designated location	Must remain at home or designated location	Take body temperature morning and night, and observe coughing protocols
Must not take transporation vehicles or travel outside of Taiwan	Must not take transporation vehicles or travel outside of Taiwan	When feeling unwell, call designated hotline and follow instructions to access medical care
Violations may be fined NTD300,000 (US$10,000). When necessary may be committed to confinement	Violations may be fined NTD150,000 (US$5000). When necessary may be committed to confinement	

Source United Daily News, Taiwan, based on Covid-19 CECC web announcement, February 29, 2020

the government to communicate, in real time, with Taiwan's public. For example, information on the real-time availability of masks, home rapid COVID-19 tests, vaccination appointment openings, whereabouts of new COVID-19 cases discovered, etc., are sent to cell phones anywhere in Taiwan, enabling everyone to have all the same information at the same time at his or her fingertip.

Any discussion of Taiwan's response in this first phase of its COVID-19 crisis is incomplete without mention of the important role Taiwan's public played. The outcome of any infectious disease outbreak ultimately depends substantially on the response of both the government and the public—it takes two to tango, as the proverbial saying goes. Taiwan's public, like Taiwan's government, also had learned painful lessons from the SARS crisis. A main lesson is the recognition that cooperation with the government is important. During the 2003 SARS crisis, some people escaped or hid from quarantine and testing, which only resulted in

harm to themselves, according to Ming-Liang Lee, presidential adviser and former health minister recognized as Taiwan's "Czar of SARS," who successfully brought the SARS crisis under control.[23] Taiwan's public cooperated with the government from the very beginning of the COVID-19 crisis. For example, the public willingly came forth for testing, voluntarily put themselves in isolation or under surveillance, and followed the government's home-based surveillance protocols, etc. Mask wearing and handwashing became routine as part of personal hygiene practices.

These measures combined produced for Taiwan the intended results, i.e., helped prevent, contain and control the entry and community spread of COVID-19 for the next 16 months, through mid-May 2021, when Taiwan entered Phase II of COVID-19. Table 1 earlier has shown the remarkable results Taiwan attained: Up to nearing the end of Phase I, as of April 13, 2021, Taiwan had a little over 1000 cases and just 11 deaths, compared to more than 31.3 million cases and 560,000 deaths in the United States and 4.4 million cases and 350,000 deaths in the UK.

Phase II Response: Navigating Through a Squall

Marking the arrival of Phase II is the sudden jump in cases and deaths in early May 2021 (Fig. 2), which caught Taiwan by surprise and caused great concern among Taiwan's policy-makers and the public. Taiwan's policy-makers had long dreaded and hoped to avoid such an occurrence. Once realizing a surge was on hand, CECC's commander-in-chief Minister Chen declared, on May 11, 2021, that Taiwan had entered the phase of "official spread," and moved the COVID-19 emergency alert from Level-1, the lowest of four levels, to Level-2.

The government soon discovered that the vast majority of cases during this 9-week mini-surge were concentrated in the two major population centers in the northern part of Taiwan: Taipei City and New Taipei City. CECC moved, on May 15, the emergency alert to Level-3 for these two cities to focus anti-COVID-19 resources on the two cities to prevent a large-scale spread to the rest of Taiwan.[24] To play it safe, the government extended emergency alert Level-3 to all of Taiwan on May 19. The two moves proved to have been the right course of action.

Under Level-3 emergency alert, the government stepped up testing, which it did not do previously because of the extremely low cases and deaths. The government also made extra efforts in contact tracing to identify all sources of contagion in order to eliminate the spread. Other

emergency measures included closing all recreational establishments (e.g., cinemas, swimming pools, and public libraries), elementary and middle schools, daycare centers for children and the elderly; the banning of large national and religious gatherings and indoor dining; a mask mandate; and social distancing. Family and social gatherings were limited to five people and outdoor gatherings to ten. Border controls remained in effect, with the number of flights allowed to land in Taiwan pegged to the country's healthcare delivery system capacity at the time to avoid overwhelming the system.[25]

These measures together produced the desired results, as Fig. 2 shows. On July 27, 2021, the government lowered the national emergency alert level from Level-3 to Level-2.[26] The government succeeded in bringing the outbreak quickly under control.

The mini-surge, however, led many in Taiwan and overseas to wonder how the "poster child of success" in COVID-19 management had stumbled into a surge, however "mini." That Taiwan was considered to be invincible to COVID-19 for so long when the world was awash in COVID-19 infections and deaths begs the question, "what went wrong?" Indeed, a sense of being underprepared was pervasive when the surge struck, an observation shared by foreign media.

UK's *Financial Times*, for example, reported in an article of June 4, 2021, that "… [Taiwan] was not prepared for a surge of infection […] Infectious disease experts say health authorities have squandered the chance to learn from the experiences that other countries had while going through outbreaks."[27]

Several other factors contributed to making the situation worse in this phase. Most important perhaps was the extremely low vaccination rate of Taiwan's population at this time—as of April 15, 2021, just 27,113 Taiwanese (out of a population of 23.*8* million) had received their first dose of the vaccine.[28] Chief among possible explanations for this low vaccination rate include the public's low trust in the AstraZeneca vaccine, which was the only vaccine available in Taiwan at that time, and the public's complacency as it did not regard being vaccinated an urgent matter since COVID-19 was thought to be well controlled.[29] Other factors included limited testing capacity, a shortage of intensive care beds, and medical personnel as a result of Taiwan's health care delivery system capacity, notable for its low doctor- and nurse-population ratios compared to comparable OECD nations. These circumstances led to the high fatality rates Taiwan experienced during the mini-surge compared to

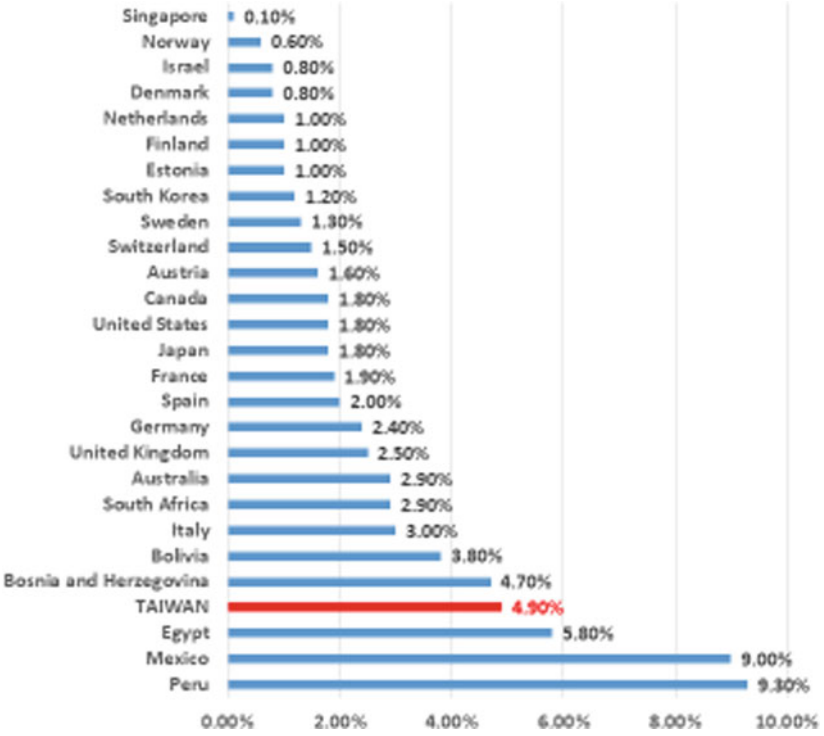

Fig. 9 COV10-19 case fatality rate in Taiwan and select OECD countries as of July 14, 2021 (*Source* CNN tracking Covid-19's global spread. https://www.cnn.com/interactive/2020/health/coronavirus-maps-and-cases/)

many other countries, as Fig. 9 shows. Case fatality rates neared 5%, and those in "COVID-19 hot spots," Taipei City and New Taipei City, were 6.05% and 5.55%, respectively.[30]

Phase III Response: Calm Returns

The COVID-19 situation remained stable after the transition from emergency alert Level-3 to Level-2 at the end of July 2021. From September 2021, new cases of domestic transmission were at zero or in the low single digits; and deaths remained very low also—no death was reported for 9 consecutive days between September 29 and October 8, 2021.[31] Across

the Pacific Ocean in the United States, average number of daily deaths in this period was 1867, with most days exceeding 2000 deaths per day.[32]

This phase saw a rapid pickup of vaccination rates among all ages in Taiwan. By the time the mini-surge subsided in mid-July 2021, 18% of Taiwan's 23.8 million population had received one dose of vaccine, and 31% had signed up for vaccination.[33] As of October 21, 2021, 65% of the population had received at least one dose of several vaccines now available in Taiwan, in contrast to earlier times when vaccine availability was limited in terms of both quantity supplied and choice of vaccines.[34] By mid-May, 2022, 86% of Taiwan's population had received their first shot, 81% their second shot, and 64% their third shot or first booster, as Fig. 10 shows.

Because of the high rates of infection overseas at this time, all incoming passengers were still required to observe the 14-day quarantine rule to keep Taiwan safe.[35]

The big picture was reassuring in Taiwan during this phase of calm. Taiwan's CECC reported a cumulative total since January 2020 of only 16,376 cases and 847 deaths as of October 25, 2021,[36] extremely low numbers compared with many other countries. For example, by this time total cases in the United States alone had exceeded 45 million with total deaths over 730,000.[37] Fast forwarding to April 2022, near the end of this phase of calm, Taiwan had experienced a cumulative total of 26,836

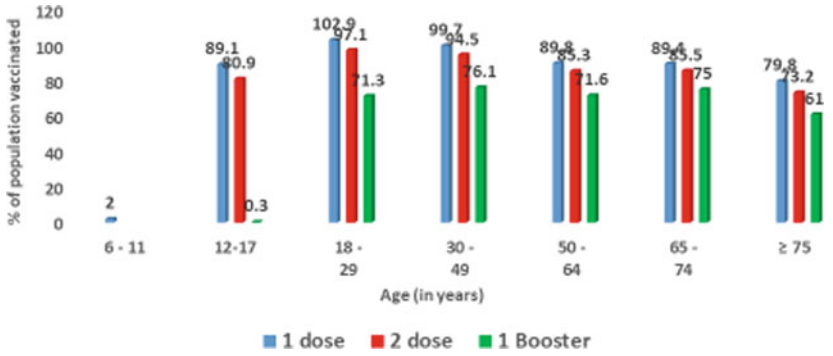

Fig. 10 COVID-19 vaccination rates in Taiwan, by age, as of May 16, 2022 (*Source* Data from Taiwan Center for Disease Control, Ministry of Health and Welfare, May 16, 2022. https://topic.udn.com/event/COVID19_Taiwan)

cases and 854 deaths in the 27 months since the start of the COVID-19 pandemic in January 2020.[38]

Phase IV Response: Major Policy Shift from 0-COVID to Coexist with COVID

Phase IV, from mid-April 2022 to July 2022, saw an explosion of COVID-19 cases and deaths. The contrast between the previous phase, before the Omicron struck, and this phase when Omicron took its tolls is stunning: As mentioned above, the cumulative total number of cases and deaths from COVID-19 in Taiwan since the beginning of the pandemic in January 2020 to April 9, 2022 were just 26,836 cases and 854 deaths. By the tail end of the Omicron surge in late July 2022, Taiwan reported a total of 4,545,696 confirmed cases and 8833 deaths.[39] Figure 11 shows the trend lines for cases and deaths in the 8 months period from December 23, 2021, to August 3, 2022. It clearly shows the tolls the Omicron surge took in Taiwan. The saving grace of the shocking Omicron surge in Taiwan is that of those infected, 99.53% had mild or no symptoms.[40]

