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UNITED STATES-CHINA TRADE WAR AND THE EMERGENCE OF GLOBAL COVID-19 PANDEMIC

ABSTRACT

This paper asserts that the retaliatory trade wars between the United States and China contributed to the emergence of the global COVID-19 pandemic because the trade wars hindered the collaboration, coordination, and transparent information sharing about infectious diseases that could have adverse effects on the global economy. The retaliatory trade wars between the two largest economies in the world turned the symmetric information sharing about global infectious diseases to asymmetric information sharing, thus the inability to prepare for the emergence of the current global COVID-19 pandemic shock. In the first two decades of the 21st century, the World Health Organization (WHO) in collaboration, coordination, and transparent information sharing with global health care systems managed to curtail the outbreaks of the severe acute respiratory syndrome (SARS) in 2002-2003, H1N1 in 2009, Ebola in 2014, Zika in 2015, Dengue in 2016, and other deadly infectious diseases. We maintain that the symmetric information sharing enabled the WHO and the other global health care systems to build the firewall against these deadly infectious diseases. The absence of collaboration, coordination, and the symmetric information sharing due to the trade wars forced both countries to resort to information distortions; therefore, the inability to prepare for the global COVID-19 pandemic. Using conceptual economics, we show that the confluence of the retaliatory trade wars and COVID-19 pandemic has significant negative ramifications on economies worldwide.

Keywords: Trade Wars, Infectious Diseases, COVID-19, Collaboration, Information Sharing

JEL Classification: F13, F51, F53, O34, O38, O57

*La guerra commerciale USA-Cina e l'emergenza sanitaria mondiale causata
dalla pandemia di COVID-19*

Secondo questo studio la guerra commerciale tra gli Stati Uniti e la Cina ha contribuito all'emergenza sanitaria causata dalla pandemia di COVID-19, in quanto ha ostacolato la collaborazione, il coordinamento e la condivisione trasparente delle informazioni circa le malattie infettive che potrebbero avere effetti sfavorevoli sull'economia globale. Tale guerra commerciale tra le due maggiori economie mondiali ha trasformato la condivisione simmetrica delle informazioni circa le malattie infettive in condivisione asimmetrica, da cui deriverebbe l'incapacità di affrontare l'attuale emergenza dovuta allo shock pandemico globale. Nei primi due decenni di questo secolo, l'Organizzazione Mondiale della Sanità, grazie alla collaborazione, al coordinamento ed alla condivisione trasparente delle informazioni con i sistemi sanitari nazionali, è riuscita a ridurre la diffusione della SARS nel 2002-2003, dell'H1N1 nel 2009, dell'Ebola nel 2014, dello Zika nel 2015, del Dengue nel 2016 e di altre malattie infettive mortali. Noi sosteniamo che la condivisione simmetrica delle informazioni ha consentito all'OMS e ai sistemi sanitari nazionali di innalzare un muro contro queste malattie infettive mortali. L'assenza di collaborazione, coordinamento e condivisione simmetrica delle informazioni causata dalla guerra commerciale ha costretto entrambi i paesi a ricorrere a delle distorsioni nell'informazione, da cui è conseguita l'inadeguatezza nell'affrontare la pandemia di COVID-19. Tramite l'economia concettuale viene dimostrato che la convergenza tra la guerra commerciale e la pandemia di COVID-19 causa conseguenze significative sull'economia mondiale.

1. INTRODUCTION

Over the past 25 years since the World Trade Organization (WTO) replaced the General Agreement on Tariffs and Trade (GATT), countries such as China that joined the WTO in 2001 have changed their policies to facilitate free and fair international trade. For example, the Clinton administration pressed Congress to approve the United States-China trade agreement and China's membership in the WTO based on the premise that the United States' economy would benefit from more trade and international relation with China. This premise is deeply rooted in international trade theory, which suggests that all countries gain from fair and free trade, especially in this era of decreasing costs of shipping goods around the world and the inherent technological diffusion, which has enabled the spread of inexpensive and reliable

communications over the past three decades. Essentially, countries around the world have experienced improvements in economic growth and development due to free and fair trade and the rapid diffusion of technology.

