

Araştırma Makalesi
Research Article

Ömer Halisdemir Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi
Yıl: 2020 Cilt-Sayı: 13(4) ss: 758-775

Academic Review of Economics and Administrative Sciences
Year: 2020 Vol-Issue: 13(4) pp: 758-775

<http://dergipark.org.tr/tr/pub/ohuiibf/>

ISSN: 2564-6931

DOI: 10.25287/ohuiibf.730281

Geliş Tarihi / Received: 30.04.2020

Kabul Tarihi / Accepted: 16.09.2020

STRUGGLING THE PANDEMIC CRISES AS A GLOBAL PUBLIC GOOD THE ECONOMIC IMPLICATIONS OF PANDEMICS

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Abstract

Public goods which have the features of nonrivalry in consumption and nonexcludability have positive externalities spreading the large masses, and also cover negative externalities (public bads) not to damage the environment, health and so on. Cross-border spillover effects of externalities actually make the public goods convert to global public goods. In this sense, struggling the pandemics is a most crucial global public good which does not only impact human life but also prevents the collapse of national economies. Pandemics slow the pace of economic growth as well as increasing the loss of workforce. Governments employ a balance between the increase in spread of disease and mortality, and economic stability. This paper attempts to explain the whole story of the pandemics and their economic implications by giving examples from literature. Main finding resulted from the papers written on this issue is that pandemics exacerbate the national economies through different channels. Developed and developing countries should take the pandemics into account as a regressive power or obstacle in front of economic growth and stability of state budgets, strongly collaborate against pandemic as a naturel disaster, support their healthcare systems and be ready for these kinds of disasters.

Keywords: Pandemics, Health, Global Public Goods.

JEL Kodları: H41, I18, I15

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KÜRESEL KAMUSAL BİR MAL OLARAK SALGIN HASTALIK KRİZLERİYLE MÜCADELE KÜRESEL SALGINLARIN EKONOMİK ETKİLERİ

Öz

Kamusal malların (public goods) özelliği tüketimde rekabetin olmaması ve tüketimden dışlanamamadır. Kamusal mallarda pozitif dışsallıklar geniş kitlelere yayılmakla birlikte genellikle çevre ve sağlık gibi alanlarda ortaya çıkan negatif dışsallıkların (kamusal kötüler) içselleştirilmesiyle de gündeme gelmektedirler. Dışsallıkların ulusal sınırları aşan etkisi kamusal malları küresel kamusal mallara dönüştürmektedir. Bu bağlamda, salgın hastalıklarla (pandemics) mücadele sadece insan hayatını korumakla kalmayan aynı zamanda ulusal ekonomilerin yıkımını da önleyen küresel kamusal bir maldır. Salgın hastalıklar neticesinde işgücü kaybıyla birlikte ekonomik büyüme hızı da yavaşlamaktadır. Ulusal devletler, hastalığın yayılması ve ölüm oranlarının artmasıyla ekonomilerin istikrarı arasında denge kurmaya çalışmaktadır. Bu çalışma, salgın hastalıkların kısa tarihini ve bu hastalıkların ekonomik etkilerini literatürden örnekler vererek açıklamayı amaçlamaktadır. Gelişmiş ve gelişmekte olan ülkeler salgın hastalıkları ekonomik büyüme denkleminde dikkate almalı ve bütçelerini buna göre düzenlemeli, salgın hastalıklar gibi doğal afetler karşısında daha güçlü bir işbirliğine gitmeli, sağlık sistemlerini güçlendirmeli ve bu tür afetlere karşı hazırlıklı olmalıdırlar.

Anahtar Kelimeler: Salgın Hastalıklar, Sağlık, Küresel Kamusal Mallar.

JEL Codes: H41, I18, I15

INTRODUCTION

Social and personal welfares depend on the consumption amount of public and private goods. Public and private goods are accurately distinguished between by measuring the features of rivalry in consumption and excludability. Rivalry in consumption means that an increasing amount of individual's consumption makes the others' consumption decrease while excludability refers to exclude people from consumption by means of price mechanism. Pure public goods (or shortly public goods) have the features of nonrivalry in consumption and nonexcludability. However, public goods have significant external effects which are called externalities and these externalities cause market efficiency to distort. Cross-border spillover effects of externalities actually make the public goods convert to global public goods and today's global issues substantially stem from the underprovision of global public goods. Global Public Goods (GPGs) have been gaining increasing attention since United Nations Development Programme (UNDP) came to grip with it in 1999. GPGs which are very crucial to decrease global risks provide an equality of opportunity and support development. GPGs became a current issue for coping with global public bads which triggered by globalization. In fact, the world under the second globalization era is vulnerable to global crises that is the main reason of GPGs. By the way, countries are reluctant to produce adequate amount of GPGs owing to financing problems even though they all benefit from these goods. Moreover, GPGs face some strifes which are resulted from the theory such as free rider problem and prisoner's dilemma. These issues clarify why countries are reluctant to contribute to the production of GPGs.

Struggling the epidemics in national level and also pandemics in global level plays a significant role to save lives and frustrate economic turmoil as a GPG. Pandemics are not only a health problem that cause human suffering and loss of lives but it also have serious economic consequences that induce major global economic downturn and change of economic structures. Governments employ a balance between the decrease in spread of disease and mortality, and economic stability. History has witnessed many infectious diseases that left many deaths behind. Some of them are the Black Death, bleeding fever, swine flu, Acquired Immune Deficiency Syndrome (AIDS), Ebola, Severe Acute Respiratory Syndrome (SARS) and recently Corona Virus Disease 2019 (COVID-19). The possibility of pandemic in the recent period is of growing concern

for many countries around the world. The rest of this paper proceeds as follows. The first section coming behind the introduction explains GPGs, and discusses the main reasons of underprovision problems, section 2 presents health as a GPG, section 3 is devoted to examine the whole story of pandemic crises and section 4 accentuates the economic implications of pandemics. This paper ends up by presenting main findings.

I. GLOBAL PUBLIC GOODS: INTERNALISING THE GLOBAL PUBLIC BADS

The concept of public good has a deep historical background and it was started to actually discuss in 18th century. The philosophers who first discussed the public goods are David Hume and Adam Smith. David Hume was mulling over the common good in his *Treatise of Human Nature* in 1739. In about 3 decades later from David Hume, Adam Smith considered almost same question in his *Wealth of Nations* (Kaul, Grunberg & Stern, 1999: 3). Public goods were systematically classified in Paul Samuelson's well-known paper of "The Pure Theory of Public Expenditure" in 1954. Papers related to GPGs started to release in 1986. The concept of GPG was first mentioned in Kindleberger's "International Public Goods Without International Government" in 1986 and also, in same year, another paper named as "The Theory of Externalities, Public Goods and Club Goods" was published by Todd Sandler and Richard Cornes. After a while, "The International Public Goods of Antarctica: A New Politico-Economic Regime for the World's Seventh Continent" was published by Bernard P. Herber in 1988 (Arsan, 1992: 403). This concept began to intensely discuss as of 1990s. United Nations Development Programme (UNDP) published a book entitled "Global Public Goods: International Cooperation in the 21st Century" in 1999 and also published one more book entitled "Providing Global Public Goods: Managing Globalization" in 2003. "International Public Goods: Incentive, Measurement and Financing" was published by World Bank in 2002. These scientific researches were motivated by developments triggered by globalisation (Kaul, Grunberg & Stern, 1999: 3).