Extensive media coverage during the Omicron surge unveiled a wide-ranging list of problems Taiwan encountered. For example: inadequate PCR testing capability and shortages of home rapid-test kits created long waiting lines and delays in timely diagnosis and treatment; overcrowded

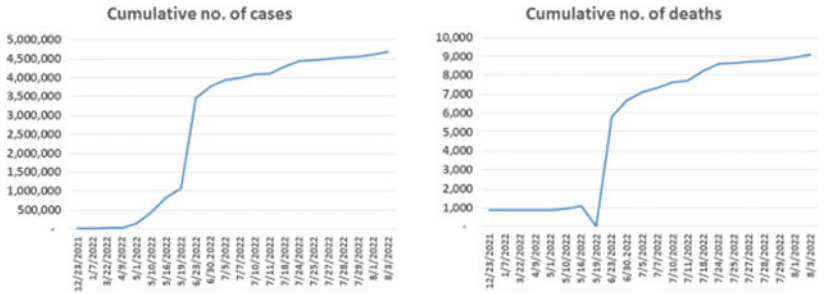

Fig. 11 Trend lines for COVID-19 cases and deaths in Taiwan in the period December 23, 2021–August 3, 2022 (*Source* Data based on published daily news briefings in this period by the Central Epidemic Control Center (CECC) Ministry of Health and Welfare, Taiwan)

hospital ER departments; complex and confusing government rules and guidelines for testing, quarantine, and home isolation; and shortages of the drug Paxlovid led to delayed treatment; shortages of health care workers, etc. Taiwan's healthcare delivery system came under considerable threat of being overwhelmed. Hospitals were ordered, beginning May 18, to limit admission for inpatient care to only three categories of patients: medium-to-severely ill, febrile infants younger than three months, and patients deemed by their physician to need inpatient care for medically necessary treatments.[41]

Complacency following long periods of calm may be, once again, one reason for the Omicron surge and the toll it took in Taiwan. A May 7, 2021, article in the *United Daily News*, one of Taiwan's largest daily papers, with the title: "UK Media [*Daily Mail*] Warns Taiwan Not Making Prior Preparations May Lead to Unprecedented Death Rates This Summer" was telling.[42] Many in Taiwan believed the government lost valuable time not using the window when things were going so well to prepare for possible surges as had happened in so many countries across the world.[43]

Realizing that the previous policy of "prevention and control" had become ineffective in the face of the highly transmissible Omicron variant, Taiwan's government made a major policy shift, replacing the previous policy with the new policy of "From '0-Covid' to 'Live with Covid'." Former vice president of Taiwan and public health expert, Chen Chien-Jen, M.D., explained, in a May 17 special CNN interview that the previous policy by now is akin to "Mission Impossible," and the new policy aims to "focus medical resources on patients with severe symptoms, … Those who are asymptomatic or with mild symptoms and close contacts should self-isolate at home."[44]

Under the new policy, Level-2 emergency alert remains in place. This means mask wearing, hand hygiene, social distancing, avoiding crowded places and occasions are all to continue. Border control is somewhat eased, with a new quota of 40,000 passengers from overseas per day allowed into Taiwan. Quarantine requirements are also relaxed from 14-day mandatory quarantine plus 7 days self-monitoring to the new "3 + 4" regime—three days mandatory quarantine and four days of self-monitoring. The government also continues to push for vaccination. As of July 29, 2022, 91.8% of Taiwan's population had received one dose of vaccine, 85.8% two doses, 71.3% one booster shot, and 6.9% two booster shots.[45] Taiwan did well in vaccinating children: As of the end of June

2022, 75.1% of children ages 5–11 were vaccinated (at least one dose), compared to 36.5% for the United States, 18.5% for Japan, and 56.1% for Canada.[46]

Going into August 2022, emergency alert Level-2 remains in effect in preparation for the expected arrival of large numbers of cases of Omicron BA.5. As of the end of July 2022, while Omicron BA.5 is the predominant variant circulating across the globe causing explosions in cases, the overwhelming majority of cases in Taiwan were still of the Omicron BA.2 variant.[47] Taiwan's first domestic Omicron BA.5 case was identified on July 17, in a woman in her twenties, thrice vaccinated, who had a COVID-19 infection in May 2022.[48] As of July 31, 2022, Taiwan has seen only 11 confirmed cases of Omicron BA.5, in contrast to neighboring Japan, South Korea, and much of the rest of the world. Japan has been seeing more than 200,000 cases a day for some days and reported more than 240,000 cases on August 4.[49] Of particular concern to Taiwan's government is the 10% of the elderly population who have not to date been vaccinated while border control policy has been relaxed to some extent to allow more travelers into Taiwan, which increases the risk of community spread of Omicron BA.4/BA.5.

3 Impact of the COVID-19 Pandemic on Taiwan's Economy and Society

For most of the two-and-a-half years since COVID-19 first emerged as a global pandemic, the majority of Taiwanese continued their daily lives as usual. Taiwan did not resort to large-scale lockdowns and testing. Mask wearing has become "second nature" for most people and the public monitors itself by reminding those few who do not wear a mask, for example, on subways, to do so. The public has cooperated closely with the government, in sharp contrast to the experience in many other countries. What impact the COVID-19 crisis had on daily life has been insignificant for most Taiwanese. Widely shared perceptions of quality of life may be gleaned from first-person narratives such as "… we live in paradise" (2020); "… Until the Omicron surge in May 2022, life in Taiwan was great. Restaurants are full, hotels are hard to get, etc."; and since the Omicron surge subsided in July (2022), "Life has not changed much here in Taiwan. People go out and function normally with masks on."[50]

Taiwan's low number of COVID-19 cases and deaths for much of the two-and-a-half years of the COVID-19 pandemic has also allowed

its economy to continue growing despite the two limited outbreaks—the "squall" (mini-surge) in May–July 2021 and the Omicron surge in May–July 2022. Figure 12 shows real GDP growth in Taiwan in the period 2011–2021 and projected growth for 2022. It is seen that Taiwan enjoyed strong economic growth in the pandemic years: 3.36% in 2020, 6.57% in 2021; and projected growth of 3.91% for 2022, in sharp contrast to the rest of the world. In 2020 world real GDP declined by 3.4%, and G-20 countries, members of the Euro area, and comparable OECD countries experienced negative growth ranging from −1% to −11%, as Fig. 13 shows.

Consumer spending in the second quarter of 2021 during the Phase II mini-outbreak May–July, however, fell by 4.2% as many businesses cut workers' hours or laid off workers to save costs.[51] Unemployment in the three months between May–August 2021 reached a ten-year high of an average of 4.3%.[52] Initial projected overall growth for 2021 remained a robust 5.9%,[53] which was revised to 6.57% in January 2022 when all the data for 2021 were in.

Projected GDP growth for 2022 in Taiwan remains a strong 4.42% as of August 11, 2022 (Fig. 12), despite the Omicron surge in May–July 2022. This is once again in sharp contrast with the latest world economic outlook, which remains dark, according to the International Monetary

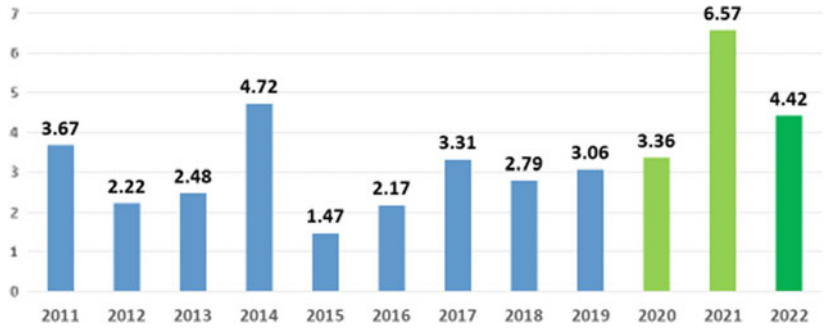

Fig. 12 Economic growth (in % GDP) in Taiwan 2011–2021 and Forecast for 2022 (*Source* Statista. Annual growth of the gross domestic product (GDP) in Taiwan from 2000 to 2021 with a forecast until 2022. https://www.statista.com/statistics/328535/gross-domestlc-product-gdp-annual-growth-rate-in-taiwan/. Accessed August 11, 2022)

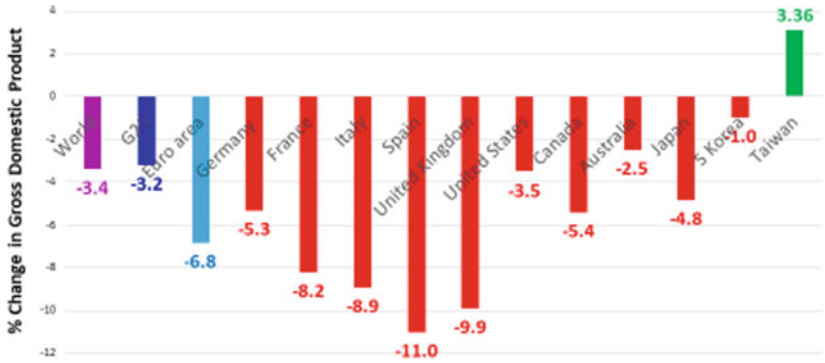

Fig. 13 Economic impact (in % GDP) of COVID-19 in the world, G20, Eurozone, select OECD countries, and Taiwan, 2020 (*Source* OECD Economic Outlook, Interim report March 2021. https://read.oecd-ilibrary.org/economics/oecd-economic-outlook/volume-2020/issue-2_34bfd999-en#page6. Data for Taiwan from the Directorate-General of Budget, Accounting and Statistics, Executive Yuan, R.O.C. (Taiwan), updated 20 FEB and SEP 2021. In Chinese. https://www.dgbas.gov.tw/ct.asp?xItem=46902&ctNode=5624&mp=1)

Fund.[54] Rising inflation, rising energy prices, the war in Ukraine, and the sharply declined economic growth in China are among the reasons for the gloomy projection. The IMF's July 2022 Group of Twenty G-20 Surveillance Note, prepared for the July 2022 G-20 Finance Ministers and Central Bank Governors' Meetings in Bali, Indonesia, reports that first quarter 2022 growth was slower for some member countries: Spain, Italy, Korea, Australian, and Canada; and negative for some other member countries: United States, Japan, and France.[55] This is a reversal from 4th quarter 2021, when all G-20 countries, except Germany and Mexico, reported growth.[56]

Inflation, public enemy No. 1 in much of the world in 2022, also has affected Taiwan, albeit to a much lesser extent to date than in many other countries. Inflation in Taiwan rose from 1.91% in June 2021 to 3.59% in June 2022,[57] far lower than the 9.1% in the United States in June 2022, and 9.4% in July in the U.K[58]; and the 7.5% in second quarter 2022 for the Euro area.[59] Non-core inflation in Taiwan, however, has seen larger increases. There have been significant increases in prices of food; and electricity bills are to increase by an average of 8.4% beginning July 2022 due to rising costs.[60]

The May–July 2022 Omicron surge affected certain sectors of Taiwan's economy more than others. As in many other countries during periods of COVID-19 surges, Taiwan's service sector, including hotels, restaurants, and entertainment establishments, was among the most adversely affected. Restaurant workers and taxi drivers lament the hardship caused by lower take-home earnings as demand for their services declined, while at the same time they face higher prices for many consumer goods such as food and electricity bills.

Overall, the Omicron surge in May 2022 in Taiwan did not hurt jobs in Taiwan. The unemployment rate was 3.68% during the peak of the surge, continuing a downward trend since June 2021, the peak of the COVID-19 mini-surge, when the unemployment rate reached 4.8%.[61]

Wage stability has remained intact in Taiwan as of July 2022. Available data for the first half of 2022, in fact, show a negligibly slight decline in real wages in Taiwan.[62] Wage stability and stability in the job market in Taiwan have thus meant that so far despite rising inflation, concerns of a price-wage spiral feared by policy-makers in many countries experiencing simultaneous rising inflation and rising wages are premature in Taiwan at this time.