The trade conflicts between the United States and China have a long history of accusations. The consensus is that the Chinese government continued to use subsidies and tax incentives to distort the true costs of production by Chinese exporting firms, and its currency devaluation or manipulation to gain unfair trade advantage over all foreign competitors. In addition to these accusations, there are other major issues that the United States, Canada, and the European Union considered to be in gross violations of WTO rules and guidelines. For instance, trade officials in developed and developing countries know that China continued to engage in musical piracy and intellectual property theft, and that foreign companies in China are forced to transfer technology and intellectual property rights to their domestic partners in order to gain access to the Chinese market. More importantly, it is a common knowledge that China lacks transparency with respect to its industrial rules and regulations. It is noteworthy that these accusations and violations did not escalate into trade war between the United States and China until March 2018 when the Trump's administration announced its intentions to impose the 25 percent and 10 percent tariffs on steel and aluminum, respectively. Imposing tariffs on China was a long held principle by Trump in the 1980s; therefore, it was no surprise that this became one of the major topics of his presidential campaign in 2016.

With respect to the issue of infectious disease threats, it is important to note that in the first two decades of the 21st century, the global health systems managed to curtail deadly infectious disease outbreaks. Some of these outbreaks included the severe acute respiratory syndrome (SARS) in 2002-2003, H1N1 in 2009, Ebola in 2014, Zika in 2015, Dengue in 2016, and other deadly infectious diseases because of the cooperation, coordination, and transparent information sharing among the global health systems. We strongly believe that the cooperation, coordination, and the symmetric information enabled the World Health Organization (WHO) and other global health systems to build the firewall against these deadly infectious diseases. We assert that the trade war that started in 2018 between the United States and China, the two largest economies in the world, turned the symmetric information about infectious diseases to asymmetric information, thus the emergence of the global COVID-19 pandemic. The COVID-19

pandemic is the symptom of global health markets failure due to asymmetric information enabled by the misguided trade wars between the two largest economies.

Was it the trade war with the United States that prevented China from sounding the global health alarm bell about COVID-19? Could China's Center for Disease Control (CDC) have shared information with the United States' CDC at the onset of COVID-19 if not for the ongoing trade wars between both countries? We contribute to the literature by using information economics to answer these conjectural questions. In doing so, we provide evidence to show that the trade wars between the United States and China forced both countries to engage in information distortions because their national interests supersede the global health and safety interests. In addition, we contribute to the literature by emphasizing that both health and economic growth are endogenous variables, which developed and developing countries around the world must take seriously because the retaliatory trade wars between the two largest economies in the world led to the breakdown in collaboration, coordination, and information sharing. This breakdown led the CDCs in both countries, the WHO, and other public health systems, which once provided effective protection against a dynamic array of infectious disease threats over the past two decades of the 21st century, to operate from different information sets about COVID-19. This is important because the inability of both CDCs, the WHO, and the other health care systems to curtail the COVID-19 pandemic also led to the unprecedented global shutdowns with significant negative ramifications worldwide.

The rest of this paper is organized as follows. In section 2, we provide the literature review with respect to trade wars and the global infectious disease threats. Section 3 ties together the dichotomy by examining what may have led to the confluence of the US-China trade wars and the global infectious disease shock that caused unprecedented shutdowns and/or lockdowns at all levels in all countries worldwide. In section 4, we use theoretical analysis to show that this global infectious disease shock has significant negative ramifications on economies worldwide. The paper concludes in section 5 with some relevant policy implications.

2. LITERATURE REVIEW

Before now, the most widely recognized tariff in the United States economic history was the 1930 Smoot-Hawley Tariff Act that cost over 200,000 jobs during the Great Depression.

According to Whaples (1995) and many other research scholars, the tariffs imposed by America's trading partners in retaliation contributed to the reduction of American exports and imports by 67% during the Great Depression. The consensus among economists and economic historians is that the passage of the Smoot-Hawley Tariff Act exacerbated the Great Depression.

Trade experts at the Peterson Institute for International Economics (PIIE) have provided detailed studies of trade wars that involved China and the United States and its allies. According to Hufbauer and Woollacott (2010), the desire to engage in trade war with China did not manifest during the tenure of President George W. Bush despite the fact that the United States International Trade Commission (USITC) found affirmative market disruptions covering imported goods from China that called for trade sanctions¹. Furthermore, Hufbauer and Woollacott (2010) pointed out that President Obama, in his first year in office, approved the relief for domestic producers of tires by imposing

“additional 35 percent ad valorem tariff duty in the first year, 30 percent ad valorem in the second year, and 25 percent ad valorem in the third year”

on imported tires from China. In the quest to resolve the trade tariffs, China got the World Trade Organization (WTO) involved after their consultation with the United States failed. The ruling from the WTO did not change the three-year tire tariffs implementations. In early 2010, China retaliated by

“imposing antidumping tariffs ranging from 50.3 to 105.4 percent and countervailing duties of between 4.0 and 30.3 percent on US and other foreign chicken part exports to China”.