There used to be a big leap especially in transportation, information and communication technology in twentieth century and these developments made a positive effect by shortening the distance between countries and cultures. Nevertheless, this period brought about some negative events such as environmental pollution, ozone layer depletion, pandemics, economic downturns and their spillover effects, and terrorist attacks. All these developments made us more responsible for global issues by presenting that social costs and benefits are not valid just in a national level but also in a global level (Erdoğan, 2006, s.270). GPGs are mostly defined as public goods but its benefits and costs stand along over borders. GPGs often come up by decreasing the negative effects of global public bads which involve the public disutility. In brief, on the one hand, GPGs must globally provide two main qualities such as nonrivalry in consumption and nonexcludability, but on the other hand these goods are able to support countries by solving global issues. These characteristics embed the goods in the general category of public goods. Another is that their benefits have cross-border spillover effects called externalities that are defined the difference between the benefits of public and private goods. (Kaul, Grunberg & Stern, 1999: 2). Morrissey, te Velde and Hewitt (2002: 39) have already identified the GPGs in regard to key sectors, which are the environment, information, health, peace, security, and governance. Some of these sectors such as the environment, health, and security are related to benefits derived from reducing risk and the others such as knowledge and governance are primarily associated with advancing capacity.

We need to take into account the countries, socio-economic groups, and generations for the taxonomy of public goods. The first requisite and significant point for a GPG is that it includes more than one group of countries. Accordingly, the concept of "global" is not only geographic but also it refers opposition to local, national or regional. If public goods' benefits just spill over a certain region, it is called a regional public good (Kaul, Grunberg & Stern, 1999: 10). That is to say, their benefits must cover a great number of the global population as well as the broad spectrum of countries (Kaul, Grunberg & Stern, 1999: 11). Intergenerational spillovers should be involved in the general definition of a global public good. GPGs provide the needs of present generations without

endangering those of future generations (Kaul, Grunberg & Stern, 1999: 11). To decrease the market failure linked with intergenerational public goods, supranational structures such as long-lived international organization or treaties maintain an intergenerational perspective. For instance, churches have been passing down religious doctrines from one generation to the next (Sandler, 1999: 42-43). In addition, GPGs ameliorate the position of low-income groups as well as not to deteriorate those of high-income groups. However, we can classify GPGs in terms of their place in the production chain such as final and intermediate goods. Final goods are outcomes rather than “goods” in the standard sense. They can be tangible such as environment or the common heritage of mankind or intangible such as peace or financial stability (Kaul, Grunberg & Stern, 1999: 13). *Table 1* below shows the taxonomy of public goods according to characteristics.

Table 1: Taxonomy of Public Goods Based On Good's Characteristics

Generational Effects	Cross-Border Spillovers	Pure Public	Impure Public	Club	Joint Product
Intragenerational	<i>Regional</i>	Forest fire suppression	Waterways	Common markets	Peacekeeping
		Groundwater pollution cleanup	Rivers	Crisis management forces	Military forces
		Animal disease control	Highways	Electric grid	Medical Aid
	<i>Global</i>	Flood control	Local parks	Information network	Technical assistance
		Ocean pollution cleanup	Electromagnetic spectrum allocation	Canals	Foreign aid
		Weather forecasts	Satellite transmissions	Air corridors	Disaster relief
Intergenerational	<i>Regional</i>	Monitoring stations	Postal service	Internet	Drug interdiction
		World court	Disease control	Shipping lanes	
		Wetland preservation	Acid rain reduction	National parks	Peacekeeping
	<i>Global</i>	Lake cleansing	Fisheries protection	Irrigation systems	Flood control
		Toxic waste cleanup	Hunting grounds protection	Lakes	North Atlantic Treaty Organization
		Lead emissions reduction	VOC emissions reduction	Cities	Cultural norms
		Ozone shield protection	Overuse of antibiotics	Transnational parks	Tropical forest preservation
		Global warming prevention	Ocean fisheries	Geostationary orbits	Space colonies
		Disease eradication	Antarctica protection	Polar orbits	United Nations
		Knowledge creation	Revolution making	Barrier reefs	Poverty alleviation

Source: Sandler, 1999: 24-25.

The most drastic problem public goods meet is the existence of a provision. Many countries are reluctant to contribute to financing of GPGs whereas these countries are differently exposed the negative effects of global public bads. Today's state notion is very different than that of old. As it's well known, Wagner's Law (1893) clarifies the transforming of the state's role in last decade of the nineteenth century. Wagner presented that elasticity of public expenditures to income is bigger than one because of the more increase in income creates the more increase in demand for health, education, and infrastructure. Wagner attributed a cultural and welfare roles and gave states new duty. After the World War II, the primary role of the states converted from the "warfare-state" to "welfare state" which is an active state implementing social reforms, offering social rights, and providing social services (Stefan, 2015: 37). However, free-rider problem that emerges from GPGs as much as public goods is still main problem for provision. Therefore, countries support international organizations to provide GPGs and make them share cost. Even if international organization play a major role, they can not directly enforce the agreements. That is to say, international organizations do not have sanction power on countries and never compel them to do anything. Instead, international organizations cooperate with countries by determining the conditions and make them self-enforce the agreements (Martin, 1999: 52).

There is a big obstacle in front of the cooperation between countries. Countries are keen on gaining benefits without bearing the cost and behave as a free-rider. The prisoner's dilemma which is a strategy for benefiting from public goods' provision without any cost requires two people having been interrogated by the police. The police officer can not charge them because of lack of evidence and then takes them separate rooms to make them confess. The police officer suggest a deal to each one. If one of these guys accepts and another refuses the crime, guy who accepts the crime is being set free and the other is being imprisoned for 5 years. If none of them accepts the crime, they are being imprisoned for a year. If both of them accept the crime, they are being imprisoned for three years. This story is being shown in *Table 2* below. The prisoner's dilemma also needs to get exact information to reach Pareto optimality (Martin, 1999: 54).

Table 2: The Prisoner's Dilemma

		Prisoner A	
		Denies	Confesses
Prisoner B	Denies	A and B each get 1 year	A gets 0 year and B gets 5 years
	Confesses	A gets 5 years and B gets 0 year	A and B each serve 3 years

Source: Kaul, Grunberg & Stern, 1999: 8.

International organizations assist states in resolving their cooperation, poor information, coordination, and technical problems instead of acting as a ruler. International organizations can interfere in reducing these strategic dilemmas in various ways. They can provide expert analyses to fairly keep the damages and expenses compensating, and also set standards for contributions to provision pools and announce information about states that avoid fulfilling their responsibility and abstain from taking measures in time (Martin, 1999: 58). Whereas non-state actors do not compete with international organization, their supply for resolving global issues is complementary to international organizations'. Non-governmental organizations also supply information on issues and support governments for reaching common purposes (Martin, 1999: 59).