Industrial output in Taiwan showed a decrease in the rate of growth in 2022 compared to 2021—the year the economy grew by a phenomenal 6.57% thanks to strong exports—as Fig. 14 shows.

Fig. 14 Changes in growth of industrial output (%) in Taiwan, June 2021–May 2022 (*Source* Directorate-General of Budget, Accounting and Statistics, Taiwan. Rate of Industrial Output (%), June 2021–May 2022. In Chinese. https://www.dgbas.gov.tw/mp,asp?mp=1)

Uncertainty about developments in the second half of 2022 is a concern to many in Taiwan. Recent stock market declines, softening demand in the manufacturing sector, a cooling housing market, and unknown direction of consumer spending are risk factors.[63] Furthermore, a significant new risk to Taiwan's economy is the yet to be seen economic repercussions from the further rise in tensions in the Taiwan Strait and the Western Pacific region following the visit to Taiwan in early August by US House Speaker Nancy Pelosi. China's superior military strength aside, it has myriad other tools such as economic sanctions and cyber-attacks that can pose significant threats to Taiwan's economy and society.

Taiwan's policy-makers, however, seem less concerned. In a July 2022 television interview, Minister of Economic Affairs Wang Mei-Hua shared her "not pessimistic" take on Taiwan's economic outlook for the second half of 2022, citing fundamental strengths of Taiwan's economy, a booming semi-conductor sector, and export growth.[64]

Regardless of what happens, Taiwan's National Health Insurance continues to provide all Taiwanese access to needed medical care, a significant policy instrument in safeguarding social peace in Taiwan. This is in sharp contrast to the United States, where access and affordability remain significant barriers to needed medical care for tens of millions of Americans, making life that is already hard under the spell of COVID-19, high inflation, a tight housing market, and deep political division even harder.

4 Lessons from Taiwan's Handling of the Pandemic

Taiwan has fared far better than most countries in managing the COVID-19 crisis. Two-and-a-half years into the global pandemic, Taiwan remains an outstanding example of how COVID-19 and its many iterations may be contained. What was unique about Taiwan's experience, and what lessons are there for other countries? There is not one simple answer. Taiwan's achievements in the fight against COVID-19 are the result of a confluence of several factors each of which played a critical role in the ultimate outcome.

Leadership, National Plan, and Early Action

The 2003 SARS crisis taught Taiwan perhaps the most important lesson in pandemic prevention and control, which consists of three parts: leadership at the top, a national plan, and early action. As soon as Taiwan learned of the outbreak caused by an unknown new virus in Wuhan, China, the government wasted no time activating a national plan it had in place for such a contingency. The most significant features of the plan included a post-SARS strengthened Taiwan-CDC and healthcare delivery system, and a constitutional ruling that granted the government power to do all that is necessary in public health emergencies including mandatory quarantine by "temporarily removing people's freedom of movement."[65] Effective quarantine and contact tracing that prevented and limited community spread of COVID-19 are the results.

To implement the national plan, the government established a central epidemic command center, or CECC, headed by the minister of health and welfare as early as mid-January 2020 to oversee all operations in connection with the then emerging threat. Such a central command structure made possible a streamlined implementation and administration of the anti-COVID-19 plan in much the same fashion as Taiwan's government-run single-payer National Health Insurance is run. The NHI is known for its administrative efficiency.[66,67]

IT and Communications Infrastructure

Taiwan's interoperable ICT infrastructure drives both government and private sector COVID-19-related operations including real-time data collection and sharing, which helps the government with data-driven decision-making, on the one hand, and the private sector and the public with real-time information on all COVID-19-related matters, on the other hand. Some examples of the latter are: Using their mobile phones, Taiwan's public can check the real-time availability of PPE at nearby pharmacies and convenience stores and reserve pickup times. They can also register online for vaccination at locations near their work or residences and monitor government notifications of new cases found and their precise locations in real time so they can avoid the hot spots, etc.[68] The importance of this data transparency and two-way open communication cannot be overestimated.

Solidarity and Cooperative Public

Ultimately, the outcome of any epidemic crisis depends to a significant degree on the response to the threat of not only the government but also the public. As the famous proverbial saying "it takes two to tango" goes, the cooperation of the public is a necessary condition for any government intervention to be successful in a public health crisis. Instead of evading or even escaping government interventions as many did during the SARS crisis, Taiwan's public cooperated with the government in all its COVID-19 prevention and control measures. Willingly, the public accepted mask wearing; hand hygiene; social distancing; contact tracing; quarantine; travel restrictions; testing; and vaccination when vaccines became available, after the public overcame their initial hesitancy due to concerns about the quality of the vaccines. Initially, only the AstraZeneca and domestically produced vaccines were available, and only months later did the Pfizer-BioNTech and Moderna vaccines become available.

In addition to trusting the government in handling the COVID-19 crisis, Taiwanese regard cooperation with the government in this crisis as a civic responsibility. They share the understanding that everyone is in this fight together and recognize the importance of working together to overcome the crisis. For many Western countries, where many citizens either do not trust the government or value their own choices over what are in the public's interest, this may be the most important of all the lessons Taiwan's experience so far has to offer. Harm that could and would have been avoided in those countries include the large number of cases and deaths, extensive disruptions to daily life caused by lockdowns, rising public health challenges such as mental health as so many have been affected by the stresses caused by the pandemic, and economic slowdown, to mention but a few among myriad.

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CHAPTER 9

The Coronavirus Pandemic and Inequality: Australia

Vera Brusentsev

1 Introduction

This chapter examines the Australian experience with the coronavirus pandemic. Response plans are critical to mitigating the potential negative effects of a pandemic on households and the economy, and to building resilience to it. At the national level, resilience is determined by the degree to which a country has the necessary resources and is capable of organizing them prior to a potential hazard occurring and during the incidence of the event. Prior to the coronavirus pandemic, Australia had undertaken a risk assessment of another biological hazard, influenza. The Australian Health Management Plan for Pandemic Influenza (AHMPPI) outlined a response to an influenza pandemic to minimize its impact on the health of Australians and the healthcare system (Australian Government Department of Health, 2019).[1]The AHMPPI was framed around

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the concept of situational awareness; a flexible approach that could adapt as evidence emerged and could deliver responses that were proportionate to the anticipated impact of the pandemic.

The AHMPPI plan provided the framework for activating the Australian Health Sector Emergency Response Plan for Novel Coronavirus (the COVID-19 plan) in anticipation of that pandemic (Australian Government Department of Health, 2020a). In line with the preparedness and response guidance for a pandemic, health strategies were implemented to minimize disease transmission: effective border measures and widespread communication. Consequently, the COVID-19 plan was effective in mitigating the effects of the pandemic on the Australian public.

As the pandemic evolved, policymakers pursued several ways to contain the spread of infections: encouraging work from home, expanding testing and contact tracing, promoting the use of face masks, and restricting large indoor gatherings. At times, policymakers introduced stringent restrictions in an attempt to slow rising coronavirus cases. Subsequently, economic activity contracted, ending 28 years of uninterrupted economic growth. The contraction was driven not only by government restrictions but also by individuals voluntarily reducing their social interactions because of the fear of contracting or spreading the virus. Yet, the recession in 2020 was relatively mild because of the well-coordinated pandemic response. The range of COVID-19 health response measures included access to telehealth, COVID-19 testing and support for residential aged care. Decisive and timely fiscal policy initiatives played an important role in stabilizing the economy and maintaining the living standards of the population. The tr 2019-20fiscal response kept employees connected to labor market jobs, helped keep firms operating, and provided income support for households. Many of the fiscal initiatives were temporary and targeted to Australian regions and sectors most affected by the coronavirus.

The first section of the chapter provides background information on the performance of the Australian economy prior to the pandemic and outlines the Australian health system. Section 2 summarizes the evolution of the coronavirus in Australia and discusses some of the effects of the pandemic. Specific public policy initiatives that were introduced to mitigate these effects are also examined. Section 3 evaluates the effectiveness of public policy in containing the pandemic and mitigating the economic and social consequences.

2 Setting the Scene

This section presents a snapshot of the Australian economy prior to the coronavirus pandemic and outlines the Australian health system. The performance of the Australian economy is examined in the context of two goals of macroeconomic policy: growth in the standard of living as reflected in Gross Domestic Product (GDP); and high levels of employment. Information on the level and distribution of household income and wealth is also presented.

A Snapshot of the Australian Economy in 2019

Statistics from the Australian Bureau of Statistics (ABS, 2020a) show that GDP grew 2.2% in 2019–20.[2] In terms of aggregate expenditure, household discretionary spending and government expenditure increased while dwelling and private business investment expenditure fell. As noted by the ABS, there was an increase in the compensation of employees for a twelfth consecutive quarter. The rise in GDP in the fourth quarter of 2019 was due to the increased number of wage and salary earners as well as an increase in the wage rate.

A high level of employment is an important macroeconomic goal as the main source of household income in Australia is in the form of wages and salaries. Figure 1 shows both the level of employment and the trend from 2014 to 2019 (ABS 2020b). Clearly, evident in the labor force statistics is the continued rise in the number of employed individuals. The unemployment rate in 2019 was 5.1% and reflected the continued fall in labor underutilization.

Aggregate employment statistics, however, obscure the disparities in labor force opportunities that are long-standing societal divisions in Australia. The Organisation for Economic Cooperation and Development (OECD, 2021) finds that the employment rates of demographic and ethnic groups vary: Aboriginal and Torres Strait Islander (respectfully hereafter, Indigenous Australians) populations are lower than for the general population; the employment opportunities of women with children are constrained given that women have the major responsibility in caring for children; and younger labor force participants tend to have less stable employment and lower wages. Furthermore, the gap in the employment rate between the Indigenous and non-Indigenous Australians in

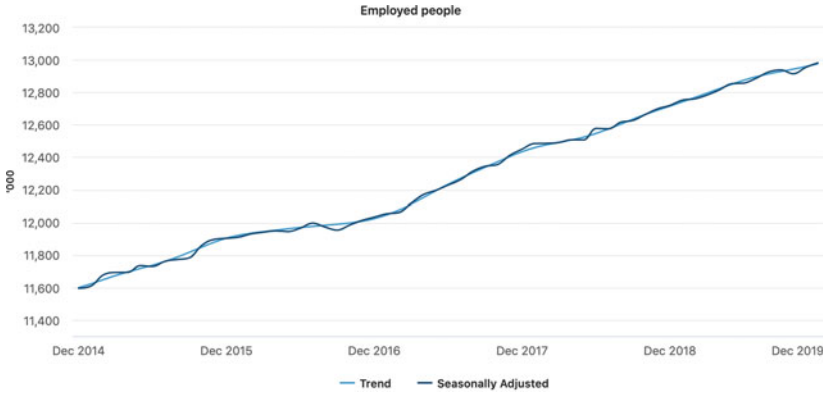


Fig. 1 Total employment, Australia, December 2014–2019 (*Source* Australian Bureau of Statistics, Labour Force, Australia December 2019)

rural and urban regions is stark: about—20% points in urban regions and—35% points in rural regions.

Economic Well-Being

Economic well-being is largely determined by an individual's control of economic resources: income and wealth. The ABS collects information about income, wealth, and housing from residents in private dwellings in the Survey of Income and Housing (SIH), excluding residents in very remote areas. The 2017–18 SIH has been used as a baseline from which to analyze the living standards of different socioeconomic groups over time. A report from the University of New South Wales and the Australian Council of Social Services (2021) used the 2017–18 SIH to examine the extent of inequality. The report notes that the main source of household income was from wages and salaries, followed by income from financial investment, social security, and from self-employment. It finds that incomes of households in the top 20% of the income distribution were nearly six times those in the lowest 20%. Moreover, that gap had widened since 2015–16, when the highest 20% earned five times as much as the lowest 20%. The average household disposable income in the highest 20% of households was more than twice the income of the middle 20%.