During the 2016 presidential election, trade experts and legal scholars assessed how the trade agendas of both candidates (Donald Trump and Hillary Clinton) would affect different parts of the US economy. For example, extending a macroeconomic model from Moody's Analytics, Noland *et al.* (2016) found that

“if Trump raises tariffs sharply on China, Mexico, and other trading partners, export-dependent US industries that manufacture machinery used to create capital goods in the information technology, aerospace, and engineering sectors would be the most severely affected. But the shock resulting from

¹ China joined WTO in 2001 during the first year of George W. Bush's presidency, and this may explain the reluctance to engage in trade war with China.

Trump's proposed trade sanctions would also damage sectors not engaged directly in trade, such as wholesale and retail distribution, restaurants, and temporary employment agencies, particularly in regions where the most heavily affected goods are produced. Millions of American jobs that appear unconnected to international trade – disproportionately lower-skilled and lower-wage jobs – would be at risk, according to the empirical study².

Given Trump's long held view with respect to United States-China trade deficit relations, and given that Section 232 of the Trade Expansion Act of 1962 allows the President to impose tariffs based on a recommendation from the US Secretary of Commerce if imports into the United States threaten the national security, experts worry about the ramifications. Hufbauer (2016) argued that

“there is ample precedent and scope for a US president to unilaterally raise tariffs that Trump vowed to do as a centerpiece of his trade policy and that efforts to block Trump's actions through the courts, or amend the authorizing statutes in Congress, would be difficult and time-consuming.”

Noland (2016) analyzed what the impact of the trade policies advocated by both Trump and Clinton would have on the United States' foreign policy interests and its global leadership. According to Noland (2016), if both candidates pull out of the Trans Pacific Partnership, which both promised to do, this would weaken US alliances in Asia and embolden its rivals, thus eroding US national security. Noland also cautioned that the abrogation of the North America Free Trade Association (NAFTA), which Trump threatened, would deliver a severe blow to Mexico's economic and political development that could increase, not decrease, the flow of illegal migrants and drugs into the United States.

Many studies such as Bown and Cimino-Isaacs (2017) wondered whether the Trump's administration would use the national security threats as the basis to start trade wars with China and other allies of the United States. As the largest importer, the consequences of the United States' engaging in tariffs trade wars with China and other allies prompted a plethora of studies². Between April 2017 and June 2020, Chad Bown, a trade expert at the Peterson Institute for International Economics, conducted and co-authored several studies, which laid out different aspects of the US-China trade wars. For example, Bown (2018) provided five reasons why

² For more studies that addressed and discussed the issues of United States' use of tariffs as weapon of trade policy, see Bown and Irwin (2019), Bown and Joseph (2017), Bown *et al.* (2018a–i), Bown *et al.* (2019), Bown and Zhang (2018, 2019a–c), (Gonzalez (2019), Hufbauer (2016), Hufbauer and Jung (2018), Lovely and Liang (2018), Lu and Schott (2018), Schott and Lu (2018), Schott (2019).

President Trump's steel and aluminum tariffs are counterproductive. First, Bown (2018) pointed out that steel has been the largest beneficiary of special protection for decades and that

"As of the end of 2017, more than 60 percent of US imports of steel were already covered by previously imposed special protections".

Second, he pointed out that nearly 94 percent of US steel imports from China are already subject to special tariffs. In other words, the new 25 percent tariff would affect the security allies of the United States more than China.

Third, among the top 10 US trading partners (Canada, China, Germany, Mexico, Brazil, Japan, Turkey, Taiwan, Russia, and South Korea), Canada is the top supplier of steel and China is the 10th largest supplier of steel to the US market. Nevertheless, the impact on these trading partners would vary considerably because 94 percent of those imports were already subject to special tariff. Fourth, the US aluminum industry is also a beneficiary covered by the special protection arising under the US antidumping and countervailing duties. Fifth, Canada is the largest source of US aluminum imports followed by China, and the established trade restrictions already covered 96 percent of US imports of aluminum products from China. This means that the 10 percent tariff on aluminum would have less impact on imports from China but significant negative impact on Canada and the other aluminum trading partners of the United States.

