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Pandemics and Economy- A Review

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ABSTRACT: Just like any other directly quantifiable natural or man-made disasters, contagious diseases have had long lasting effects on the economics and politics of the world throughout history. The COVID-19 pandemic, apparently, has led to a substantial upshot on the world economy, a complete tangible analysis of which still remains incomplete. In this light, it is essential to take a look back into the preceding pandemics and acquire knowledge on the subsequent socio-economic impacts. This research assesses some of the most infamous diseases and their impacts on economics through a systematic review of literature. Thereafter we evaluate the potential impacts of COVID-19 till date and probable ways of overcoming these impacts. In order to escape the vicious cycle of economic instability, it is essential to prevent scores of unemployment across various sectors through government support and policy interventions.

KEYWORDS: COVID-19, economy, depression, labour, pandemics, epidemics, unemployment.

I. INTRODUCTION

Several pandemics have shaken humankind in the past, resulting in significant crises due to economic and health impacts. The uniqueness of a pandemic is often assessed by a combination of several factors, including geographic domain, the proportion of the susceptible population, and duration of illness, infection producing contacts per unit time, disease move and novelty. Pandemics are often recurrent, owing to their unpredictable nature, thus leading to wide scale disruptions in the natural functioning of the economy and lifestyle.

Some of the oldest recorded pandemics date back to 430 BC (Athens). This was followed by the Antonine Plague (165 AD), Egyptian Plague (250 AD), Justinian Plague (541 AD) and Leprosy (11th Century). Thereafter, as many as twenty epidemics have led to small and large scale impacts on humans. The Black Death and its variations and the Spanish Flu (1918-20) were the most devastating ones.

Aftermaths due to epidemics have followed a certain trajectory throughout history. In general, the vulnerable and poorest section of the society have always been more susceptible to health and economic effects of an epidemic. An analysis of some of the most serious epidemics in history- the Black Death, the Plagues of Europe, the Spanish Flue, and SARS 2002- is important to understand the influence of epidemics on the economy.

II. IMPACTS OF PANDEMICS AND EPIDEMICS IN THE PAST

The Black Death

The most infamous pandemic in history dates back to the 14th Century (1348-1351), when the Black Death (also referred to as the Bubonic Plague) claimed approximately 60 million lives, 20 million in Europe alone [1]. The disease had massive repercussions on the economy through plummeting wages and food shortages. However, contradictory to the period of the outbreak, after the pandemic receded, wages saw a considerable spike. This rise in nominal wages was of little use as the section of society that depended directly on money-wages (labourers, craftsmen) faced a reduction in real income due to rambling inflation.

A stringent law in the form of Statute of Laborers [2] was put into action in 1351, forcing potentially healthy, unemployed people below the age of 60 into labour at a predetermined wage rate. This law, however, proved to be futile in the red of illegal high wages paid by the landlord in the form of in-kind payments and fringe benefits. The net result was an absolute rise in wages due to labour shortages [3]. As an aftermath, the pandemic had swapped the role of the working-class, leading to the reclamation of capital accumulation structures and welfare distributions [4]. Moreover, the decline of the labour force at the end of the pandemic paved the way to a major shift in the societal functioning from feudalism to the centralization of governments [5]. This plague phenomenally changed the economy's production structure within centuries from agrarian to urban-centric [6].

Plagues in Europe

A series of plagues shook Europe during the sixteenth, and seventeenth-century wherein southern Europe was more severely hit by its northern counterpart. A total of four significant waves of plague were rampant during the sixteenth Century and only one in the seventeenth Century.

Table 1: Quantification of Plague Outbreaks In Europe (1500-1749)

	Spain and Portugal	Italy	France	England, Scotland, and Ireland	Belgium, Low Countries, and Luxemburg	Germany, Austria, Bohemia, and Switzerland
1500–1549 (%)	21.4	42.0	29.8	14.3	15.6	19.8
1550–1599 (%)	36.7	22.6	30.6	28.5	26.8	24.4
1600–1649 (%)	22.1	19.6	33.4	46.1	36.9	37.1
1650–1699 (%)	19.9	13.5	4.9	11.1	20.7	16.1
1700–1749 (%)	0.0	2.3	1.3	0.0	0.0	2.5
1500–1749 (%)	100	100	100	100	100	100

Source: Biraben (1975, pp. 363–374), Aflani (2013) [7]

The disease started its withdrawal in the second half of the seventeenth Century, ultimately fizzling out subsequent years [8]. A culmination of a certain number of factors is believed to be responsible for the eradication of the disease, some of which include: communal adaptation of man and pathogen, amelioration of sanitation and hygiene, effective check on epidemics and disparities in population of vectors of the disease [9] [10].