The report finds that in 2017–18, average household wealth exceeded $1 million. Of this wealth, 39% was the value of the main home; 21%, superannuation (pensions); 20%, shares and other financial assets; 12%, investment real estate (in addition to the main home); and 9%, the value of other non-financial assets. The distribution of wealth was also unequal, with the average wealth of the top 20% equal to about 90 times that of the lowest 20%. Moreover, the wealthiest 20% held almost two-thirds of all household wealth, more than all other households combined. Those in the lowest 10% held very minimal average net wealth, and the bottom 5% held net debt.

The 2019–20 cycle of the SIH was released on 28 April 2022. Once, researchers have had time to analyze and compare it to the 2017–18 SIH cycle, it will help to extend the assessment of the pandemic on inequality and further evaluate the effects of government policies for maintaining income and employment. With the release of subsequent surveys, a more extensive evaluation can be undertaken.

The Australian Health System

Australia has a two-tier health system, public and private, with the responsibility divided between three levels of government. The federal government is responsible for regulating private health insurance, pharmaceuticals, and therapeutic goods. The states own and manage the delivery of services for public health care and regulate private hospitals and the healthcare labor force. Local governments are responsible for the delivery of community health and preventive health programs. The organization of the health system is summarized in Fig. 2 below.[3]

The universal public health insurance program, Medicare, is financed through general tax revenue. While the financing is at the federal level, the administration of Medicare is regional. Not only is enrollment in Medicare automatic for Australian citizens, but also for citizens from New Zealand, and permanent residents. Individuals from countries with reciprocal agreements are eligible to enroll in Medicare. Once enrolled, individuals receive free public hospital care and substantial coverage for physician services, pharmaceuticals, and certain other health services.

Approximately, half of the population purchase supplementary private insurance to cover private hospital care, dental services, and other health services. Private insurance coverage varies across socioeconomic groups. Glover (2020) finds that private health insurance covers one in five of

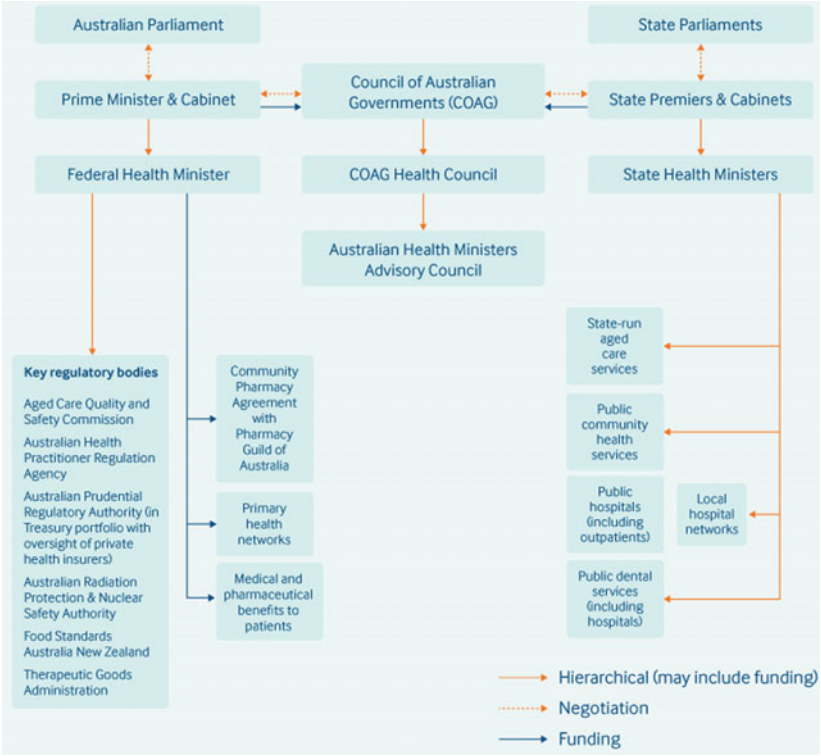


Fig. 2 Organization of the Health System in Australia (*Source* L. Glover, 2020)

the most disadvantaged quintile of the population, but more than 57% of the most advantaged quintile. The federal government helps to offset the premiums of private insurance with a rebate to lower-income households and also imposes a tax penalty on higher-income households who do not purchase it.

There are disparities in health outcomes between people living in major urban centers and those in rural and remote regions. The federal government provides financial incentives for health practitioners to relocate and work in these areas. The most prominent health disparities are between Indigenous Australians and the rest of the population and chronic disease

rates are higher among Indigenous Australians living in remote areas (Australian Government Department of Health. 2020c).

The government also provides the telecommunication infrastructure for telemedicine services. Whether conducted by telephone or video conferencing, telehealth visits enable healthcare providers to triage, and monitor patients in their homes. The use of telehealth became widespread during the coronavirus pandemic, and, on November 27, 2020, the Australian government announced that telehealth would become a permanent part of the Medicare system.[4]

With imperfect and evolving information in the early stages of the pandemic, the Australian government decided to balance health security with support for economic activity. As noted in the introduction, a clear and coordinated strategy was formulated in the COVID-19 plan. As new information became available, particularly as the coronavirus mutated and emerged with higher levels of transmissibility, the plan was adapted. Policymakers' ensured information was clearly communicated and grounded in the expert knowledge of epidemiologists and behavioral scientists. To mitigate the economic effects of the pandemic, policymakers provided income support for individuals and families and extended assistance to firms and industries most affected by the pandemic.

3 Evolution of the Pandemic and Policy Reponses

The chronology of the pandemic covered in this chapter is from January 2020 to March 2022. The first positive case of coronavirus was reported in Australia on 25 January 2020. Heightened global concerns about the pandemic potential of the coronavirus led to an emergency declaration by the World Health Organization (WHO) on January 30, 2020.[5] Australia took the precautionary approach of activating the COVID-19 plan in February 2020 in anticipation of a pandemic: border restrictions, isolation, surveillance, and contact tracing. Hotels were contracted to quarantine international travelers arriving in the country and systems for free testing and contact tracing were instigated. On February 1, 2020, Australia closed its border with the Peoples Republic of China (hereafter, China), its largest trading partner. On February 3, 2020, 241 Australians were evacuated from China and placed in government-mandated quarantine for 14 days. The WHO declared the coronavirus to be a pandemic on

March 11, 2020. Australia closed international borders to non-residents on March 19, 2020.

The COVID-19 plan articulated the risks posed by the coronavirus: 'It has the potential to cause high levels of morbidity and mortality and to disrupt our community socially and economically' (Australian Government Department of Health, 2020a). Also articulated was the concern about the capacity of the health system to cope with the demand for specialist services. An important strategy of the COVID-19 plan was the communication of accurate and consistent information about its implementation. The public was informed about how to reduce the risk to themselves and their families. The information would enable them to make more informed decisions about employment, schooling, and travel. Health recommendations for at-risk individuals and groups were also clearly communicated. The objective was to build public confidence in the capacity of health services to manage the response.

As the number of cases began to accelerate in March 2020, strict confinement measures were introduced. Returning citizens were required to quarantine at government-mandated hotel facilities for two weeks, stringent lockdown measures were imposed, and, at times, people were prevented from leaving their homes except for essential services. According to the OECD (2021), these containment measures had a significant impact: the number of daily new cases peaked within two weeks and fell sharply thereafter.

Throughout 2020, a stated priority of governments in Australia was job creation and economic recovery (Commonwealth Government of Australia Budget 2020–21). Financial assistance was introduced by both federal and state governments in mid-March 2020 as the severity of the pandemic became apparent. The objective was to support communities, regions, and sectors facing significant challenges. The main federal government response was a series of temporary measures to maintain employment and provide income support: free childcare for families; assistance to apprentices and trainees; cash flow assistance to small and medium-sized enterprises; additional tax write-offs for investment; increased household incomes through higher social assistance payments; and permitting individuals to make early withdrawals from their superannuation (pension) funds.

The major employment measure was a large-scale temporary wage subsidy scheme, JobKeeper Payment, to last six months from March 30,

2020, to September 27, 2020. The objective was to maintain the employment attachment of eligible employees with their employers. The wage subsidy was a flat payment of $1,500 per fortnight for each employee or self-employed individual, regardless of the number of hours worked in the labor market or prior earnings. In July 2020, the government announced that JobKeeper would be extended for six months, albeit with reduced payments and modified eligibility criteria. The JobKeeper Payment scheme ended on March 28, 2021, and is no longer available.

While the JobKeeper Payment was the largest labor market intervention, other initiatives were also introduced. Individuals who received unemployment benefits received a one-off cash payment and a temporary increase in the benefit level through the JobSeeker COVID-19 Supplementary Payment. Similar to JobKeeper, substantial changes to these unemployment payments were made in July 2020, with a reduction in the level of payments and a tightening of eligibility requirements.

With a significant rise in new cases in July 2020 in the state of Victoria, strict lockdown measures were reimposed for over three months.[6] Once that outbreak was mitigated, few coronavirus cases were reported for the next six months, and any localized outbreaks were effectively contained by the imposition of local lockdowns or restrictions.

The willingness to close national borders and restrict interstate travel, together with periodic lockdowns kept cumulative coronavirus cases and deaths low by international standards. Borland and Hunt (2021: 1) posit that 'Australia contained the initial COVID-19 outbreak by early May 2020, before a more severe but geographically limited outbreak in July–October 2020 brought national COVID-19 cases back to the previous peak.'

The COVID-19 plan enabled Australia to expand the capacity of the healthcare system in the first wave of the pandemic by delaying elective care and reallocating medical professionals. There was insufficient planning, however, about chronic exhaustion experienced by healthcare personnel as subsequent waves of the pandemic coincided with the need to attend to other conditions that had worsened during lockdowns.

By October 2020, the case load returned to a low level where it remained in the first half of 2021. In June 2021, however, an outbreak of the Delta variant of the coronavirus occurred in New South Wales and soon spread to other parts of the country.[7] In response, strict lockdowns were once again implemented in several states, including the large states of New South Wales and Victoria. With the return to severe lockdowns

in June 2021, the federal government expanded economic support to households and firms. The COVID-19 Disaster Payment for employees experiencing reduced hours was increased and continued as long as lockdown restrictions remained in place. Small and medium-sized enterprises received new support payments as well as increased tax relief. Childcare providers received additional support. By the end of 2021, most of these support measures were wound back.

In 2021, the Australian government also focused on coordinating vaccinations not only as a protective measure against coronavirus infections but also containment of the virus. A vaccination program was officially launched on February 22, 2021, (Australian Government Department of Health, 2021). The first people to receive vaccines were those who are at a higher risk of contracting the coronavirus: quarantine and border workers, frontline healthcare workers, and aged and disability care residents and staff. Vaccination clinics were established at hospitals in each state and territory, and in aged care and disability care facilities across Australia. The number of locations was increased as more doses arrived in the country. By the end of October 2021, vaccines were available to everyone older than 11 years.

In July 2021, the government announced that changes to the COVID-19 plan would depend on community take-up of vaccines. Once, 70–80% of the adult population was fully vaccinated, strict containment measures would be lifted and international borders would be reopened. Then the focus of the COVID-19 plan would be the prevention of serious illness, hospitalization and fatality, and the public health management of other infectious diseases. As vaccination rates increased, the response to coronavirus outbreaks shifted. State governments introduced two-to four-week lockdowns or introduced such local restrictions as bans on inter-household mixing and domestic travel restrictions.

In late December 2021, the number of cases increased rapidly due to an outbreak of the Omicron variant of the coronavirus, which is more transmissible. With the new rise in cases, elective care and surgery were once again delayed in another effort to expand the capacity of the health system. Despite the outbreak of the Omicron variant, the case fatality rate (ratio between confirmed deaths and confirmed cases) is low in Australia. The low rate can be attributed to the successful vaccination campaign as vaccine inoculations are effective at preventing severe illness, hospitalization, and death. Vaccines also play an essential role in protecting the most vulnerable individuals from severe infection.