II. HEALTH AS A GLOBAL PUBLIC GOOD

Health is truly accepted as a fundamental human right and is the most important building stone for prosperity. Health which is a key component of human capital and has a important role for development states the human's physical and spiritual progress, and being free from any illnesses. Health care can efficiently produce in a market because of rivalry in consumption and excludability.

However, governments support health care markets due to market failure taken place by some reasons such as externalities, lack of supply, income inequality, intergenerational transfer, and spillover effects. Accordingly, health care is known as a public good. As stated previously, public goods have the features of nonrivalry in consumption and nonexcludability. Nonrivalry in consumption refers to an ability to consume unless decreasing the others' consumption while nonexcludability refers not to exclude a person from consuming a good. Health became a GPG owing to globalization. Globalization resulted in increasing international trade volume and migration that have hurried the spread of disease around the world (Chen, Evans & Cash, 1999: 289). Health demonstrates cross-border externalities and so international cooperation and global governance become important to reduce risks.

Diseases are traditionally classified in three groups. These are infectious disease, non-infectious disease, and injury. Infectious diseases are strongly tied in with poverty and malnutrition, which are frequently seen in developing countries and mostly affect women and children. Non-infectious diseases such as cardiovascular disease, cancer, stroke, and diabetes are linked to lifestyle and health related behaviour. Lastly, it doesn't matter whether you are poor or rich, you can face with injury at anytime. Externalities cause the control of infectious disease to be a public good but treatment for non-infectious disease and injury is mostly private (Chen, Evans & Cash, 1999: 285). Serious outbreaks are rapidly reported by modern information technology and the global media. Nevertheless, it's observed that governments are actually reluctant to report epidemics due to economic results (Zacher, 1999: 269). In the case of pandemic which is an infectious disease easily spreading through human populations across a large region all countries benefit from the knowledge of pandemic outbreak. This position makes countries take measures to protect their people and prepare their medical institutions to cope with threatening disease and prevent disease to spread out of its sources (Zacher, 1999: 268).

There are some measures to reduce the effects of pandemics such as good hygiene and sanitation, social distancing, school closure, exact reporting, transparency, "best-shot" strategies, border controls, early warning systems, and international organizations. Social distancing and other mitigation steps can reduce the transmission rate from an initial value of 2.38 to an average of 1.36 during the period from January 24th, 2020 to February 3rd, 2020 in Wuhan (Atkeson, 2020: 8). School closure is a key component of many countries' plans to mitigate the effect of an influenza pandemic. By this way, the contagion effect of pandemic can get under control. Exact information, reporting, and transparency play a crucial role to struggle with pandemics as well as reduce the economic costs. Best-shot strategies remove epidemics where they emerge before they spill over the rest of the world. Thus, these technics cut down the expenses and save human health as well. All countries have been taking advantage of the activities of a few major states, non-governmental organizations and international organizations (Zacher, 1999: 269). Moreover, we need to emphasize that many experiences have revealed that it is really difficult to monitor and control international travellers for signs of disease at borders (Zacher, 1999: 275).

III. THE SHORT STORY OF PANDEMIC CRISES IN HISTORY

There are many infectious diseases killed rather more people than war during history. These diseases actually stem from the migration, trade, famine, wars, and social chaos. During the Justinian era of the Roman Empire one third of the population died of the plague (Zacher, 1999: 266). In the middle of 14th century, great (black) plague first emerged in Central Asia and expanded over the south and west and then reached up to Europe. This plague was called as "Black Death" by European because of killing millions of people where it visited. Black Death killed almost one third of Europeans in the 14th century and resulted in long-term demographic, social, and economic results both in Europe and countries in Middle East such as Syria and Egypt. This event demonstrates that infectious diseases are an inseparable part of human history (Özdemir, 2005: 22). Black Death and also repeated pandemics were the most devastating natural disasters ever to strike Europe in the 14th and 15th centuries. It's exactly difficult to globally estimate the number of people killed by Black

Death. There were the great number of people passed away because of Black Death, which number is bigger than we thought in the late of medieval era. Population in the beginning of 15th century's Europe decreased up to more than one third of the population it included a hundred years ago (Herlihy, 1997: 17). Black Death is universally accepted the biggest pandemic ever seen in Europe and this pandemic deeply impacted social and economic structure and also working life and women's roles in Europe. In addition, Black Death is evaluated to play a significant role for devastating the feudalism (TÜBA, 2020: 22). In the 16th and 17th centuries, 60 to 90 percent of the native population of the Americas from Mexico southward died of smallpox, measles, and influenza (Zacher, 1999: 266).

There were some other developments before the great influenza pandemic (Spanish flu) emerged. In the early nineteenth century, a new disease engaged attention in Europe and America. Cholera sprawled around Europe and America but it was not contagious. In 1832 a German physician named as Hecker who was directly motivated by the threat of cholera published a paper on the pestilence of 1348 and 1349 (Herlihy, 1997: 19). China in 1894 happened to struggle the plague that emerged from the inland provinces of Hunan and Canton where it was endemic to assault the port towns of Hong Kong and this waterborne disease went on to threaten port towns and their hinterlands around the world (Herlihy, 1997: 20). At the onset of December, 1915, there used to be a illness which was later recognized as influenza and this was not a officially reportable disease because its diagnostic criteria for influenza and pneumonia was ambiguous. By the way, mortality from influenza and pneumonia in the United States had sharply risen in 1915 and 1916 because of a major respiratory disease epidemic. Mortality started to somewhat decrease in 1917. The first pandemic influenza wave came out in the spring of 1918, which mercurially spreaded through the United States, Europe, and Asia over the next 6 months. Although the morbidity was still moderately high, the mortality in several territories were noticeably lower. Second wave that was much more fatal resumed from September 1918 to January 1919 and third wave showed itself up in February 1919 to June 1920 (Taubenberger & Morens, 2006: 16).

This airborne infection was based on the Influenza A virus that was subtype of H1N1. This disease and its waves overlapped with the last year of the World War I that promoted the spread of the infection due to movement of massive troops across countries. An unpleasant property of this disease was the high mortality among young adults and this pattern created negative economic impacts on prosperity by losing productive population (Barro, Ursúa & Weng, 2020: 2). These three waves revolved around the globe in less than a year. However, these active waves of disease hadn't been evenly seen around the world. For instance, Australia experienced a single and also longer wave of influenza activity due to the partial success of a maritime quarantine that postponed the pandemic until early 1919 (Johnson & Muller, 2002: 107). However, some features of the 1918 pandemic were unique. Mortality was conspicuously 5 to 20 times higher than expected. These higher mortality stemmed from the several factors such as including a higher proportion of severe and complicated infections of the respiratory tract, concentrating on young age group, and engendering 3 convulsive pandemic waves within a year. To understand the unique characteristics of the 1918 virus, natural and environmental factors should be examined (Taubenberger & Morens, 2006: 20).