Pre-epidemic conditions before the seventeenth Century ranks Italy as one of the most affluent countries, boastful of its strong economy [11]. The plague proved to be a massive shock to the Italian peninsula leading to its relative decline among the wealthy European nations. The Italian economy was forced to stagnate, resulting in plummeting aggregate demand, finally leading to a decline in the production levels, which disallowed revival of the economy even after the epidemic ebbed. Needless to say, as the epidemic claimed thousands of lives, an inevitable shortage of labour cropped up, leading to a long-term deficiency in human capital. An eminent shortage of skills added to the economy's woes during the seventeenth Century [11][12]. To make matters worse, other nations of Europe continued to develop while Italy grappled with the clutches of the deadly pathogen. The Italian population took about eighty years to recover from the repercussions of the disease.

Spanish Flu

The pandemic in discussion these days is the Spanish Flu, which had a global catastrophic effect about a century before the onset of the Covid-19 pandemic. The disease, coupled with the ongoing World War and an apparent political tension, had a severe debilitating impact on the economy. Prevalent between 1918 and 1920, the Spanish Flu is believed to have claimed about 39 million lives in 43 countries [13].

Table 2: Flu Death Rates as a Percent of Total Population for Spanish Flu (1918-20)

Country	1918	1919	1920	Sum of Death Rates
Argentina	0.16	0.17	0	0.33
Australia	0	0.24	0.04	0.28
Austria	0.76	0.21	0	0.97
Belgium	0.71	0.11	0.01	0.83
Brazil	0.48	0.21	0	0.69
Canada	0.4	0.15	0.07	0.62
Chile	0.06	0.53	0.03	0.62
China	0.56	0.65	0.22	1.43
Colombia	0.44	0	0.02	0.46
Denmark	0.17	0.08	0.06	0.31
Egypt	0.79	0.18	0.1	1.07
Finland	0.54	0.15	0.02	0.71
France	0.52	0.22	0	0.74

Germany	0.65	0.02	0.1	0.78
Greece	0.43	0.02	0	0.45
Guatemala	2.94	0	0.98	3.92
Hungary	0.91	0.26	0.1	1.27
Iceland	0.44	0.21	0.15	0.8
India	4.1	0.86	0.26	5.22
Indonesia	2.28	0.76	0	3.04
Italy	1.17	0.06	0	1.23
Japan	0.4	0.18	0.37	0.96
Kenya	3.64	2.14	0	5.78
Korea	0.77	0.24	0.37	1.38
Madagascar	2.2	1.3	0	3.5
Malaysia	1.23	0.06	0	1.29
Mauritius	2.02	1.18	0	3.2
Mexico	1.55	0	0.52	2.06
Netherlands	0.55	0.14	0.02	0.71
New Zealand	0.57	0.03	0.09	0.69
Nigeria	1.54	0.9	0	2.44
Norway	0.45	0.11	0.01	0.57
Peru	0.1	0.1	0.19	0.39
Philippines	1.07	0.82	0	1.88
Portugal	1.72	0.09	0	1.81
Russia	1.42	0.39	0.06	1.87
Singapore	0.99	0.14	0.16	1.29
South Africa	2.11	1.24	0	3.36
Spain	1.05	0.14	0.17	1.36
Sri Lanka	0.57	1	0.17	1.74
Sweden	0.47	0.14	0.02	0.63
Switzerland	0.53	0.11	0.12	0.76
Taiwan	0.53	0.02	0.52	1.07
Turkey	1.03	0.05	0	1.08
United Kingdom	0.34	0.12	0	0.46
United States	0.39	0.07	0.05	0.52
Uruguay	0.13	0.05	0.04	0.22
Venezuela	0.99	0.26	0	1.25
Means (unweighted average of death rates)	0.98	0.34	0.11	1.42
Aggregate Death Rate	1.42	0.52	0.16	2.1

Source: Barro (2020)