Furthermore, the study by Amiti *et al.* (2019) showed graphically the impact of Trump's tariffs on prices and the welfare losses due to higher import tariffs. They concluded that the deadweight welfare costs of Trump's tariffs reached \$1.4 billion per month by December 2018, which they believe is consistent with the findings of a growing number of studies with respect to the 2018 tariffs. Robinson *et al.* (2018) also pointed out that Trump's tariffs on steel and aluminum will cause production in automobile industries to fall by 1.5 percent and further cause between 195,000 and 624,000 US workers to lose their jobs over a one-to-three-year period or possibly longer [see also Cavallo *et al.* (2019), Flaaen *et al.* (2019), Fajgelbaum *et al.* (2019)].

As for those episodes of global infectious disease threats, Bloom and Cadarette (2019) pointed out that since the Spanish flu pandemic of 1918 with 500 million recorded cases and between 30 to 100 million deaths, no other pandemic has approached its magnitude in terms of fatality over such a short period. According to Bloom and Cadarette (2019),

“Humanity’s relative good fortune with respect to infectious disease can be attributed, in part, to the elaborate global health system the world has gradually developed as a bulwark against infectious disease threats, both known and unknown”.

In their study, they discussed prominent infectious disease outbreaks, epidemics, and pandemics of the last century. In doing so, they raised several pertinent issues including the fact that infectious disease threats pose economic and social risks, and that there are a number of complicating and challenging factors when it comes to managing the risk of infectious diseases. According to both authors, several ongoing demographic trends point toward an increased potential for transmission of pathogens. In this regard, they identified several issues such as population growth, especially in developing countries where there is a rapid growth in urbanization; climate change could also be an important factor in driving pathogen transmission; human interactions with animal populations, which can lead to producing pathogen spillovers; civil (economic, political, social) conflicts that can result in new disease outbreaks or the exacerbation of ongoing outbreaks; and globalization, which enables many diseases with epidemic and pandemic potential to be transmitted domestically and across countries worldwide.

In addition, Bloom and Cadarette (2019) indicated the economic and political challenges that can impede the implementation of measures needed to prepare for and respond to infectious disease threats. Among some of the political challenges is the lack of a reliable mechanism for incentivizing international collaboration and coordination in the development of new biomedical countermeasures wherein manufacturers from high-income countries could rely on developing countries to provide biological samples needed for research and development. More importantly, the authors recommended the formation of a multi-disciplinary “Global Technical Council on Infectious Disease Threat” to address emerging global challenges related to infectious diseases and the associated social and economic risks. This recommendation is premised on the assumption that a newly created “Global Technical Council on Infectious Disease Threat” would strengthen the global health systems by improving collaboration and coordination across organizations such as the WHO, national CDCs, and pharmaceutical manufacturers; fill the knowledge gaps with respect to infectious disease tracing/surveillance and treatment; provide the needed funding for research and development, financing models, and the social and economic impacts of potential threats; and make high-level but medical evidence-

based recommendations for managing global risks associated with infectious diseases.

More recently, Bown (2020a, 2020b) listed many critical medical products from China that were subject to Trump's tariffs with dire consequences emanating from the global COVID-19 pandemic. As Bown pointed out, Trump hit even more medical products from China with 15 percent tariffs in September of 2019 and the

“alarming unintended consequence of President Donald Trump's misguided trade war with China has suddenly threatened to cripple the US fight against the COVID-19 pandemic”.

He also pointed out that the request from AdvaMed and the pressure from the shortages of medical products necessary and needed to treat COVID-19 forced Trump to suspend tariffs on some vital medical products on March 10 and 12, 2020.

3. THE CONFLUENCE OF TRADE WARS AND THE GLOBAL COVID-19 PANDEMIC

Given the importance of collaboration, coordination, and information sharing across organizations such as the WHO, national CDCs, and pharmaceutical manufacturers, which Bloom and Cadarette (2019) alluded to in their study, the challenging questions are: Can one expect the United States and China – the two largest economies enmeshed in a tit-for-tat trade war – to collaborate, coordinate, and share pertinent information needed to mitigate the threats posed by any infectious disease such as the COVID-19? Is COVID-19 the unintended consequence of the retaliatory trade wars with China? Could the trade wars during which the global COVID-19 pandemic emerged be construed as strategic or tactical miscalculations by both countries?