We can compare the coronavirus's mortality and economic effects with the world's experience of the Spanish flu. It's estimated from the 43 countries that the Spanish flu murdered almost 39 million people around the world, and this number accounted for 2 percent of the world's population at that time. However, the other source says that mortality was estimated about 50 millions worldwide and almost 675 thousands just occurred in the USA. This number the world have ever seen since the Black Death in the 14th century is the peak of worldwide mortality from a natural disaster (Barro, Ursúa & Weng, 2020: 2). An estimated one third of the world's population (almost 500 million people) were infected and they had clinically apparent illnesses during the 1918–1919 influenza pandemic. The disease was rarely serious, and casefatality rates were 2.5-5.0 percent. These rates also showed a high increase when comparing to less than 0.1 percent in other influenza pandemics. Another paper estimated the number of deaths almost 50 millions and were possibly as high as 100 millions (Johnson & Muller, 2002: 114).

The HIV (Human Immunodeficiency Virus) was considered to transform from non-human primates in Africa and infected human populations in central Africa by the early 1970s. The first AIDS case was reported at the beginning of 1981 and actually seen among homosexual men, intravenous drug users, and hemophiliacs in 1980s. HIV is clearly transmitted by sex workers, injecting drug users, long-haul truck drivers, immigrants, and sailors. According to UNAIDS/WHO (2003: 3), 38 million people had been infected, 3 million people annually died, and 4.8 million new infections occurred each year. Total loss reached at least 25 million around the world, and AIDS killed more people than any other communicable disease over the last two decades (Bell & Lewis, 2004: 153). According to UNAIDS' data given for 2019, 1.7 million people were newly infected with HIV, 38 million people were living with it, and 690 thousands people died of AIDS-like illnesses.

The first case of Food and Mouth Disease (FMD) was reported in Hsinchu county in the northwest part of the island of Taiwan on March 14, 1997. The Taiwan Health Research Institute confirmed the diagnosis for FMD as soon as possible and clinical cases were observed in the 10 western counties. By the way, vaccination was not beneficial to sweep the disease away and FMD damaged the entire swine industry even though FMD did not become a serious health threat to pork consumers. The predominant measure for this kind of epidemic is to extinguish or slaughter the infected herds and emergency vaccination of herds should be given. Although government made a decision on the adoption of vaccination measure across the country, Taiwan announced an unclear prohibition of pork exports on March 21, 1997. Within the first few weeks of the export prohibition, almost 400 thousand animals from over one thousand infected farms were destroyed, and another 500 thousands were expected to be slaughtered (Fuller, Fabiosa & Premakumar, 1997: 5).

Infectious diseases were supposed to emerge in developing countries but develop countries in the twenty-first century. Severe Acute Respiratory Syndrome (SARS, H5N1) which was a first infectious disease in the twenty-first century arose in November 2002 in the Chinese province of Guangdong and brought about the world alert. The pioneers of SARS had been seen in the Southeast Asia where had been also witnessed the two previous scary which were the H5N1 avian influenza outbreak in Hong Kong in 1997 and the Nipah virus outbreak in 1998–99 in Malaysia. Whereas the H5N1 virus disseminated from birds to humans, the Nipah virus dispersed from pigs to people (Fidler, 2004: 72). SARS overspread at least 28 countries, including Australia, Brazil, Canada, South Africa, Spain, and the USA. As from July 2003, the number of SARS cases had reached 8,437 around the world and the death toll had reached 813 people, including 348 people in China and 298 people in Hong Kong (Mckibbin, 2004: 114). The pandemic we are facing today is called as COVID-19 that emerged from Wuhan city with the population of 11 millions in Hubei province of China on December 31th, 2019. COVID-19 has been spreading over other continents besides Asia. Countries are struggling to prevent the contamination (TÜBA, 2020: 27). There have been over 28 million confirmed cases and 912 thousand deaths according to data given by World Health Organization (WHO). Mortality rate is 3 percent as of 12 September, 2020.

IV. ECONOMIC IMPLICATIONS OF PANDEMICS

Health is very significant determinant of wealth and provides many benefits for progress. First of all, health can effect income by means of education and secondly, good health boosts labor productivity, savings, and investments. Lastly, health has an effect on country's population age structure (Bloom & Canning, 2004: 309). However, it's very difficult to figure out the size of the economic costs of pandemics. But we obviously know that it largely affects the economies across the world. Governments first attempt to bring the pandemic under control by facilitating coordination with the rest of the world and international organizations and later ensure the economic security. After a certain point, governments need to balance between the effects of the pandemic and its economic damages. Many governments are willing to slow down the rate of infection through a number of measures such as shut-down of the production, part-time employment, home confinement (quarantine), social distancing, travel restrictions and bans, closure of borders, schools and restaurants and theatres, suspension of sports events, and so on. By the way, the biggest abstacle in

front of estimating these kinds of extreme macroeconomic events is the lack of sufficient data because these events occur infrequently (Barro & Ursúa, 2012: 85). However, estimating the economic damages of these types of naturel disasters is ambiguous even though there have been many registered events for many years. This section historically examines the economic impacts of pandemics from Black Death to COVID-19.

Europe was a very crowded continent before the Black Death emerged and there used to be a stability. One hundred year before 1348, the population showed a trivial increase. Nevertheless, food costs were high and famines were frequent, and also the economy was saturated. Production was just for meeting the requirements such as feeding, clothing, and sheltering. Agriculture was mobilized for the production of cereals, and the basic food stuff and cultivation had expanded to the limits of the workable land (Herlihy, 1997: 57). The Black Death brought out a long-term permanent changes in demographic behaviour, agriculture, manufacturing, trade, and technology. It was a strong exogenous shock which led to a sharp increase in wages across Europe and the eastern Mediterranean. This position headed on a large scale of institutional changes in the countryside. In other words, these changes induced the growing commercialisation of agriculture. Also, increase in trade and manufacturing made a lasting impact in urban life as well as decreased interest rates, and the skill premium followed these developments. The Black Death brought about greater institutional changes such as making the guilds more flexible, and rising the rural industries. Scarcity and the high cost of labor triggered the labour-saving technological innovations (Pamuk, 2007: 312). The Black Death drastically reduced the number of workers and their average length of life. Whereas the life expectancy in the thirteenth century were between 35 and 40 years, severe pandemic in the late fourteenth century reduced that figure below 20 years. After 1400, life expectancy extended to about 30 years. These changes necessarily transformed the balances between young and old, and producers and dependents. As a result of these developments, high wages and low rents raised the standard of living for substantial numbers (Herlihy, 1997: 39-42).