Significant literature already exists on the economic impacts of the pandemic. Barro and Ursua have concluded that the virus had occasioned losses surmounting to 6 per cent in terms of GDP and 8 per cent in consumption [14]. A vicious cycle of economic depression followed due to the negative psychosocial impacts and loss of middle-aged labour. The scenario of Sweden serves as an appropriate example wherein the pandemic exacerbated poverty and led to negative returns on capital [15]. A significant result relating to the association of government interventions relating to quarantine and economic outcomes have been obtained by Correia, Luck and Verner (2020). It has been stated that American cities that adopted a quick and widespread method response mechanism to tackle the virus enjoyed a sturdier economic surge than others that did not [16].

The approximates of the economic bearing of the Spanish Flu pandemic in the United States without large scale immunization has been shown in table 3. On average, the outbreak's economic impact was somewhere between 71.3 billion dollars to 166.5 billion dollars. Given any attack rate, loss of life itself accounted for about 83 per cent of all economic losses [17].

Table 3: Direct and Indirect Cost of Influenza Pandemic Computed As A Percentage Of Clinical Influenza Illness Per Population

Cost per gross attack rate ($ millions)					
	15%	20%	25%	30%	35%
Deaths					
Mean	59,288	79,051	98,814	118,577	138,340
5th percentile	23,800	31,733	39,666	47,599	55,532
95th percentile	94,907	126,543	158,179	189,815	221,451
Hospitalizations					
Mean	1,928	2,571	3,214	3,856	4,499
5th percentile	1,250	1,667	2,084	2,501	2,917
95th percentile	2,683	3,579	4,472	5,367	6,261
Outpatients					
Mean	5,708	7,611	9,513	11,416	13,318
5th percentile	4,871	6,495	8,119	9,742	11,366
95th percentile	6,557	8,742	10,928	13,113	15,299
Ill, no medical care sought					
Mean	4,422	5,896	7,370	8,844	10,317
5th percentile	3,270	4,360	5,450	6,540	7,629
95th percentile	5,557	7,409	9,262	11,114	12,967
Grand totals					
Mean	71,346	95,128	118,910	142,692	166,474
5th percentile	35,405	47,206	59,008	70,810	82,611
95th percentile	106,988	142,650	178,313	213,975	249,638

Source: Meltzer (1999)

SARS 2002

The Severe Acute Respiratory Syndrome (SARS) broke out in late 2002 and got transmitted among the population in no time [18]. The outbreak, which is believed to have emerged in the Guandong province of China, eventually spread out to Australia, Brazil, Canada, Hong Kong, South Africa, Spain and the USA. Table 4 presents a brief overview of the disease's distribution, infectivity rate, and fatality rate through the timeline.

Table 4: Distribution of the Cases of Sars 2003 Pandemic

Areas	Cumulative number of cases			**No. of deaths**	**Case fatality ratio (%)**	**No. of HCW affected (%)**	**Date onset first probable case**	**Date onset last probable case**
	Female	**Male**	**Total**					
Australia	4	2	6	0	0	0 (0)	26-Feb-03	1-Apr-03
Canada	151	100	251	43	17	109 (43)	23-Feb-03	12-Jun-03
China	2674	2607	5327	349	7	1002 (19)	16-Nov-02	3-Jun-03
China, Hong Kong Special Administrative Region	977	778	1755	299	17	386 (22)	15-Feb-03	31-May-03