To answer these questions, we document major trade battles with related actions, which trade experts at the Peterson Institute for International Economics classified into five categories of trade battles³. However, on a cautionary note, the apparent link between the United States-China trade wars and the global COVID-19 does not imply causation one way or the other.

³ This retaliatory trade wars covered different related battles with actions and counteractions from China and other trading partners drawn into the trade battles by the United States.

3.1 Simultaneous Tariffs Battles

The study by Bown and Joseph (2017) showed that President Trump dug deep into many aspects of the United States trade laws in the attempt to impose tariffs on China, Canada, Mexico, and other European allies. Trump's tariffs battles started with solar panels and washing machines.

Battle 1: Solar Panels and Washing Machines Tariffs

The solar panels and washing machines tariffs came from the two separate requests, which Suniva Solar Panel and SolarWorld Americas filed with the United States International Trade Commission (USITC) under Section 201 of the Trade Act of 1974. In Table 1, we provide a summary of the interactive actions with the dates on which these actions occurred.

TABLE 1 - *Battle 1 and Related Actions*

No.	Actions	Date of Actions
1	USITC Recommended Tariffs and Quotas as Remedies	October 31, 2017
2	Trump Imposed Safeguard Tariffs	January 22, 2018
3	China Investigates US Exports of Sorghum	February 5, 2018
4	China Imposed Preliminary Tariffs on US Sorghum	April 17, 2018
5	South Korea Filed WTO Disputes	May 14, 2018
6	China Ended Tariffs on US Sorghum During Negotiations	May 18, 2018
7	China Filed WTO Dispute Against US Solar Panel Tariffs	August 14, 2018

Battle 2: Steel and Aluminum Tariffs

Three months into his presidency, Trump instructed Wilbur Ross, the Commerce Secretary, to launch two self-initiated investigations (see Table 2) into whether steel and aluminum imports posed a national security threat under Section 232 of the Trade Expansion Act of 1962.

TABLE 2 - *Battle 2 and Related Actions*

No.	Actions Taken	Date of Actions
1	Launched the National Security Investigations	April 20, 2017
2	Results of National Security Investigations	February 16, 2018
3	Announcement of Tariff	March 1, 2018
4	European Union Threatened to Rebalance in Response	March 7, 2018
5	Steel and Aluminum NAFTA Tariff Exemptions	March 8, 2018
6	More Tariff Exemptions	March 22, 2018
7	Tariffs Went Into Effect	March 23, 2018
8	South Korea Received Permanent Exemption on Steel, But Not Quota	March 28, 2018
9	China's Retaliatory Tariff on Aluminum	April 2, 2018
10	US Extended Tariff Exemptions for EU, Canada, and Mexico	April 30, 2018
11	US Ended Tariff Exemptions for European Union, Canada, and Mexico	June 1, 2018
12	European Union Retaliated on Iconic American Goods	June 22, 2018
13	Canada Retaliated	July 1, 2018
14	Trump's administration Filed WTO Challenges	July 16, 2018
15	Subsidies to American Farmers Due to Export Fallout	July 24, 2018
16	Trump's administration Raised Steel Tariff on Turkey	August 10, 2018
17	Turkey Reciprocated	August 14, 2018
18	Steel Tariffs Impacted Poor Countries the Hardest	November 15, 2018
19	Jobs Gained in Steel and the Associated High Costs	December 20, 2018
20	United States Lifted Tariffs on Canada and Mexico	May 17, 2019
21	India Retaliated after Losing Special Trade Status	June 15, 2019
22	Trump's administration Broadened Tariffs	January 24, 2020

Battle 3: Unfair Trade Practices for Technology and Intellectual Property Theft Tariffs

According to Bown (2017a), the Trump's administration looked into many outdated trade laws in its trade wars with China. As Bown (2017b) indicated, Trump's memorandum of August 14, 2017 instructed and compelled the United States Trade Representative (USTR), Robert Lighthizer, to launch a self-initiated investigation into China's practices of forced transfer of technology and intellectual property theft under Section 301 of the Trade Act of 1974.