As from the beginning of the twentieth century financial sector became significant. This means that the modern economy today is represented by financial globalization and a crisis appeared from any reason in the financial system deeply affects countries. *Figure 1* below shows in what ways pandemics affect the modern economy. First of all, disease is detected and registered as a epidemic by the countries and they try to restrain it spilling over the rest of the world. But, in fact, countries do not admit that disease can become a international problem because of their economic concerns and they do not announce it in time. Whenever epidemic converts to a pandemic as a global problem, countries and international organizations take measures to make disease remove. By the way, pandemics first hurt the human health, and secondly national economies even if countries attempt to prevent its attack rate. After a while, economy becomes as important as human health. In an advanced stage, people lose their trust and confidence against the economy and government becomes responsible for stabilizing the economy. This position increases the public debts and crowds the private sector out of the economy. You can easily follow this cycle from the figure 1 below.

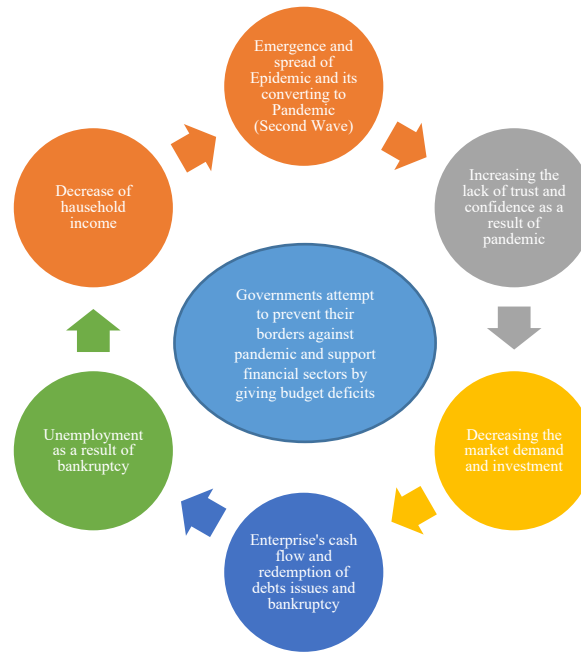


Figure 1. What Channel Economy Is Affected

Students are largely influential in dispersing the virus around so the first channel epidemics unfold is the schools. School closure is first considered as a urgent measure for implementation. During the 1918 influenza epidemic in the USA, school closure and cancellation of public gatherings were markedly engaged with reduced mortality (Chen, Huang, Chuang, Chiu, & Kuo, 2011: 200). Strategies involving school closure are approximately 14 to 21 times as costly as single intervention strategies with antivirals or prevaccination (Sander et al., 2009: 5). The school closure strategies are very expensive from the society's perspective but imbedding school closure to any FTAP (Full Targeted Antiviral Postexposure Prophylaxis) strategy or prevaccination increases removal rate of pandemic up to 7 percent. If school closure is imbedded to FTAP, no more than about 50 percent antiviral stockpiling is needed to effectively control the pandemic (Sander et al., 2009: 6).

Contagion does not just refer to the "transmission" of the diseases but also refers to the spillover effects of economic downturn. Asian flu started with the devaluation of the Thai baht in July 1997 and then spilled over Malaysia, Indonesia, Korea and Japan with the Hong Kong stock market crashing in October 1998 (Jackson, 1999). The crisis emerged in Southeast Asia first jumped to Russia and Brazil by means of loan default, affected Europe and North America, and also resulted in the collapse of the US hedge fund long-term capital management (Claessens & Forbes, 2001: 4). Whereas 1991 cholera outbreak in Peru costs the country almost 800 million dollars due to the diminishing rate of trade volume and travel restrictions, 1994 plague outbreak in India expenses the country 1.5 billion dollars due to the same reasons (Zacher, 1999: 273).

China which has been the main growth driver among countries approximately makes up 16.3 percent of the world's GDP. IMF estimates that China alone contributes 39 percent of global economic growth in 2019. This means that any downturn in the China's economy could probably make the global economy fluctuate (IMF, 2019). Wuhan where the COVID-19 primarily appeared has been recognized as a principal financial hub for central China. It is also a important transportation and trade center, where the headquarters of the nation's major local steel and vehicle makers are settled. The city serves as a production center to more than 300 factories of the world's best 500 companies such as Microsoft, SAP, and Groupe PSA (South China Morning Post, 2020).

In democratic regimes, governments are interested in enhancing the well-being of citizens in order to be reelected and they rely on tourism sector and trade volume (net export) to achieve this goal. Governments encourage their tourism sector because of an important role in augmenting nations' business activity such as foreign currency earnings and job creation. However, the tourism sector is very sensitive to negative environmental factors such as natural disasters, serious social

conflicts, economic crises, wars, and terrorism. World Tourism Organization (UNWTO) estimates that international tourist arrivals could decline by 20 percent to 30 percent in 2020 in consideration of the latest urgent measures to restrict the COVID-19 pandemic. This could cause a loss of 300 to 450 billion dollars in international tourism receipts which is almost one third of the 1.5 trillion dollars generated globally (UNWTO, 2020:3). *Figure 2* below shows the change in international tourism receipts due to global crises. As it's shown from the figure, pandemics affect the tourism receipts even harder than economic downturns and regional tensions.

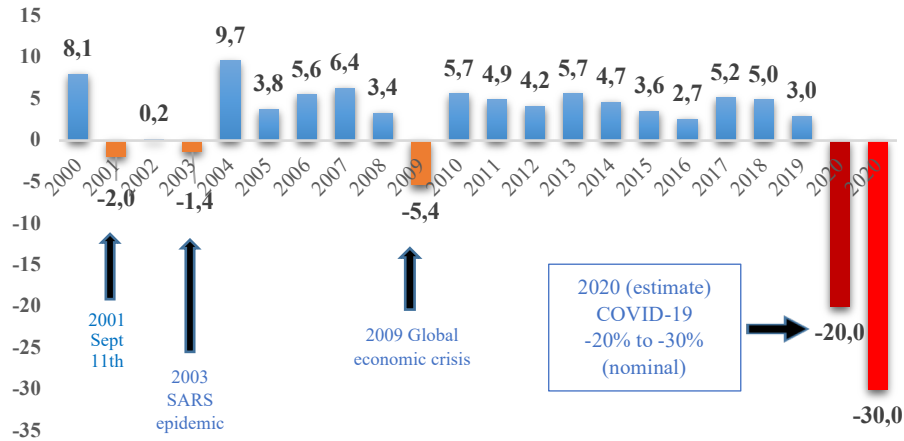


Figure 2: International Tourism Receipts, World (real change, %)

Source: UNWTO, 2020: 7.

Trade volume decreases during the pandemic period so that the market demand is sharply fallen down. Unfortunately, on the one hand, export restrictions including certain medical equipments were adopted by governments around the world, but on the other hand, countries attempted to respond to COVID-19 pandemic (Carreno, Dolle, Medina, & Brandenburger, 2020: 405). Total export of European Union decreased by 33.1 percent in April, 2020 comparing to the same period of the previous year. States implement expansionary monetary and fiscal policies by boosting money supply, expanding public expenditures, and reducing taxes so as to increase the demand struck by the pandemic. Many states introduced tax measures including tax cuts, tax credits, tax deferrals, and other instruments (OECD, 2020). However, pandemic as a natural disaster swiftly devastates the world economy as a whole even if each countries and international organizations take measures in time. Table 3 below presents the economic implications of pandemics by giving examples from literature.