The vaccination program was extended to all children aged 5 to 11 on 10 January 2022. The proportion of the population who were fully vaccinated on March 25, 2022, was 83% (Australian Government Department of Health, 2022).[8] As the proportion of fully vaccinated people is high, and the public health and social measures in use are low, elective care, and surgery resumed. The ban on outbound travel was lifted on November 1, 2021, and some inbound travel for fully vaccinated foreign travelers was possible. A full reopening of Australian borders for all fully vaccinated individuals came into effect on February 21, 2022. The pandemic management response currently in place is widespread testing and contact tracing.

The Health Effects of the COVID-19 Pandemic

Since January 2020, the highest number of cases occurred in the month of January 2022 due to the outbreak of the Omicron variant of the coronavirus; however, the highest number of deaths were recorded back in August 2020 (Australian Government Department of Health, 2022). On March 25, 2022, cumulative deaths from COVID-19 were 5,884 individuals.

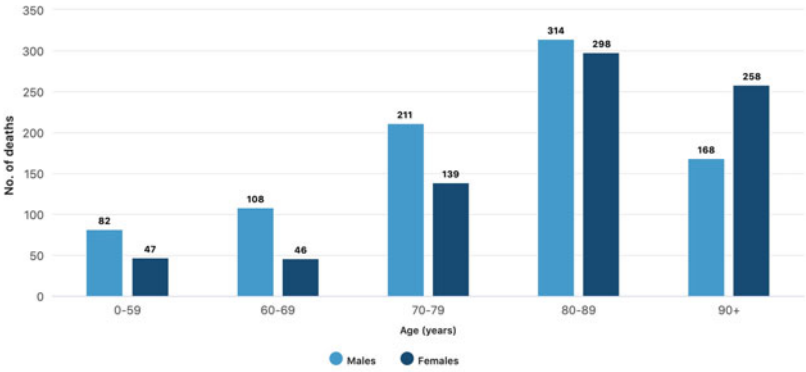
Even with this tragic loss of life, mortality from the coronavirus is not one of the top 10 leading causes of death in the country. According to the Peterson Center on Healthcare and KFF (N.d.), the five leading causes of death in the nation in rank order, with the number of deaths in 2020 shown in parentheses, were cancer (45,230), heart disease (33,291), stroke (10,186), dementia (9,450), and chronic respiratory disorders (7959); COVID-19 ranked as the 21st leading cause of death out of 32 disease categories (3.6 deaths per 100,000 people).

The relative success of containing the pandemic, however, has not meant equal health outcomes for all Australians. A report by the University of New South Wales and the Australian Council of Social Services (2021) explores a number of health outcomes using statistics from national health surveys. One of the findings is that stark inequities in health exist across the country: Individuals in the highest income group are more than twice as likely (60%) to report their health status as good, very good or excellent, compared with 33% of those in the lowest income group. In addition, people on lower incomes are at greater risk of chronic illnesses, which makes them more likely to be susceptible to the effects of

the pandemic. The report concludes that preventable economic and social disadvantage is responsible for these inferior health outcomes.

The response to the coronavirus pandemic was not without its challenges. In an assessment of the early evidence from the People's Republic of China, Wu and McGoogan (2020) report that severe and fatal COVID-19 case rates were elevated among older people, and those with such pre-existing conditions as cardiovascular disease, diabetes, chronic respiratory disease, hypertension, and cancer. Figure 3 shows the number of deaths for women and men in different age cohorts in Australia and clearly indicates that the COVID-19 pandemic disproportionately affected men and older cohorts. As older people are particularly vulnerable to respiratory diseases, the coronavirus presents heightened risks for them.

The number of deaths would almost certainly have been higher were it not for the introduction of a number of reforms to the aged-care system in 2018 to address concerns about quality of care. One of the reforms was the allocation of increased federal funding to help people remain in their own homes as they age. A second reform was the establishment of an independent Royal Commission into Aged Care Quality and Safety



a. This graph only includes information on registered deaths due to COVID-19. Numbers of deaths will differ to disease surveillance systems.
b. Information on deaths due to COVID-19 includes all deaths due to the disease that occurred by 31 October 2021 and were registered by 30 November 2021.
c. Deaths due to COVID-19 in this report have an underlying cause of either ICD-10 code U07.1 COVID-19, virus identified or U07.2 COVID-19, virus not identified.
d. This data is considered to be provisional and subject to change as additional data is received.
e. Refer to Provisional Mortality Statistics methodology for more information regarding the data in this graph.
f. Data in this article reports on deaths due to COVID-19 that were certified by either a doctor or a coroner. This scope differs from data published in the Provisional Mortality Statistics monthly report which only includes deaths certified by a doctor (not coroner-referred deaths).

Fig. 3 COVID-19 Registered deaths by age and sex (*Source* Australian Bureau of Statistics, COVID-19 mortality 22/12/2021)

(hereafter, Commission) in 2019 to assess the performance of the aged-care sector. The aged care system in Australia offers three main types of care service: the Commonwealth Home Support Program, Home Care Packages, and residential care. The most commonly used type of service in 2018–19 was the Commonwealth Home Support Program whose focus is to provide services to maintain health, independence, and safety at home and in the community.

While the pandemic was continuing, the Commission released a special report on October 1, 2020. Two aspects of the report are relevant to this discussion. First, on average, individuals in rural and remote areas have lower income and wealth, lower levels of education, and inferior health outcomes. Older people make up a greater share of the population in these areas than in major cities, but access to aged care services is significantly lower and has declined in recent years. Second, Indigenous Australians experience an earlier onset of ageing-related conditions compared to the non-Indigenous Australian population. For instance, long-term health conditions affect 88% of Indigenous people over the age of 55 years; '(b)y any objective measure, they should be receiving proportionately higher levels of aged and health care' (Commission, 2021: 108). Social and economic disadvantages continue to create barriers for Indigenous Australians in accessing services.

The Commission made six recommendation in its report (2021: 171–73). On November 30, 2020, the Australian Government accepted the recommendations and tabled its response in Parliament. Subsequently, the federal government increased its contribution under the COVID-19 plan from 50 to 100% for activity by states and territories to support aged care services, particularly infection and prevention control training. It is likely that both the earlier reforms and the recommendations of the Commission played an important role in preventing more deaths in older cohorts of the population. These initiatives were in addition to the general public health measures to mitigate the pandemic.

Age is not the only factor that leads to disparate outcomes in mortality. Mortality from the coronavirus also differs by socioeconomic status. The Australian Bureau of Statistics (ABS, 2021b) constructs Socio-Economic Indexes for Areas (SEIFA) that ranks areas in the nation according to socioeconomic advantage and disadvantage.[9] One of the four indices is the Index of Relative Socio-Economic Disadvantage (IRSD). The percentages of coronavirus mortalities were similar for both females and males within each socioeconomic quintile. Individuals living in the most

advantaged areas (quintile 5) had the lowest number of registered deaths from COVID-19. The number of people who died from the coronavirus was more than four times higher for individuals in quintile 1 (most disadvantaged) compared to those in quintile 5 (most advantaged). Despite the relative success of Australian policymakers in managing infections, higher death rates from COVID-19 were more prevalent in areas of economic and social disadvantage.

The most prominent disparities in health outcomes have been between Indigenous Australians and the rest of the population. 'Close the gap' entered the Australian discourse in 2006 as an approach for improving the health of Indigenous Australians and for reducing socioeconomic disadvantage. In 2008, the Council of Australian Governments (COAG) introduced an initiative for achieving life expectancy equality for Indigenous Australians by 2030, Close the Gap. A review of the strategy found that health services and infrastructure for Indigenous Australians had not significantly improved (Holland, 2018). Equal participation by Indigenous Australians in the design and delivery of policies, programs, and services that affect them was considered to be essential for meeting the challenge of health inequality. In March 2019, COAG and the National Coalition of Aboriginal and Torres Strait Islander Peak Organizations signed a formal agreement for achieving equality in health and life expectancy within a generation, the National Agreement on Closing the Gap.

Prior to the WHO declaring COVID-19 a global pandemic, the Aboriginal Community Controlled Health Organizations (ACCHOs) were delivering culturally sensitive messages for preventative health care in their communities. In response to the pandemic, ACCHO called for support in restricting access to rural and remote Indigenous Australian communities from the risks of contact with non-residents. The call for support was based on the findings that Indigenous Australians have higher rates of chronic disease compared to non-Indigenous Australians and are at a higher risk from morbidity and mortality during a pandemic.

Fiscal Policy and the Socioeconomic Effects of the Coronavirus Pandemic

Australian federal and state governments implemented fiscal support measures that, according to the OECD (2021) amounted to 8.6% of

GDP by June 2020. As a result of the health and economic interventions, the contraction in GDP in 2020 induced by the pandemic was short and limited to the first wave of infections. Additional federal fiscal support was approximately 15.7% of GDP, with spending mostly concentrated in 2020. State and territory governments announced additional initiatives that, according to the OECD (2021), accounted for around 2½% of Australian GDP.

The JobKeeper Payment was one of the largest labor market interventions in Australia's history (Commonwealth of Australia, 2020). In its first six months, the initial program from March to September in 2020, it supported around 3.5 million employees in more than 900,000 firms and played a crucial role in containing the declines in employment and income over those six month. Bishop and Day (2020) find that one in every five employees who received JobKeeper would have exited employment had it not been for the wage subsidy. In scaling their estimates to the aggregate level, the authors suggest that the JobKeeper subsidy reduced overall employment losses by at least 700,000 during its first four months in operation.

Statistics from the ABS (2021c) show that JobKeeper payments varied substantially by industry. In such hard-hit industries as accommodation and food services and arts and recreation services, almost 50% of employee compensation in the second quarter of 2020 was attributable to the JobKeeper subsidy. By contrast, in industries less affected by the coronavirus, the share of employee compensation from the subsidy was 10% or less.

Figure 4 shows the distribution of weekly earnings for all employed persons by earnings categories from 2019 to 2021 (ABS, 2021a). The distribution shows the expected bunching around $750 per week, the amount of the JobKeeper wage subsidy.[10] The share of employed individuals with weekly earnings in the range from $600 to $800 increased from 10.0% in August 2019 (prior to the pandemic and JobKeeper) to 13.2% in August 2020. Also, 29.6% of employed persons earned $800 or less in August 2019.

While it is not possible to separate the precise effects of the JobKeeper program on macroeconomic activity from other government stimulus measures and from the successful management of the pandemic, it is possible to make some generalizations. Borland and Hunt (2021) suggest three effects. First, by providing a macroeconomic stimulus the

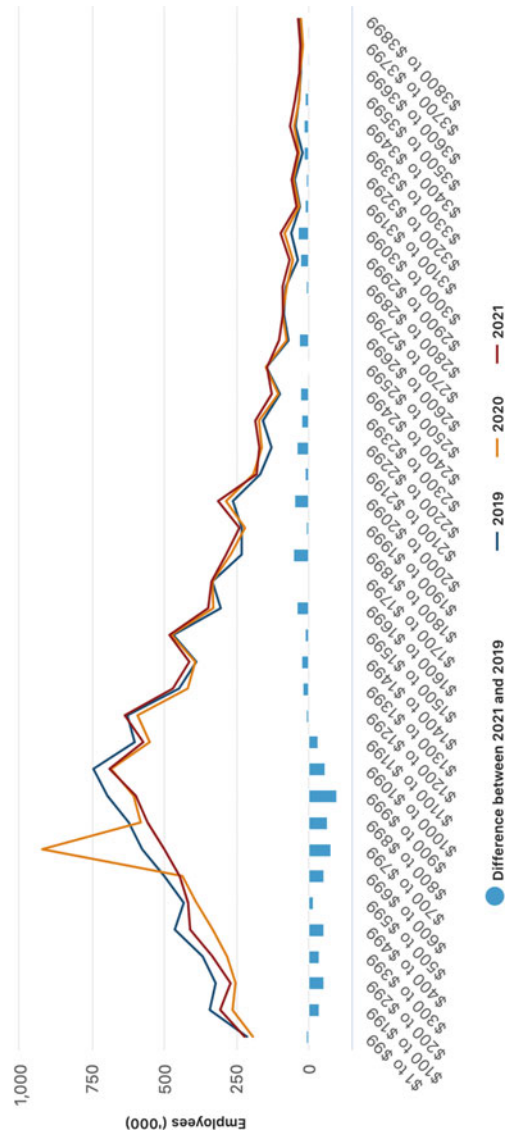


Fig. 4 Distribution of weekly earnings (*Note* In August 2020, there was a larger number of people than usual earning around $750 per week, which was the amount of the JobKeeper wage subsidy. *Source* Australian Bureau of Statistics, more than 40% of Australian worked from home 14/12/2021)

wage subsidy program fostered increased economic activity and facilitated income smoothing over time. Second, increasing the incomes of employed persons who would otherwise have experienced lower hours of labor market work had a positive distributional effect. Third, by maintaining viable firms that would have ceased to exist in the absence of JobKeeper and by preserving job attachment, the program decreased the subsequent adjustment costs associated with COVID-19 in the recovery.