TABLE 3 - *Battle 3 and Related Actions*

No.	Actions Taken	Date of Actions
1	United States Trade Representative Launched Investigation of China	August 18, 2017
2	Results Found Unfair Trade Practices by China	March 22, 2018
3	United States Threatened To Impose Tariffs on 1,333 China Products	April 3, 2018
4	China Threatened Retaliation on Auto, Aircraft, and Agriculture	April 4, 2018
5	United States Considered Additional Tariffs on \$100 Billion Imports	April 5, 2018
6	White House Put Tariffs on Brief Hold	May 29, 2018
7	United States Revised \$50 Billion Tariff List of April 3, 2018	June 15, 2018
8	China Revised Retaliation List	June 15, 2018
9	Trump Asked for More Tariffs	June 18, 2018
10	United States and China Imposed First Phase of June 15 Tariff Lists	July 6, 2018
11	USTR Announced \$200 Billion Tariffs on China	July 10, 2018
12	Trump Threatened Tariffs on All Imports from China	July 20, 2018
13	Subsidies for American Farmers After Export Fallout	July 24, 2018
14	Trump Wanted 25 Percent Tariff, Not 10 Percent	August 1, 2018
15	China Threatened \$60 Billion Tariffs	August 3, 2018
16	USTR Finalized Second Tranche of Tariffs	August 7, 2018
17	China Revised Its \$50 Billion Tariff List, Removed Crude Oil	August 8, 2018
18	United States Passed Law on Trade and National Security	August 13, 2018

TABLE 3 - *continued*

No.	Actions Taken	Date of Actions
19	US and China Imposed Second Phase of \$50 Billion Tariffs	August 23, 2018
20	Trump Finalized \$200 Billion Tariff List	September 17, 2018
21	China Finalized Tariffs on \$60 Billion of US Goods	September 18, 2018
22	Next Phase of Tariffs Went Into Effect	September 24, 2018
23	United States-China Tariff Truce	December 1, 2018
24	Almost 15 percent of US Imports Are Now Protected	February 15, 2019
25	Tariff Increase Delayed	February 24, 2019
26	Concerns Emerged Over Possible Deal	April, 2019
27	Trump Renewed Tariff Threats	May 5, 2019
28	United States Raised Tariff Rate on Previous List	May 10, 2019
29	China Planned to Hike Tariff Rate in Retaliation	May 13, 2019
30	China Raised Retaliatory Tariffs	June 1, 2019
31	US Announced Tariffs on Almost All Remaining Imports from China	August 1, 2019
32	Trump Planned Two Major Rollouts of Fall 2019 Tariffs	August 13, 2019
33	China Retaliated and Trump Announced More Tariffs	August 23, 2019
34	China Removed a Few Tariffs, Trump Moved Dates	September 11, 2019
35	Trump Canceled October Tariffs Due to “Phase One” of Deal with China	October 11, 2019
36	Trump Called Off December Tariffs in Anticipation of Deal	December 13, 2019
37	Leaders Signed Phase One Deal	January 15, 2020
38	Phase One Deal Went Into Effect	February 14, 2020
39	Quiet and Temporary Suspension of Tariffs Due to COVID-19	March 10, 2020
40	Quiet and Temporary Suspension of Tariffs Due to COVID-19	March 12, 2020

Source: These battles and the related actions are compiled by the authors from Bown and Kolb (2020). For detailed explanations of each action, see *Trump’s Trade War Timeline: An Up-to-Date Guide*, <https://www.piie.com/blogs/trade-investment-policy-watch/trump-trade-war-china-date-guide>.

From the information provided in Tables 1-3, one can infer that these tariffs trade battles started within the first 14 months of the Trump's administration through the requests from private industries affected by free trade competition and the Trump's memorandum, which instructed and compelled some cabinet members to embark on self-initiated simultaneous investigations⁴. More importantly, one can conclude that trade battle 3 and the related actions reported in Table 3 reveal the intensity of the trade wars between both countries from August 18, 2017 and March 12, 2020. The intensity of the trade wars may explain why collaboration, coordination, and information sharing about a looming COVID-19 pandemic became a herculean task for both countries because the diplomatic trade relationship was already sour and fractured. There were other battles and actions that addressed the issue of imported automobiles and parts, which the Commerce Department also initiated premised on national security threat from Mexico and other allies of the United States. Under the auspices of threat to national security, the Trump's administration threatened to impose tariffs on Mexico to deter illegal immigration.