Table 3. Economic Implications of Pandemics

Author(s)	Country	Model	Variables	Conclusion
Alfaro et al. (2020)	Hong Kong (SARS) and USA (COVID-19)	Exponential and Logistic Model	Daily market returns and cumulative number of cases in a country	Epidemics demonstrate a decline in aggregate market return from 8 to 11 percent for SARS and 4 to 10 percent for COVID-19
Barro, Ursúa & Weng (2020)	43 Countries (Spanish flu)	Regressions	Economic growth rate, death rates of natural disasters such as flu and war, real rates of returns and inflation rates	Natural disasters decline the countries' GDP by 6 percent and total consumption by 8 percent. Higher mortality decreases real returns on stocks and short-term government bills
Baker et al. (2020)	USA (COVID-19)	Survey	Transaction-level household financial data	Results present sharp drops in demand for restaurants, retails, air travels, and public transports
Barrot, Grassi & Sauvagnat (2020)	France (COVID-19)	Standard model of production networks	Sectors and household expenditures	Six weeks social distancing brings down the GDP by 5.6 percent
Zeren & Hızarcı (2020)	China, South Korea, Italy, France, Germany, and Spain	Cointegration test with multiple break (Maki, 2012)	COVID-19 daily total deaths and COVID-19 daily total cases with stock markets	Total cases have cointegration with SSE, KOSPI, and IBEX35 and do not have cointegration with FTSE MIB, CAC40, and DAX30
Zhou, Sun & Liu (2019)	China	SEIRS Model (with double delay)	Risk-free interest rate and funds' effective infection rate	Results show that when the effective infectious rate of funds equals 0.08, its value accounts for the capital saturation level. In the case of normal market fluctuation, the removal rate of funds ranges from 5 per thousand to 3 percent
Barro & Ursúa (2012)	28 countries for consumption and 40 countries for GDP	Time Series Analysis	Growth rate, consumption, stock prices, and disaster probability	Macroeconomic crises (disasters) fall down the GDP 21 percent, and also total consumption 22 percent
Chen et al. (2011)	Taiwan (Swine flu)	Questionnaire Interview	The questionnaire interview assesses the harmonization of restrictions on public place visits or gatherings, and seeks for childcare during the school closure, economic impact by workplace absenteeism, and wage loss.	In response to the 2009 P/H1N1 virus, the median wage loss in affected households accounts for 0.93 percent of Taiwan's per capita GDP in 2009

Table 3. Economic Implications of Pandemics (cont.)

Boucekkine, Diene & Azomahou (2008)	Sub-Saharan Africa (AIDS)	Blanchard Model	Life expectancy, average human capital, loss in labor force, loss in productivity, and the effects of both private and public health expenditure on productivity	AIDS-like epidemics drop savings and higher probability of death causes schooling time to drop, and also productivity decreases
Beutels et al. (2009)	China (SARS)	Time Series Analysis	Monthly SARS cases and deaths, and sectoral indicators	Estimating the cost of SARS crisis in Beijing is not straightforward. Losses of tourism receipts are estimated about 1.4 billion dollars or 300 times expensive than the treatment in Beijing
Sander et al. (2009)	United States	Stochastic Agent-Based Model	The number of influenza cases and effectiveness of interventions	School closure incurs high cost to society, which is about 2.7 million dollars per 1000 people
Sadique, Adams & Edmunds (2008)	United Kingdom	Human Capital Method (HCM)	Labor force loss and average wage rate	GDP is estimated to have lost by 0.85 - 0.97 percent if school shuts down for 12 weeks.
Garrett (2007)	USA (Spanish flu)	Survey	Survey	Whereas entertainment industries' receipts suffer from the epidemics, businesses specialized in health care products experience an increase in revenues. The U.S. Department of Health and Human Services expects 1.9 million dead and almost 200 billion dollars economic cost in the USA
Kalemlı Özcan (2006)	44 African countries (AIDS)	Panel Regression	Country level total fertility rate	There is a positive effect of the epidemic on fertility rate between country and region comparisons. By the way, there is no robust effect of the diseases on fertility rate between country comparisons
Kim, Chun & Lee (2005)	Korea (SARS)	Qualitative Method (Interview)	Hotels' occupancy rate and income	The occupancy rate decreases almost 14 percent from February 2003 to July 2003 in regard of the same period in previous year. The occupancy rate from April 2003 to June 2003 was fairly worse, that indicating a 26 percent drop in regard to that of 2002

Table 3. Economic Implications of Pandemics (cont.)

Freire (2004)	South Africa	Gali (1990)'s Model	Annual probability of death due to HIV/AIDS	Significant drop in the future saving rates
Nippani & Washer (2004)	Canada, China, Hong Kong, Indonesia, Philippines, Singapore, Thailand, and Vietnam	T-tests and the non-parametric Mann-Whitney test	S&P 1200 Global Index	SARS has no adverse effect on the exposed countries' stock markets except for China and Vietnam
Bloom & Mahal (1997)	51 developed and developing countries	EPIMODEL	Growth rate of real per capita, average annual increase of AIDS and vectors of variables that influence economic growth	As the number of AIDS cases per 1,000 people increases, the average annual rate of per capita income growth decreases 0.86 percentage point
Kambou, Devarajan & Over (1992)	Cameroon (AIDS)	General Equilibrium Model	Labor force and growth rate	AIDS epidemic lowers the GDP growth rate by 2 percentage points per year

CONCLUSION AND POLICY RECOMMENDATIONS

This paper examines the impacts of pandemics on national economies. Although the economic impacts of pandemics are very comprehensive and somewhat ambiguous, some are straightforward in literature. However, it's very difficult to figure out the size of the economic costs of pandemics because of the separate development level of countries, economic measures employed, duration of pandemics, sectors differently affected, and international collaborations. Governments employ some measures to control the spread pace of pandemics. These measures are part-time employment, home confinement (quarantine), social distancing, travel restrictions and bans, closure of borders, schools, and crowded places as well. These measures bring about serious economic problems even though they confine the negative effects of pandemics. A paper studied on Spanish flu and World War I's impact on economy presents that natural disasters decline the countries' GDP by 6 percent and total consumption by 8 percent. Another paper studied for France during COVID-19 pandemic suggests that six weeks social distancing brings down the GDP by 5.6 percent. Also, Korea's SARS experience explains that hotel's occupancy rate decreases almost 26 percent from April 2003 to June 2003 in regard of the same period in previous year. Whereas 1991 cholera outbreak in Peru costs the country almost 800 million dollars due to the diminishing rate of trade volume and travel restrictions, 1994 plague outbreak in India expenses the country 1.5 billion dollars due to the same reasons. UNWTO estimates that international tourist arrivals could decline by 20 percent to 30 percent in 2020 in consideration of the latest urgent measures to restrict the COVID-19 pandemic. This could cause a loss of 300 to 450 billion dollars in international tourism receipts which is almost one third of the 1.5 trillion dollars generated globally. Main finding resulted from the papers written on this issue is that pandemics exacerbate the national economies through different channels. Developed and developing countries should take the pandemics into account as a regressive power or obstacle in front of economic growth and stability of state budgets, strongly collaborate against pandemic as a natural disaster, support their healthcare systems and be ready for these kinds of disasters.