On the other hand, the authors find that the cost of each JobKeeper-job was high given that both part-time and full-time workers received the same flat rate. They suggest that the six-month extension from October 2020 to March 2021 with reduced payments and modified eligibility criteria would have been a more effective program to use initially as the impact on employment may have been larger, and the cost per job lower. Another cost concern raised by the authors was the 'relatively large proportion of JobKeeper subsidies that flowed to businesses that had revenue decreases smaller than the intended threshold for eligibility' (Borland and Hunt, 2021). One of their proposals to reduce the costs of the program is to include a claw-back mechanism from firms that, ex-post, are found not to have met the conditions for eligibility.

A number of initiatives announced in the latest budget will continue to support the recovery from the pandemic over the next few years: households and firms will be provided with extended tax relief, and the funding for aged care and childcare is to be increased.The Pandemic Leave Disaster Payment will provide 'financial support to individuals who cannot work and earn income because they are directed by a state or territory health official to self-isolate or quarantine as a result of COVID-19' (Commonwealth of Australia, 2021). The federal government continues to work with states and territories to provide financial assistance to those affected by restrictions when coronavirus outbreaks occur.

The Australian Economy in 2021

As noted in the introduction, the mild recession Australia experienced in 2020 ended 28 years of uninterrupted economic growth. Empirical evidence from Caselli et al. (2020) demonstrates that lockdowns can substantially reduce coronavirus infections, especially if they are introduced early in a pandemic and are sufficiently rigorous. Despite short-term economic costs, stringent restrictions lead to a faster recovery

by containing the spread of the virus and possibly facilitating overall positive effects on the economy.This finding is consistent with the Australian experience. Figure 5 shows GDP from 2013 to 2021. The information clearly shows that economy activity began to recover through the second half of 2020 and is continuing to recover.

Statistics from the ABS (2022) show that economic activity was 3.4% higher in 2021 than it was before the start of the pandemic. The largest rates of economic growth were in those states where the strict containment measures imposed in mid-2020 were lifted: New South Wales (6.7%), Victoria (3.7%), and the Australian Capital Territory (1.9%). Household spending rose by 6.3% with the largest increase in non-essential spending, 14.2%—the largest increase on record. Production in industries most affected by restrictions also surged: the air transport industry grew the fastest (56.5%), followed by accommodation and food services (26.1%), and personal and other services (15.4%).

Similar to the changes in GDP, the initial labor market effects of the downturn were abrupt, but the subsequent recovery was rapid. Most employment relationships were preserved during lockdowns. As a high-income nation, it is relatively easy for many people to work from home and sustain periods of temporary unemployment because of the relatively high personal savings of the nation and also the timely government policy responses to the pandemic. These responses were in addition to such social protection programs as child care, parental leave, and paid sick leave. Supportive social protection programs not only have economic consequences, but also social consequences.

Figure 6 shows monthly changes in key labor market indicators from May 2021 to November 2021, a time frame that captures the strict lockdowns associated with the Delta variant of the coronavirus. The extent of the recovery between October and November is clearly evident after the easing of restrictions in both New South Wales and Victoria, states that have a large influence on the national statistics.

The rapid recovery in employment between October and November was due to the large number of people remaining attached to their positions of employment throughout the lockdowns because of supportive public policy. According to the ABS (2022), the changes in employment and participation were particularly large for 15-to-24-year-olds; the youth participation rate increased by 3.7% points to 70.1%, the highest it had been since March 2009. By early 2021, total hours worked in the labor market had completely recovered. The unemployment rate has fallen from

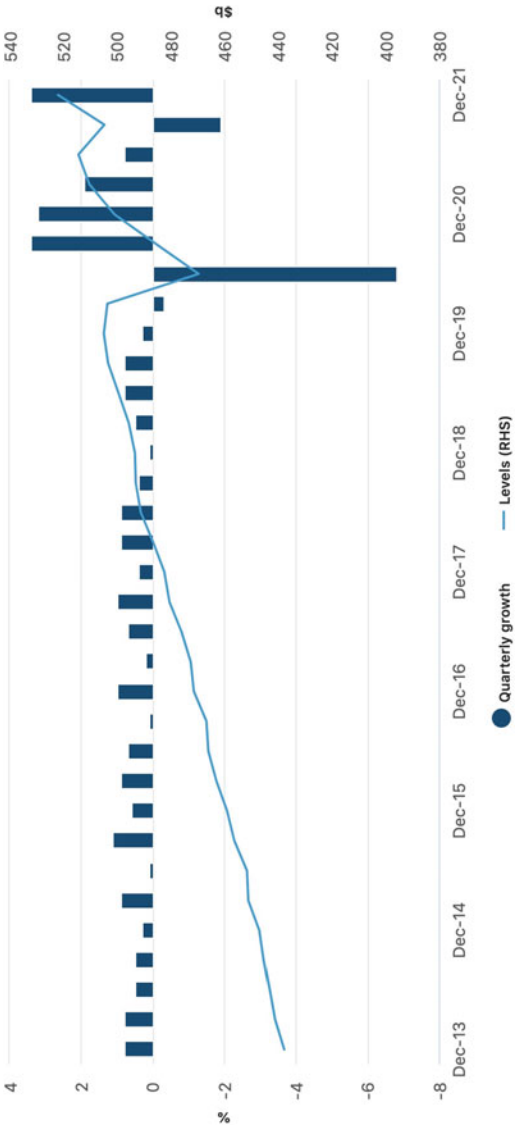


Fig. 5 Gross Domestic Production (GDP) Chai. Volume measures, seasonally adjusted (*Source* Australian Bureau of Statistics, economic activity increased 3.4% in December quarter 2/03/2022)

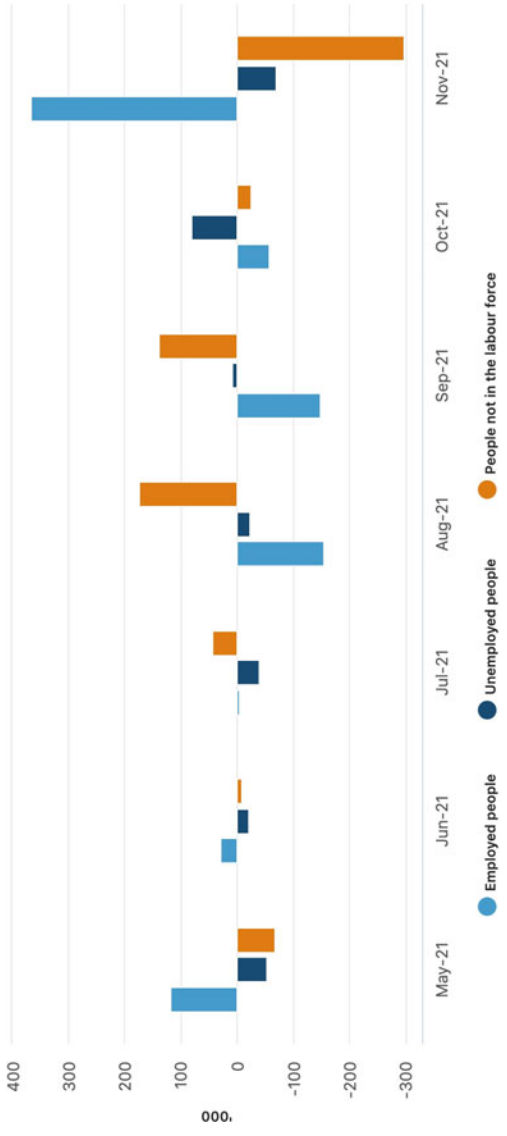


Fig. 6 Monthly changes in key labor populations, Australia (*Sources* Labour Force, Australia, Table 1; Australian Bureau of Statistics, Employment rebounds by 366,000 after lockdowns end 16/12/2022)

its peak of 7.4% in mid-2020 to 4.0% in February 2022, the lowest since August 2008.

4 Evaluating the Effects of the Coronavirus Pandemic

This section focuses on specific economic and physical health consequences, acknowledging that there are also important side effects on educational attainment and mental health issues. Overall, Australia has been relatively successful in containing outbreaks of the coronavirus. Testing, tracking, and contact tracing were critical in managing these outbreaks. Australia was also successful in assessing the risks of the pandemic to particularly vulnerable groups and prioritizing the responses for them. Australia was also able to facilitate a relatively quick economic recovery. Policymakers were effective in both containing the pandemic and reducing some of the economic consequences.

While the location of Australia could be cited as a reason for its relative success with the coronavirus pandemic, it does not provide a full explanation. Australia is highly connected to the world through trade, tourism, and immigration. According to the ABS (2020c), 9.5 million international tourists arrived in Australia in 2019. These statistics suggest that Sydney and Melbourne could easily have become hot spots for the spread of the virus. Instead, Australia restricted travel and personal interaction until vaccinations were widely available, prioritizing particularly vulnerable people before gradually reopening the country.

Australia's pandemic preparedness and response, however, is also the result of trust: trust in science and public institutions, as well as interpersonal trust. According to Chang et al (2020) compliance rates with social distancing guidelines, along with testing, contact tracing and isolation, remained relatively constant at around 90% throughout the early outbreaks of the virus in 2020. Comparative statistics from 177 countries show that when the pandemic began, 76% of Australians stated that they trusted the healthcare system and 93% of Australians reported that they were able to receive support from people living outside their household in times of crisis (COVID-19 National Preparedness Collaborators, 2022). Moreover, Australians were more likely to agree that 'most people can be trusted'—a major factor in containing the virus as most people were willing to reduce their movements, wear masks, and get vaccinated.

Furthermore, the survey data show that interpersonal trust mattered more than health spending or the structure of government.

The pandemic highlighted the need for a management plan to mitigate the risk of biological hazards and build resilience. Since 1999 a comprehensive effort has been undertaken by all levels of government to develop a national response to an influenza pandemic. The approach to emergency management used in Australia is consistent with that used by the Federal Emergency Management Agency (FEMA): prevention, preparedness, response, and recovery. The AHMPPI published in August 2019 is intended to be a 'living' document, that 'will be regularly updated and refined to make sure…(it keeps) up with current ideas and evidence' (Australian Government Department of Health, 2019: 24). On the basis of seasonal influenza experience and the epidemiological evidence from past pandemics, the risk assessment identified vulnerable populations and gave them high priority in the response plan.[11]

With a national strategy in place, it was possible to activate the COVID-19 plan in February 2020 in anticipation of a novel coronavirus pandemic. As new information became available, the plan was adapted. Public messaging about the potential risk of the coronavirus encouraged people to engage with various measures to address the pandemic. The aim was to build resilience and empower people to manage their own exposure. Individuals reduced their social interactions because of the fear of contracting or spreading the coronavirus. Given the success of policymakers in managing infections and responding to the pandemic, Australia saw one of the lowest rates of coronavirus mortality among the member countries of the OECD (2021) and, unlike most other countries, Australia did not see expected life expectancy at birth decrease.