China, Macao Special Administrative Region	0	1	1	0	0	0 (0)	5-May-03	5-May-03
China, Taiwan	218	128	346	37	11	68 (20)	25-Feb-03	15-Jun-03
France	1	6	7	1	14	2 (29)	21-Mar-03	3-May-03
Germany	4	5	9	0	0	1 (11)	9-Mar-03	6-May-03
India	0	3	3	0	0	0 (0)	25-Apr-03	6-May-03
Indonesia	0	2	2	0	0	0 (0)	6-Apr-03	17-Apr-03
Italy	1	3	4	0	0	0 (0)	12-Mar-03	20-Apr-03
Kuwait	1	0	1	0	0	0 (0)	9-Apr-03	9-Apr-03
Malaysia	1	4	5	2	40	0 (0)	14-Mar-03	22-Apr-03
Mongolia	8	1	9	0	0	0 (0)	31-Mar-03	6-May-03
New Zealand	1	0	1	0	0	0 (0)	20-Apr-03	20-Apr-03
Philippines	8	6	14	2	14	4 (29)	25-Feb-03	5-May-03
Republic of Ireland	0	1	1	0	0	0 (0)	27-Feb-03	27-Feb-03
Republic of Korea	0	3	3	0	0	0 (0)	25-Apr-03	10-May-03
Romania	0	1	1	0	0	0 (0)	19-Mar-03	19-Mar-03
Russian Federation	0	1	1	0	0	0 (0)	5-May-03	5-May-03
Singapore	161	77	238	33	14	97 (41)	25-Feb-03	5-May-03
South Africa	0	1	1	1	100	0 (0)	3-Apr-03	3-Apr-03
Spain	0	1	1	0	0	0 (0)	26-Mar-03	26-Mar-03
Sweden	3	2	5	0	0	0 (0)	28-Mar-03	23-Apr-03
Switzerland	0	1	1	0	0	0 (0)	9-Mar-03	9-Mar-03
Thailand	5	4	9	2	22	1 (11)	11-Mar-03	27-May-03
United Kingdom	2	2	4	0	0	0 (0)	1-Mar-03	1-Apr-03
United States	13	14	27	0	0	0 (0)	24-Feb-03	13-Jul-03
Vietnam	39	24	63	5	8	36 (57)	23-Feb-03	14-Apr-03

Source: Keogh-Brown (2008)

Substantial economic losses were recorded as a result of the pandemic. GDP loss was observed in Hong Kong, wherein a loss of US$ 3.7 billion was estimated. Along the same lines, China suffered an average loss of 3.1% in the second quarter of 2003. The domestic tourism sector of China and Malaysian tourism dealt a massive blow of US$ 3.5 billion and US$ 1.7 billion, respectively, as per estimates. A sharp decline in the hospitality sector in Hong Kong was attributable to a loss of 0.26 billion US dollars [19].

The SARS-2003 pandemic was of a much smaller stature compared to the previous pandemics in history. Naturally, expenses relating to medical expenditure, demographic or human capital consequences are considered to be insignificant. However, factors like fear to venture out during the pandemic, the surge in the cost of disease prevention and the uncertain features of the disease led to major suffering of travel and retail services. Hence, the economic burden of the pandemic on significant economies like China and Hong Kong were primarily not due to the disease directly, but a repercussion of change in human behaviour due to the disease.

III. COVID-19 AND THE GLOBAL ECONOMY

The channels through which a pandemic affects the global economy are numerous. They affect the global economy either directly or indirectly and have severe short term impacts, besides imposing long term burdens on the nations. These channels got recently highlighted all the more in the context of the outbreak of the COVID-19.

As soon as the COVID -19 virus was declared a pandemic, many countries declared lockdowns and started practising social distancing norms to control the spread. Recent studies have focused on determining the extent of initial effects on the economy in terms of decline in consumption, services, and investments due to the imposition of these lockdowns. Data indicates that in the U.S., due to shutdowns, market production fell 25-28% below average, while by April 2020, employment had already seen a decline of about 28 million. Moreover, the cost of a shutdown was approximately $7 trillion annually or about $15,000 per household per quarter [20]. Also, in the U.S., typical spending patterns in major categories underwent a rapid change with the onset of the COVID-19. During the first half of March 2020 (as cases had slowly started rising and the states enacted shelter-in-place order), individuals increased total spending by over 40% across a wide range of categories, which was accompanied by a subsequent 25-30% decrease in overall spending during the second half of March(the period during which the disease was spreading rapidly). The only exceptions to this decline in spending in the latter half were the food delivery and the grocery spending [21].

Moreover, several sectors like tourism, aviation, catering, and leisure were directly affected due to the pandemic. In China, where the COVID-19 originated, major luxurious travel agencies have forecasted a foregone tourism revenue of 75%, which refers to 2019 data, is almost $95 billion in 2020[22]. The aviation industry was also equally hard hit. The decrease in passenger demand coupled with intra-country and inter-country flight bans in most nations led to tremendous declines in revenues for most airlines. For example, the expected revenue loss to the Indian aviation sector due to lockdown amounted to INR 240 billion; airlines account for 70% losses, followed by allied services-ground handling. [23] Moreover, many companies had to cease almost all their operations and grounded entire fleets; many airports had to close down their runways to free up space for aircraft parking, while many others just shut down indefinitely. Most companies in the aviation sector are working with minimum staffing on strict rotations [24].