Etik Beyanı : Bu çalışmanın tüm hazırlanma süreçlerinde etik kurallara uyulduğunu beyan ederim. Aksi bir durumun tespiti halinde ÖHÜİBF Dergisinin hiçbir sorumluluğu olmayıp, tüm sorumluluk şahsıma aittir.

Yazar Katkıları : Bu çalışmanın ortaya çıkma sürecinde değerli hakemlerin düzeltmeleri dışında herhangi bir dış katkı veya ortak yazar söz konusu değildir.

Çıkar Beyanı : Çalışma herhangi bir finansal destek almamıştır.

Teşekkür : Çalışmaya düzeltmeleriyle katkı sunan değerli hakemler başta olmak üzere dergi editörü Doç. Dr. Ali Eren Alper'e ve usanmadan sorularımıza cevap veren dergi editör yardımcısı Arş. Gör. Ali Gökhan Gölçek'e şükranlarımı sunarım.

Ethics Statement : I declare that the ethical rules are chased in all preparation processes of this paper. In the event of a contrary situation, I swear that ÖHÜİBF Journal has no responsibility and so all responsibility belongs to me.

Author Contributions : There is no external contribution or co-author(s) except reviewers' corrections.

Conflict of Interest : No financial support.

Acknowledgement : I would like to thank to first dear reviewers and after editor Assoc. Prof. Ali Eren Alper and co-editor R. A. Ali Gökhan Gölçek who patiently answered my all questions.

REFERENCES

- Alfaro, L, Chari, A., Greenland, A. N., & Schott, P. K. (2020). Aggregate and firm-level stock returns during pandemics in real time, *NBER Working Paper Series*, 26950, Retrieved from <https://www.nber.org/papers/w26950.pdf>
- Arsan, H. Ü. (1992). Kamu maliyesi alanında yeni bir inceleme konusu: uluslararası kamusal mallar, *Ankara Üniversitesi S. B. F. Dergisi*, 47(1), 403-426.
- Atkeson, A. (2020). What will be the economic impact of COVID-19 in the US? rough estimates of disease scenarios, *NBER Working Paper Series*, 26867, Retrieved from <https://www.nber.org/papers/w26867.pdf>
- Baker, S. R., Farrokhnia, R.A., Meyer, S., Pagel, M., & Yannelis, C. (2020). How does household spending respond to an epidemic? consumption during the 2020 COVID-19 pandemic, *NBER Working Paper Series*, 26949, Retrieved from <https://www.nber.org/papers/w26949.pdf>
- Barro, R. J., & Ursúa, J. F. (2012). Rare macroeconomic disasters, *annual review of economics*, 4, 83-109, Retrieved from <https://www.jstor.org/stable/42949932>
- Barro, R. J., Ursúa, J. F., & Weng, J. (2020). The coronavirus and the great influenza pandemic: lessons from the "Spanish flu" for the coronavirus's potential effects on mortality and economic activity, *NBER Working Paper Series*, 26866, Retrieved from <https://www.nber.org/papers/w26866.pdf>
- Barrot, J. N., Grassi, B., & Sauvagnat, J. (2020). Sectoral effects of social distancing, *Centre for Economic Policy Research*, 3, 89-107, Retrieved from <https://cepr.org/sites/default/files/news/CovidEconomics3.pdf>
- Bell, C. L. G., & Lewis, M. (2005). The economic implication of epidemics old and new, *World Economics*, 5(4), 137-174. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=997387
- Beutels, P., Jia, N., Zhou, Q. Y., Smith, R., Cao, W. C., & de Vlas, S. J. (2009). The economic impact of SARS in Beijing, China, *Tropical Medicine and International Health*, 14(1), 85-91. Retrieved from <https://onlinelibrary.wiley.com/doi/epdf/10.1111/j.1365-3156.2008.02210.x>
- Bloom, D. E., & Mahal, A. S. (1997). Does the AIDS epidemic threaten economic growth?, *Journal of Econometrics*, 77, 105-124. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0304407696018088>
- Bloom, D. E., & Canning, D. (2004). Epidemics and economics: interactions between global change and human health, *Scripta Varia*, 106, 304-331. Retrieved from <http://www.casinapioiv.va/content/dam/accademia/pdf/sv106/sv106-bloom.pdf>