Consistent with the acknowledged risk to older populations and Indigenous Australians, the COVID-19 plan outlined specific mitigation strategies for these populations. To mitigate the risk for older populations, the plan required the Department of Health to work closely with aged care providers. An Aboriginal and Torres Strait Islander Advisory Group on COVID-19 developed a health response for Indigenous Australians that was activated in July 2020. Despite targeted interventions, their effectiveness showed mixed results on the levels of morbidity and mortality for these groups. It is likely that the elevated rates of severe and fatal coronavirus cases among older people is correlated with older populations being particularly vulnerable to respiratory diseases. A positive effect of the pandemic experience is that Australia has learned to

focus more resources to care of the elderly. For Indigenous Australians, however, the explanation is more complicated. Because of existing health and socioeconomic inequities, Indigenous Australians face heightened morbidity and mortality risk. Until these existing inequities are addressed, more than likely the risk and vulnerability that these communities would face from future biological hazards will continue.

By recognizing that a pandemic is a health crisis that has economic consequences, Australia provided an effective response. Increased expenditure on health care supported the existing medical infrastructure: testing, contract tracing, antiviral drugs, vaccines, personal protective equipment, ventilators, and intensive care units. The coronavirus pandemic highlighted the importance of a well-functioning healthcare system. Nations that ensure affordable, efficient, and equitable access to quality care have an advantage in mitigating a pandemic. While Australia has an effective healthcare system, there is a limit to the services that can be provided during a pandemic. The coronavirus pandemic increased the demand for specialist expertise, particularly acute care and emergency services. Australia made a remarkable effort to expand the capacity of the healthcare system capacity in the first wave of the pandemic by delaying elective care and reallocating medical professionals. With the rise in cases of the Omicron variant in late December 2021, however, elective care and surgery were again delayed. While these strategies contributed to the resilience and sustainability of the health system, there was insufficient planning about chronic exhaustion among health system personnel as subsequent waves of the coronavirus coincided with the need to also attend to other health conditions that had worsened during lockdowns. Overall, the Australian effort to expand the capacity of the healthcare system had mixed results.

With medical infrastructure in place, policymakers provided employment protection and income maintenance to mitigate the economic effects of the pandemic. As a consequence, the economic downturn was relatively mild. Numerous policy initiatives were introduced by Australian policymakers to ensure a sustainable recovery in both product and labor markets, in particular, targeted assistance to address some of the structural divisions in society. Clear guidance from policymakers about their objectives and future policy changes was responsible for maintaining confidence in the economy and enhancing the transparency of fiscal choices. Figure 7 shows the number of policy measures employed between January and November 2022 to mitigate the effects of the pandemic based on the 79

policy instruments recorded in the OECD COVID-19 Policy Response Tracker. The large number employed by Australian policymakers is consistent with the swift and effective policy response to the coronavirus pandemic.

Given the relatively short duration of the recession and the fast pace of recovery, it is likely that the various employment and income support programs provided substantial macroeconomic stimulus during 2020 and 2021. These programs raised household and business incomes and, more than likely, were responsible for increasing consumer and business confidence. The adjustment to employment of the JobKeeper program came through temporary and permanent layoffs, particularly of casual and low-tenure permanent employee. As JobKeeper payments went predominantly to individual employees at the lower end of the income distribution, they provided income support to an economic and socially disadvantaged group. The introduction of JobKeeper and the doubling of the unemployment payment with the COVID-19 supplement temporarily raised the incomes of unemployed individuals or those who were at risk of losing their positions of employment. Households in the lower half of the income distribution benefited substantially from these payments, offsetting all or some of the increase in earnings inequality resulting from lockdowns. More than likely, disparities in labor force opportunities will reemerge now that the support has been removed.

Although a well-coordinated pandemic response led to a mild recession and a relatively fast recovery, the effects of the pandemic response were uneven. With the release of subsequent SIH cycles, researchers will be better able to assess the impact of the pandemic on inequality, evaluate the effect of government policies for maintaining income and employment, and shed light on the legacy of the coronavirus pandemic. To address long-standing structural challenges, however, the long-term effect on income and wealth inequality will depend on maintaining adequate income support for vulnerable individuals and households. A more equitable distribution of income and wealth in Australia would improve well-being including the health of the population and its resilience to future pandemics.

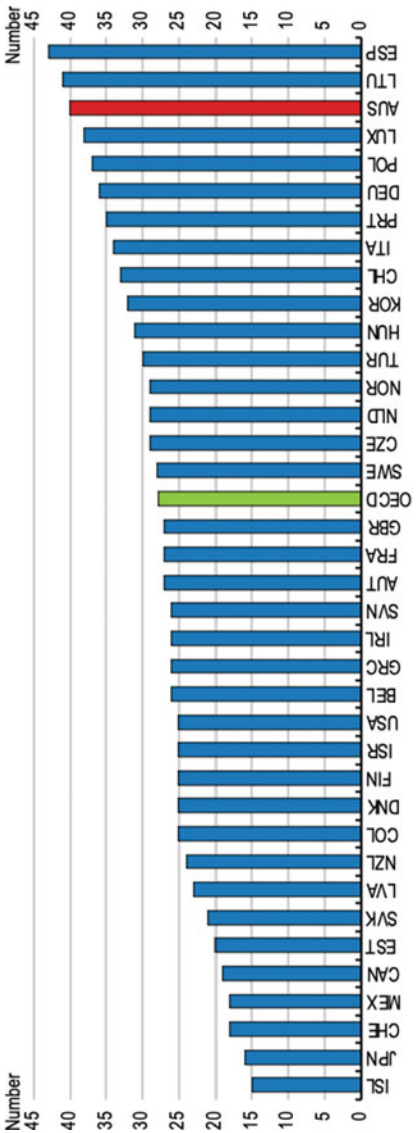


Fig. 7 Number of policies employed by OECD countries to mitigate to mitigate the effects of the pandemic between January and November, 2022 (*Source* OECD economic surveys: Australia 2021)

Notes

1. The Australian Health Management Plan for Pandemic Influenza (AHMPPI) divides the response into a sequence of stages: Preparedness; Standby; Initial Action; Targeted Action; and Standdown. It also provides a rational basis for switching from early, general response strategies (the Initial Action stage) to more proportionate, specific strategies (the Targeted Action stage).
2. The financial year in Australia is from 1 July in the current year to 30 June the following year.
3. Diagram retrieved from the on-line publication by Lucinda Glover (2020), 'International Health Care System Profiles: Australia.'
4. The Honorable Greg Hunt, MP, Minister for Health and Aged Care, Transcript, *Doorstop interview on 27 November 2020*. Retrieved from https://www.health.gov.au/ministers/the-hon-greg-hunt-mp/media/doorstop-interview-on-27-november-2020, 18 December 2021.
5. The World Health Organization maintains the International Classification of Diseases (ICD). Since 2015, the best practice for naming new human infectious diseases involve: using specific descriptive terms that are easy to pronounce and can be shortened into acronyms; the year of discovery and a sequential identifier; and using a causative pathogen. The causative pathogen for COVID-19 is a *coronavirus* that was first reported in Wuhan, People's Republic of China, in November 2019. The virus that causes COVID-19 is severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).
6. The contribution of economic activity in the state of Victoria toward the national economy is about one-quarter.
7. The state of New South Wales accounts for about one-third of the national economy.
8. Individuals are considered to be fully vaccinated two weeks after receiving the second dose of a two-dose vaccine series of Moderna, or Oxford-AstraZeneca, or Pfizer-BioNTech.
9. Socio-Economic Indexes for Areas (SEIFA) are based on information from the five-yearly Census. Using a different subset of Census variables, four indices are constructed by the ABS: Index of Relative Socio-Economic Disadvantage (IRSD); Index of Relative Socio-Economic Advantage and Disadvantage (IRSAD); Index of Education and Occupation (IEO); and Index of Economic Resources IET).
10. Note that the JobKeeper Payment was a flat wage subsidy of $1, 500 per fortnight per employee or self-employed individual.
11. According to the Australian Government Department of Health, the pandemic (H1N1) influenza 2009 virus was not the same as seasonal influenza. There were 37,636 cases of pandemic (H1N1) influenza in

Australia during 2009, including 191 associated deaths. The median age of those dying was 53 years, compared to 83 years for seasonal influenza. The evidence from this pandemic identified high risk groups where the illness is more likely to cause complications. These groups include patients with chronic respiratory conditions, pregnant women, patients who are obese, Indigenous Australians and patients with chronic cardiac, neurological and immune conditions. Not only were children and younger people shown to be at increased risk of serious complications but also rapid spreaders of the virus.

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CHAPTER 10

Conclusion

Shirley Johnson-Lans

The eight countries whose experiences with the COVID-19 pandemic are presented in this book have all suffered some degree of health consequences and experienced at least temporary negative effects on their macro economies and on the well-being of individual households and families. These effects are notable even for the two African nations that have had very low coronavirus infection rates. Section 1 provides some observations about health effects (including comparative countrywide cumulative death rates per million population). It then provides a listing of the categories that have formed the basis for inequality in health status or access to health care that are relevant in a world where the effects of COVID-19 have been very unequal. There is remarkable similarity across countries in the categories of people who are disadvantaged. Section 2 looks at steps taken to control the pandemic and/or to alleviate some of its effects, but focuses particularly on vaccinations, providing a table that

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shows the proportions of populations vaccinated in the eight countries. Section 3 provides a few concluding thoughts on possible lessons learned.

1 The Effect of COVID-19 on Health of Populations

Deaths Per Million Population

A good metric to use in measuring the devastation to health associated with the coronavirus pandemic is the cumulative COVID-19 death rate. It is a more reliable indicator than confirmed number of infections or hospitalizations, particularly since vaccination and previous infections have resulted in more asymptomatic cases or slight illnesses not being reported or even recognized by those experiencing them.

Figure 1, below, shows the path of cumulated deaths/ million, over the period January 2020 to October 2022 in seven of the eight countries included in this volume. It does not include the deaths that resulted from postponement of treatments for other medical conditions during the pandemic or from the increase in mental and emotion illness associated with the stress that COVID-19 caused.