Besides having direct short-term impacts on the economy, pandemics give rise to an atmosphere of uncertainty among consumers. In the case of COVID-19, much uncertainty was created regarding the nature, lethality, infectiousness, and ways to control the spread of the disease itself in the initial phases. To make matters worse, a ban on air travel led to volatile employment status, finally resulting in substantial job losses. Together with the uncertainty among consumers, uncertain economic policies further magnified the problem. This increased uncertainty indirectly deteriorated macroeconomic outcomes. Upon considering uncertainty indicators, Altig et al. (2020) found several actual results that confirm huge uncertainty jumps in reaction to the pandemic and its subsequent economic fallout [25]. Baker et al. (2020b) used similar real-time forward-looking uncertainty measures to study the issue of increased economic uncertainty and its macroeconomic impacts during the COVID-19 crisis. A yearly basis contraction in U.S. real GDP was observed, amounting to nearly 11 per cent as of 2020 Q4. About half of the forecasted output contraction reflected a negative effect of COVID-induced uncertainty [26].

COVID-19 related uncertainty was also reflected in increased stock market volatility. Baek (2020) observed volatility affected by specific economic indicators and is sensitive to COVID-19 news. A negativity bias was prevalent due to the greater impact of negative news than its positive counterpart. Considerable rises in total and idiosyncratic risk were observed across all industries, while changes in systematic risk varied across the industry.[27]

The several immediate shocks that the economy received with the onset of the COVID-19 pandemic subsequently lead to a massive decline in GDP for countries across the globe. The initial pandemic situation saw gross domestic product fall by 2 per cent below the benchmark for the world, a 2.5 per cent fall below the benchmark for the developing countries, and 1.8 per cent fall below the benchmark for the industrial countries. The most prominent adverse shocks were recorded for domestic services affected by the pandemic and traded tourist services [28]. For India, Dhingra and Ghatak (2021) observed that from April to June 2020, India's GDP dropped by a massive 24.4%. Moreover, the latest national income estimates, in the second quarter of the 2020-'21 financial year (July-September 2020), the economy contracted 7.4% more, with the third and fourth quarters (October 2020-

March 2021) seeing only a weak recovery, with GDP rising 0.5% and 1.6%, respectively. So, India's overall rate of contraction was (in real terms, adjusted for inflation) 7.3% for the whole 2020-'21 financial year[29]. Unemployment rates significantly spiked too and were accompanied by lower individual income levels. Su et al. (2021) have tried to study how the COVID-19 pandemic has influenced unemployment in five selected European economies. They found that in Z-test results, Germany, Spain, and the U.K. have shown a significant positive change in unemployment due to COVID-19. COVID-19 cases have caused unemployment for Germany, Italy, and the U.K. and deaths due to COVID-19 have caused unemployment in Italy and the U.K. Overall, the study stresses that the pandemic has increased the unemployment rate robustly in these European countries economies.[30]

An essential concern in the COVID afflicted economy was regarding the continuity of global supply chains. COVID-19 related shutdowns, ban on domestic and international air travel, suspension of public transport and disruptions in other forms of communications have led to disruptions in labour supply and other global supply-chain disruptions. Workers were laid off, and contracts were not getting renewed, and on the whole, the firms were running with a much-reduced labour force. In those G20 countries where data are available, monthly labour force data records a sharp decline in the number of employed people at work as workers were laid off, put on furlough, or did not have their contracts renewed. Between December 2019 and April 2020, these declines ranged from nearly 40% in Mexico to around 8-9% in Japan and Korea [31]. Guan et al. (2020) have studied the effects of COVID-19 on global supply chains. They have used the latest global trade modelling framework to show that supply-chain losses related to initial COVID-19 lockdowns were largely dependent on the number of countries imposing restrictions and that losses were more sensitive to the duration of a lockdown than its strictness. A longer containment that has more potential to eradicate the disease imposes a more impactful loss than shorter ones. Earlier, stricter and shorter lockdowns can minimize overall losses. Lifting restrictions in a phased manner may reduce overall damages if it avoids the need for other lockdowns [32].