3.2 Episodes of Global Infectious Diseases in the First Two Decades of the 21st Century

Next, we document six relevant episodes of global infectious diseases in the first two decades of the 21st century in order to comprehend the confluence of the United States-China trade wars and the COVID-19 pandemic. This is particularly important because the main battles and actions documented in Tables 1-3 above depict real world retaliatory trade tariffs between the two largest exporting (China) and importing (United States) countries in the world.

The trends in or episodes of global infectious disease threats over the last two decades with the number of recorded cases and deaths are reported in Table 4. A cursory examination of Table 4 reveals two very important facts. First, the H1N1 and Dengue were both worldwide in terms of geographical location with the number of recorded cases and deaths in the millions of people. Second, the SARS in 2002-2003 and COVID-19 in 2020 also showed the same geographical location. So far, the data showed COVID-19 to be more than 6,000 times and almost 1,600 times more deadly than SARS with respect to the number of recorded cases and deaths, respectively.

⁴ Section 3.1 is a summary deeply rooted in those studies by the trade experts at the Peterson Institute for International Economics.

TABLE 4 - *Global Infectious Disease Threats, 2000-2020*

Year(s)	Pathogen	Geographical Location	Recorded Cases	Fatality: Deaths
2002-2003	SARS	China	8,098	774
2009	H1N1	Worldwide	60.8 million†	151,700-575,400†
2014-2016	Ebola	West Africa	28,600	11,325
2015-2020	Zika	The Americas	37,414*	0
2016	Dengue	Worldwide	100 million	38,000
2017	Plague	Madagascar	2,417	209
2020	COVID-19	China	> 48.2 million**	> 1.2 million**

Source: Compiled by the authors from Bloom and Cadarette (2019), *Infectious Disease Threats in the Twenty-First Century: Strengthening the Global Response*. The 37414* computed from the data obtained from the CDC for 2015-2020 and †, and ** obtained from the World Health Organization as of November 6, 2020

https://covid19.who.int/?gclid=EAiaIQobChMI6rvWhPjt6wIVgeazCh3CqwIsEAAAYASAAEgLVffD_BwE.

Although it is impossible to infer correlation and/or causation from the information provided in Tables 1-4, the fact remains that the United States and China have been enmeshed in trade wars since the later part of 2017 when trade experts and legal scholars expected President Trump to use tariffs as the weapon of trade policy. The adversarial trade relationship between the two countries played out with ceaseless information distortions on different social media platforms and this continued into the third quarter of 2019 when there was little or no time for any meaningful collaboration, coordination, and information sharing about the looming COVID-19 pandemic. One can concur with Bown (2020a, 2020b) that Trump's trade policy was instrumental in hampering the United States' fight against COVID-19 pandemic, and that the frightening shortages of vital medical equipment, which endangered the lives of Americans and others.

3.3 Theoretical Analysis of Information Sharing and Global Infectious Diseases

This section uses information economics to shed some light on the importance of collaboration, coordination, and information sharing in combating the spread of global infectious diseases⁵. This is particularly important because as Table 4 shows, two global infectious diseases (SARS and COVID-19), which originated from China have different outcomes in terms of recorded cases and fatalities. To highlight some pertinent factors/variables with respect to global infectious diseases (*GIDs*) over the past two decades, we express these in functional forms as:

$$GIDs = f[WHO(CC), CC(IS), HCS(IS)] \quad (1)$$

and

$$COVID-19 = g[WHO(CC), CC(IS), HCS(IS), IS(USCTW)] \quad (2)$$

where *WHO(CC)* captures how the World Health Organization relies on genuine collaboration and coordination (*CC*) within and between advanced countries and less developed countries to control *GIDs*, *IS* measures information sharing, which could be symmetric (*SIS*) or asymmetric (*AIS*), and *HCS* is the health care systems in countries worldwide. In addition, *IS(USCTW)* captures the United States-China trade wars, which hampered information sharing before and after the outbreak of COVID-19 pandemic. The difference between equations (1) and (2) is *IS(USCTW)* because it provides the answer to the questions we posed earlier in the introduction section of this paper.