The cumulative death rate in the Comoros Islands is not shown on the graph, but is known to be approximately 19 deaths per 100,000 population, the second lowest rate in the eight countries studied (*NY Ti*mes, Coronavirus Tracker, October 30, 2022).[1] Only Ethiopia's death rate is lower: 7572 recorded COVID-19 deaths in a country of 121.6 million people. see Chapter 6). Low COVID-19 death rates have been typical in Africa which so far has remained relatively unscathed due at least in part to its much younger population and one that engages in less travel outside local communities. By contrast, as noted in Chapter 1, the United States has suffered a higher death rate than in the "once in a century" 1918 influenza pandemic, when there were no effective medical treatments or vaccines available. Brazil, a country which, like the United States, had a coronavirus denying president, and was in the midst of an economic crisis in January 2020, has had an even higher death toll, and Italy, which was the first European country to be hard hit, has cumulative deaths close to those of Brazil and the United States. Even, Australia and Taiwan, which experienced much lower infection and death rates during the earlier surges, have suffered some late-in-the-game surges associated with the Omicron variant, and, in the case of Australia, a steepening of the

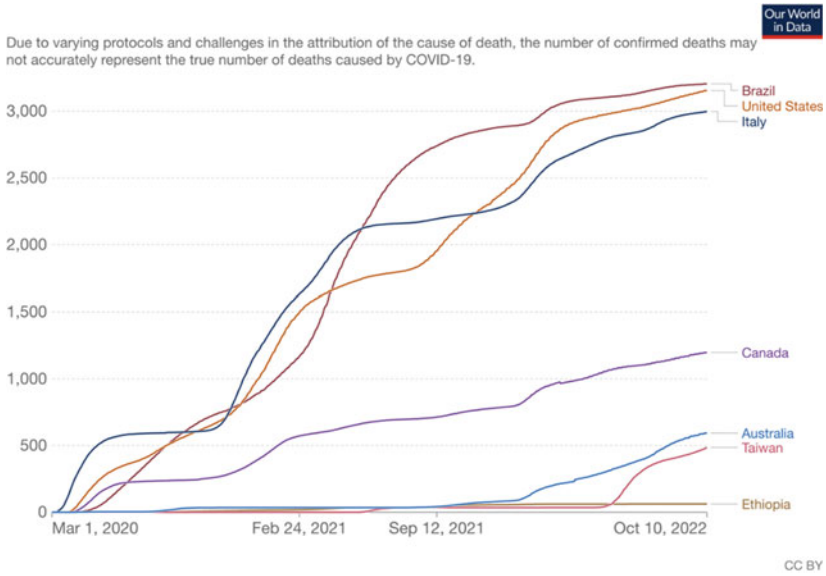

Fig.1 Cumulative confirmed COVID-19 deaths per million people (*Sources* Johns Hopkins University CSSE COVID-19 Data; Constructed using *Our World In Data*, a project of the Global Change Data Lab, U.K.)

curve associated with the period of the Delta variant in the fall of 2021. Canada also suffered from the Omicron variant, with deaths predominantly occurring among the unvaccinated portion of its population (see, Chapter 3).

Subgroups Whose Health Has Been Most Affected by COVID-19.

Intercountry comparisons show that there was a good deal of inequality in the severity of effects on different subgroups within the countries studied. There is a great deal of similarity among the countries as to which groups were most affected. There is also agreement that the factors listed below are often clustered so as to interact and amplify the vulnerability of individuals who can be identified as belonging to several categories, for instance, elderly/poor/non-white.

(a) Age

The elderly, particularly those 80 years and older in residential care homes had the highest death rates in all the countries reporting death rates by age. Australia undoubtedly saved many lives by having invested in 2018 in reforms to the aged care system that enabled more of the elderly to remain independent and in their own homes (See Chapter 9). Most of the countries have increased funding to improve care for this very vulnerable group during the pandemic.

(b) Gender

Men have experienced higher fatality rates than women in all countries studied. They also have had greater declines in life-expectancy in all countries for which data on life-expectancy is provided.

(c) Race/ethnicity

In multi-racial societies, including Canada, the United States, Brazil, and Australia, non-whites and indigenous groups were found to be more vulnerable to coronavirus infection and experienced higher death rates. In Australia, the indigenous are the racialized group with the highest death rates from COVID-19, and in the United States they have experienced the greatest decline in life-expectancy during the pandemic. They are also a disadvantaged group in Canada compounded by often living in remote areas where health care is harder to obtain. It is less well known that Canada also has large numbers of South Asians and Filipinos who are recognized as minorities and whose socio-economic position and health situations reflect this.

(d) Location

The effect of location varies from country to country. In Italy, for instance, at least initially the epicenter of the pandemic was in the higher income and more industrialized North. However, the virus quickly spread throughout the country and given that quality health care was less available in some lower income areas, the death rates rose compared with the more prosperous North, aided by the difficulty of traveling to the

North for treatment during the lockdown (a common practice prior to the pandemic). In Canada and Brazil there were noticeable differences between provinces in death rates. And everywhere, people living in remote rural areas were found to be at higher risk. Health care is often less available in these areas even in Canada where for many years subsidies have been offered to recent medical school graduates if they will open practices in underserved areas.

(e) Recent Immigrant status.

Even where immigrants are covered by a country's healthcare program, they have had higher rates of infection and death. In Italy, where they are covered, it was noted that this is particularly true of immigrants from outside the EU and those who are undocumented. (see Chapter 5).

(f) Socio-economic status

Low educational level and income are part of a cluster of factors leading to higher rates of COVID-19 infection and death. Particularly at risk in all the countries were found to be those below the designated poverty level. In Brazil, where half the population is living in poverty, those dwelling in favelas (urban slums) were found to be particularly at risk. (see Chapter 4).

2 Controlling the Coronavirus and Mitigating Its Effects

Although the countries varied in the degree to which lockdowns, school and business closures, and social distancing were mandated, all of the countries studied had some degree of closure. Moreover, given the global nature of the pandemic and the degree of economic interdependence in the world, even the countries that were much less hard hit by the virus, nonetheless found their economies affected by such things as supply chain problems, which seriously interfered with Ethiopia's readymade garment industry, and the lack of international travel, which significantly impacted Comoros, whose economy relies heavily on its tourism industry.

Throughout the pandemic-ridden world, people of lower socio-economic status not only faced greater health risks but were much more likely to be unemployed or have their hours of work greatly reduced. If their employment continued they were in greater danger of being infected and much less likely to be able to work from home, often working in circumstances that had become dangerous to their health, such as in meat-packing plants. Their children suffered more from school closings as they were less likely to have computers and internet service that would allow them to participate in distance learning. Moreover, at least until some large municipalities were able to set up food distribution centers, children whose nourishment depended on having at least one meal provided at school were going hungry. So, in summary, not only were there disproportionate health risks but low income families faced devastating losses of income to cover their basic needs.

Most of the countries that we have been studying provided generous, sometimes previously unheard of sized relief programs for workers, the unemployed and their families, and for vulnerable businesses. The chapters in this book provide lengthy descriptions of the programs of direct cash payments in lieu of wages, supplemental unemployment benefits, child allowance payments, regulations prohibiting firings and layoffs, permitted delays without penalty of mortgage, student loan and credit card repayments and prohibitions on evictions for non-payment of rent, etc. Similar programs were enacted in Australia, Canada, Italy, Taiwan, Brazil, and the United States, despite Brazil being in a fiscal crisis and in the middle of an austerity program at the time the pandemic hit.

Healthcare systems including hospitals and provincial, state, and local governments also received support. Consumers received supplementary payments for health care expenses or had their co-payments reduced or temporarily abolished. The relief packages in a number of countries were large enough so that income inequality actually decreased, at least temporarily.

During this period, active programs to develop reliable vaccines and medicines to help those infected with COVID-19 were also proceeding at unheard of speed. Vaccines were the most likely way of saving the world's populations from devastation. Fortunately by the end of 2020, successful vaccines had been developed. The next question was how to distribute them efficiently and fairly and how to persuade the doubting-Thomases of their safety and effectiveness.

Table 1 COVID-19 vaccination rates

	% with at least one shot	*%Fully vaccinated*	*Doses/100 people*
Taiwan	**92**	**86**	**264**
Canada	**90**	**84**	**249**
Brazil	**89**	**82**	**224**
Australia	**88**	**86**	**231**
Italy	**84**	**80**	**235**
U.S	**80**	**68**	**191**
Comoros	**52**	**47**	**98**
Ethiopia	**38**	**33**	**47**

Source New York Times, Coronavirus Tracker, Updated October 30, 2022

Jumping ahead to where we are now, a look at the rate of vaccinations in the eight countries studied is informative. Table l below provides information on the proportion of the population vaccinated in the eight countries studied in this volume.

As Table 1 shows, both African countries have lower proportions of their populations vaccinated. One reason for this is the low supply of vaccines available through the Covax project.[2] Referring back to Fig. 1, it is interesting that the two countries with the lowest cumulative death rates are the two countries with the highest proportion of the population fully vaccinated (86%). This table does not show the proportions of the population who have received additional booster shots, but the figure for Taiwan is 88%, for Italy 74%, for Canada 72% for Australia and Brazil, 56%, and for the United States 34%. For both Ethiopia and Comoros, it is negligible. Recent reports have shown that booster shots are going unused in the United States, another example of pandemic fatigue. One wishes that some of these doses could be made available for distribution by Covax, a non-profit consortium organized by WHO and UNICEF to try to secure vaccines for the whole world, including particularly, low and middle income countries.

3 Concluding Thoughts

What should be done to prepare for future pandemics, either those resulting from further variants of COVID-19 that will undoubtedly evolve, or perhaps from some new contagious diseases? If we look at the

success of both Australia and Taiwan in the early stages of the pandemic in winter and spring of 2020, it becomes apparent that preparedness is a major part of their success.

By January 23 2020, Taiwan had its Central Epidemic Command Center (CECC) set up and functioning. The country wasted no time in closing its borders and imposing a variety of other restrictions. These measures did have economic consequences that were certainly not minimal. Chapter 8 focuses on the health-related programs, but it is important to note that the CECC also oversaw what was a giant rescue program for so small a country. Over 25 billion was spent on rescue programs to support businesses and households in much the same way that US rescue packages functioned. However, the part of the plan that was devoted to trying to minimize the infiltration of the virus into Taiwan was handled with greater speed and more efficiency than was the case in most other countries.

As emphasized in Chapter 8, very important parts of the success story were the clear, timely, and effective communications to the public about the progress of the virus and what was necessary to control it and limit the infections. The use of IT to maintain contact with the public and provide an effective testing and tracing program was also very important. In addition, as emphasized by Dr. Tsung Mei-Cheng in Chapter 8, an essential part of the success story is the willing participation of the public and their trust in their government. This is in sharp contrast to the situation in Brazil and the United States in 2020, when both countries' presidents were coronavirus doubters and when the public was divided in its views about their leadership and about how active and responsible citizens should be.

Australia is another success story. The fact that it had created the Australian Health Management Plan for Pandemic Influenza (AHMPPI) which outlined a response to a potential influenza pandemic in order to minimize the impact of such an event on the health of Australians and the healthcare system and that this was set up before the advent of the coronavirus pandemic made a huge difference. The AHMPPI was organized to take a flexible approach that could be adapted as a pandemic unfolded and it was thus able to be employed in dealing with COVID-19.

To quote from Dr. Brusentsev's opening pages of her chapter on Australia:

> *Australia's pandemic preparedness and response, however, is also the result of trust: trust in science and public institutions, as well as interpersonal trust. Clear guidance from policymakers about their objectives and future policy changes was responsible for maintaining confidence.* (Chapter 9)

Here, we see a similar view reflected to that expressed about Taiwan. It is even more impressive given the fact that Australia is a very large continental country that is a federation of six states and two self-governing territories. What an impressive combination of a nation that proactively created a practical plan about how the country would deal with a future health crisis involving a communicable disease and one that has the ability to inspire trust in its institutions and government. This combination seems to embody two general requirements for a successful society in which citizens have a sense of belonging and responsibility. Understanding the importance of this combination as prerequisites for a well-functioning democracy would seem to be a good lesson learned and a good note on which to end this book.

Notes

1. The reason that Comoros's Death Rate per Million may not be represented graphically is that the total population of the country is less than a million. But the number of reported COVID-19 deaths in Comoros is known. The number reported by Johns Hopkins CSSE was 161 as of October 28, 2022, at which time there were cumulatively only 8,761 confirmed cases of COVID-19 in a population of 836,774.
2. It has been set up by the World Health Organization, the Vaccine Alliance and UNICEF (the largest single buyer of vaccines) to promote an equitable distribution of vaccines around the world but especially to provide them to low and middle income countries.

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Correction to: The Response of the United States to the Coronavirus Pandemic

Shirley Johnson-Lans

Correction to:
Chapter 2 in: S. Johnson-Lans (ed.), *The Coronavirus Pandemic and Inequality*, Global Perspectives on Wealth and Distribution, https://doi.org/10.1007/978-3-031-22219-1_2

The original version of chapter 2 was inadvertently published with incorrect section citations on page 8, which have now been corrected. The chapter has been updated with the change.

The updated original version of this chapter can be found at https://doi.org/10.1007/978-3-031-22219-1_2

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The original version of the book was inadvertently published without incorporation of the final corrections, which have now been updated. The book has been updated with the changes.

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