- Boucekkine, R., Diene, B., & Azomahou, T. (2008). Growth economics of epidemics: a review of the theory, *Mathematical Population Studies*, 15(1), 1-26, Retrieved from <https://www.tandfonline.com/doi/pdf/10.1080/08898480701792410?needAccess=true>
- Carreno, I., Dolle, T., Medina, L., & Brandenburger, M. (2020). The implication of the COVID-19 pandemic on trade. *European Journal of Risk Regulation*, 11(2), 402-410.
- Chen, W. C., Huang, A. S., Chuang, J. H., Chiu, C. C., & Kuo, H. S. (2011). Social and economic impact of school closure resulting from pandemic influenza A/H1N1, *Journal of Infection*, 62, 200-203. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0163445311000089?via%3Dihub>
- Chen, L. C., Evans, T. G., & Cash, R. A. (1999). Health as a global public good, In I. Kaul, I. Grunberg & M. A. Stern (Eds.), *Global public goods international cooperation in the 21th century* (pp. 284-304), New York: Oxford University Press.
- Claessens, S., & Forbes, K. (2001). International financial contagion: an overview of the issues and the book. In S. Claessens & K. Forbes (Eds), *International financial contagion* (pp. 3-18), Dordrecht and London: Kluwer.
- Erdoğan, M. M. (2006). Küresel kolektif varlıklar, finansman problemleri ve düzeltici vergileme temelli çözüm yolları, *Marmara Üniversitesi İ.İ.B.F. Dergisi*, XXI(I), 269-295.
- Fidler, D. P. (2004). *SARS, governance and the globalization of disease*, First Edition, New York: Palgrave Macmillan.
- Freire, S. (2004). Impact of HIV/AIDS on saving behaviour in South Africa, *Forum Paper*, Retrieved from https://pdfs.semanticscholar.org/5267/47656af2ebaf4c279bd6814f30f36a38f90a.pdf?_ga=2.79497297.478059263.1588126441-490337133.1579866999
- Fuller, F., Fabiosa, J., & Premakumar, V. (1997). World trade impacts of foot and mouth disease in Taiwan, *Briefing Paper*, 97-BP 16. Retrieved from <https://core.ac.uk/download/pdf/38921255.pdf>
- Garrett, T. A. (2007). Economic effects of the 1918 influenza pandemic implications for a modern-day pandemic, *Federal Reserve Bank of St. Louis*, Retrieved from https://www.stlouisfed.org/~media/files/pdfs/community-development/research-reports/pandemic_flu_report.pdf
- Herlihy, D. (1997). *The Black Death and the transformation of the west*, Harvard University Press, Retrieved from <https://www.jstor.org/stable/j.ctvjghwgp>
- IMF (2019). *World economic outlook growth slowdown precarious recovery*. Retrieved from <https://www.imf.org/en/Publications/WEO/Issues/2019/03/28/world-economic-outlook-april-2019>
- Jackson, K. D. (1999). Introduction: the roots of the crisis. In K. D. Jackson (Eds). *Asian contagion the causes and consequences of a financial crisis*. New York: Westview Press.
- Johnson, N.P.A.S., & Mueller, J. (2002). Updating the accounts: global mortality of the 1918–1920 “Spanish” influenza pandemic. *Bull Hist Med*, 76, 105–115.
- Kalemli-Ozcan, S. (2006). AIDS, "reversal" of the demographic transition and economic development: evidence from Africa, *NBER Working Paper Series*, 12181, Retrieved from <https://www.nber.org/papers/w12181>
- Kambou, G., Devarajan, S., & Over, M. (1992). The economic impact of AIDS in an African country: simulations with a computable general equilibrium model of Cameroon, *Journal of African Economies*, 1, 109-130. Retrieved from <https://academic.oup.com/jae/article-abstract/1/1/109/681426?redirectedFrom=fulltext>
- Kaul, I., Grunberg, I., & Stern, M. A. (1999). Defining global public goods, In I. Kaul, I. Grunberg & M. A. Stern (Eds.), *Global public goods international cooperation in the 21th century* (pp. 2-19), New York: Oxford University Press.
- Kim, S. S., Chun, H., & Lee, H. (2005). The effects of SARS on the Korean hotel industry and measures to overcome the crisis: a case study of six Korean five-star hotels, *Asia Pacific Journal of Tourism Research*, 10(4), 369-377. Retrieved from <https://www.tandfonline.com/doi/full/10.1080/10941660500363694>
- Martin, L. L. (1999). The political economy of international cooperation, In I. Kaul, I. Grunberg & M. A. Stern (Eds.), *Global public goods international cooperation in the 21th century* (pp. 51-64), New York: Oxford University Press.
- Mckibbin, W. (2004). Globalization and disease: the case of SARS. *Asian Economic Papers*, 3(1), 113-131. Retrieved from <https://www.mitpressjournals.org/doi/pdfplus/10.1162/1535351041747932>

- Morrissey, O., te Velde, D. W., & Hewitt, A. (2002). Defining international public goods: conceptual issues, In M. Ferroni & A. Mody (Eds.), *International public goods: incentives, measurement and financing* (pp. 31-46), Kluwer Academic Publisher, Boston & Londra.
- Nippani, S., & Washer, K. M. (2004). SARS: a non-event for affected countries' stock markets?. *Applied Financial Economics*, 14, 1105-1110, Retrieved from <https://doi.org/10.1080/0960310042000310579>
- OECD (2020). International Trade Pulse. Retrieved from <http://www.oecd.org/sdd/its/international-trade-pulse-oecd-updated-july-2020.htm>
- Özdemir, H. (2005). *Salgın hastalıklardan ölümler 1914-1918*. Ankara: Türk Tarih Kurumu Yayınları.
- Pamuk, Ş. (2007). The Black Death and the origins of the “great divergence” across Europe, 1300-1600, *European Review of Economic History*, II, 287-317. Retrieved from https://www.jstor.org/stable/41378468?seq=1#metadata_info_tab_contents
- Sadique, M. Z., Adams, E. J., & Edmunds, W. J. (2008). Estimating the costs of school closure for mitigating an influenza pandemic, *BMC Public Health*, 8(135), 1-7. Retrieved from <https://bmcpublihealth.biomedcentral.com/track/pdf/10.1186/1471-2458-8-135>
- Sander, B., Nizam, A., Garrison Jr, L. P., Postma, M. J., Halloran, M. E., & Longini Jr, I. M. (2009). Economic evaluation of influenza pandemic mitigation strategies in the United States using a stochastic microsimulation transmission model. *Value Health*, 12(2), 226-33. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3710126/pdf/nihms59313.pdf>
- Sandler, T. (1999). Intergenerational public goods strategies, efficiency and institutions. In I. Kaul, I. Grunberg & M. A. Stern (Eds.), *Global public goods international cooperation in the 21th century* (pp. 20-50), New York: Oxford University Press.
- South China Morning Post (2020). Why Wuhan is so important to China's economy and the potential impact of the coronavirus. Retrieved from <https://www.scmp.com/economy/china-economy/article/3047426/explained-why-wuhan-so-important-chinas-economy-and-potential>
- Stefan, G. M. (2015). European welfare state in a historical perspective a critical review, *European Journal of Interdisciplinary Studies*, 7(1), 25-38. Retrieved from <http://www.ejist.ro/files/pdf/391.pdf>
- Taubenberger, J. K., & Morens, D. M. (2006). 1918 influenza: the mother of all pandemics. *Emerging Infectious Diseases*, 12(1), 15-22. Retrieved from <https://www.medigraphic.com/pdfs/revbio/bio-2006/bio061i.pdf>
- TÜBA (2020). COVID-19 küresel salgın değerlendirme raporu. Erişim adresi: <http://www.tuba.gov.tr/files/images/2020/kovidraporu/T%C3%9CBA%20Covid-19%20Raporu%202.%20G%C3%BCncelleme.pdf>
- UNAIDS/WHO (2003). AIDS epidemic update, Retrieved from https://data.unaids.org/pub/report/2003/2003_epiupdate_en.pdf
- UNWTO (2020). Impact assesment of the COVID-19 outbreak on international tourism. Retrieved from <https://www.unwto.org/tourism-covid-19>
- WHO (2006). SARS how a global epidemic was stopped, Retrieved from https://apps.who.int/iris/bitstream/handle/10665/207501/9290612134_eng.pdf?sequence=1&isAllowed=y
- Zacher, M. W. (1999). Global epidemiological surveillance. In I. Kaul, I. Grunberg & M. A. Stern (Eds.), *Global public goods international cooperation in the 21th century* (pp. 266-283), New York: Oxford University Press.
- Zeren, F., & Hızarcı, A. E. (2020). The impact of COVID-19 coronavirus on stock markets: evidence from selected countries, *Muhasebe ve Finans İncelemeleri Dergisi*, 3(1), 78-84, Retrieved from <https://dergipark.org.tr/tr/download/article-file/1024340>
- Zhou, Q., Sun, S., & Liu, Q. (2019). The capital flow of stock market studies based on epidemic model with double delays, *Physica A: Statistical Mechanic and its Applications*, 120733, 1-18. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0378437119303255>