The several shocks that the economy received due to the onset of COID-19 had adversely affected both the formal and informal sectors of the economy. Nevertheless, the informal sector employees cannot count on formal assurance of income replacements available to their formal sector counterparts. This makes the informal workers more vulnerable to economic shocks due to the pandemic. In fact, "To die from hunger or the virus" was the real dilemma faced by most of them. ILO estimates show that, without any alternative income sources, labour income lost due to the pandemic will lead to an increase in relative poverty for informal workers and their families by more than 21 percentage points in the upper-middle-income countries, by almost 52 points in high-income countries and by 56 points in lower- and low-income countries. [33]

IV. DISCUSSIONS

We have discussed how COVID-19 has negatively impacted economic outcomes like GDP, employment, etc. However, all these adverse effects of the COVID-19 pandemic on the economy will ultimately manifest in increased poverty and inequality across the globe. This, in turn, implies significant detrimental welfare effects for the people in the years to come. In 2019, a total of 650 million people were thought to be in extreme poverty, and poverty was steadily reducing in most countries, judging by likely growth trajectories, as well as in the aggregate. However, based on IMF 2020 estimates, compared to 2019, poverty in 2020 would be higher by 120 million people, and relative to the baseline path for poverty, the 2020 figure is 144 million people higher. Some of this increased poverty will be slightly offset by mild economic recoveries in 2021. However, the long-term projection suggests that half of the rise in poverty could be permanent, such that by 2030, the poverty count can still be higher than the baseline poverty measure by 60 million people [34]. Added to increased poverty is the issue of increased income inequality. Employment data of 2020 shows that due to the COVID-19 shock, job loss experience was not the same for highly-educated and low-educated people, which might lead to increase in within-country income inequality [35].

Besides wreaking havoc in the short run, the pandemics can also leave behind long-lasting effects on the economy. The severe after-effects of pandemics persist for decades, with accurate rates of return remaining substantially low [36]. Sengupta (2020) predicts that long-term losses from COVID-19 might far exceed the short-term ones. In the framework he presented, output depends on the labour force, labour efficiency, and capital accumulation. While the immediate effects of COVID-19 only lower the effective labour size(keeping the other two factors affecting output unchanged), the decline in present output will lower efficiency of labour, capital accumulation and labour supply together in the future. This will lead to a greater impact on future output [37].

As the economies are slowly trying to revive from the disaster, it is essential to look at the projected path of economic recovery. Economic recoveries may be of many types: Z-shaped(this is a highly optimistic recovery path view where after a crash, the economy quickly bounces back to its pre-crisis growth level), V-shaped(another optimistic path where at first there is a steep decline followed by a quick recovery), U-shaped(this is a somewhat pessimistic view, where the economy remains around a low growth rate for some time before gradually reaching its pre-crisis levels), W-shaped (a pessimistic recovery path where a second

decline follows an initial recovery), L-shaped(which is a highly pessimistic view of recovery involving a prolonged downturn), J-shaped(growth rises sharply from the lows much higher than the trend-line and stays there). [38][39]

Much debate has centered around whether the economic recovery from the COVID-19 situation will be an overly optimistic V or Z or a pessimistic U, W or L or even a J. Keeping the much discusses possibilities aside, a 'K' shaped recovery curve, introduced by JP Morgan, is being recently considered. Herein, a greater emphasis is laid on increased economic inequality in the post-COVID world. According to speculations, the COVID-19 recovery path is feared to bifurcate in two directions. Due to their status and reach, large firms and public-sector institutions with direct access to government and central bank stimulus packages shall recover quickly. Unfortunately, small and medium-sized enterprises (SMEs), blue-collar workers, and the middle class will be left out of recovery [38].

Thus, policies must be formulated accordingly to secure the employability of the retail sector. Pathways to support underqualified labour should be created through arranging an attachment between agriculture, food industries and the retail sector. In addition, downsizing of labour and shutdown must be prevented in SMEs involved with industrial production. To conclude, all countries' governments and financial management must focus on controlling labour market impurities through morality support to individuals and societies. Besides, healthcare services should be ramped up at the earliest. A shock, as unprecedented and massive as the COVID-19 pandemic, shall take a considerable amount of time to recover. Thus, proper management and financial planning should be coupled with the urge to prepare for future pandemics.

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