The consensus among health professionals is that health care systems in advanced countries are more organized and effective relative to those in less developed countries; therefore, we expect that there would be different outcomes when it comes to controlling global infectious diseases. To highlight these outcomes for both advanced countries and less developing countries in this era of COVID-19 pandemic, we take the partial derivatives of equation (1) to get:

⁵ For detailed discussions on the economics of asymmetric information problems, adverse selection, moral hazard, and principal-agent problems, see Hillier (1997).

$$\frac{\partial GIDs}{\partial WHO} \frac{\partial GIDs}{\partial CC} < 0 \quad \text{or} \quad \frac{\partial GIDs}{\partial WHO} \frac{\partial GIDs}{\partial CC} > 0 \quad (3),$$

$$\frac{\partial GIDs}{\partial CC} \frac{\partial CC}{\partial SIS} < 0 \quad \text{or} \quad \frac{\partial GIDs}{\partial CC} \frac{\partial CC}{\partial AIS} > 0 \quad (4),$$

and

$$\frac{\partial GIDs}{\partial HCS} \frac{\partial HCS}{\partial SIS} < 0 \quad \text{or} \quad \frac{\partial GIDs}{\partial HCS} \frac{\partial HCS}{\partial AIS} > 0 \quad (5).$$

Differentiating equation (2) with respect to $WHO(CC)$, $CC(IS)$, $HCS(IS)$ will yield the same outcomes given by equations (3)-(5); therefore, we focus solely on $IS(USCTW)$ because this is the factor that we consider to be the main hindrance to information sharing between both countries thus this variable sets COVID-19 apart or different from the other GIDs. Its differentiation yields:

$$\frac{\partial COVID-19}{\partial AIS} \frac{\partial AIS}{\partial USCTW} > 0 \quad (6).$$

Interpretatively, equation (3) states that the WHO can be instrumental in effectively controlling the rapid spread of $GIDs$ when advanced and less developed countries engage in transparent collaboration and coordination; and that the absence of transparent collaboration and coordination between countries nullifies the importance of WHO, thus $GIDs$ could spread rapidly as manifested by the current COVID-19 pandemic. Equation (4) shows that collaboration and coordination between countries nurtured by symmetric information sharing (SIS) are essential for countries worldwide to be successful and effective in controlling the rapid spread of $GIDs$ and that asymmetric information sharing (AIS) could explain the rapid spread and upsurge in $GIDs$.

Furthermore, equation (5) shows that the ability of the health care systems in advanced countries and less developed countries to control $GIDs$ depends on SIS and AIS . Simply put, if health care systems or institutions and the governments at all levels in countries worldwide are guided by transparent SIS , they can easily control $GIDs$ until reliable vaccines are developed for that specific pandemic. When these countries engage in AIS when confronted with $GIDs$, their ability to control the pandemic is curtailed due to information distortions, which would

ultimately cause confusion and mistrust of their health care systems or institutions. More importantly, equation (6) states that the United States-China trade wars contributed to asymmetric information between both countries and that this was instrumental in the United States' inability to plan and effectively control COVID-19 pandemic. In addition, the endless disinformation from the federal, state, and local governments overwhelmed the United States' health care systems and this eroded public trust in its health care institutions such as the CDC, Health and Human Services (HHS), National Institute of Health (NIH), and the Food and Drug Administration (FDA). The endless disinformation further magnified the United States' inability to control the upsurge in COVID-19 pandemic. Political experts and health care professionals attribute the spread of disinformation, a hazardous component of asymmetric information, to the severity of political divisiveness in the United States.

4. THE IMPACTS ON THE GLOBAL ECONOMY

In this section, we present the economic framework for analyzing the effects and/or the consequences of the United States-China trade wars and the global COVID-19 pandemic.

4.1 *The Effects of United States-China Trade Wars*

The United States is the largest importer while China is the largest exporter in the world; therefore, in order to analyze the effects of trade wars on both countries, it is useful to begin with a simple net export function. Our central focus here is on the trade wars between both countries.

For simplicity, we employ a generalized net export function of the form:

$$NX = NX(P_R, Y_R, RER, r-r^f, TT) \quad (7)$$

where NX is net exports, P_R and Y_R represent relative prices and relative incomes, respectively, RER is the real exchange rate, $r-r^f$ is interest rate differential instrumental in perfect capital mobility, and TT stands for the trade tariffs. The impact of TT on NX varies across countries, which means it can be positive or negative. That is,

$$\frac{\partial NX}{\partial TT} > 0 \text{ or } \frac{\partial NX}{\partial TT} < 0 \quad (8).$$

According to Amity *et al.* (2019), Trump's tariffs led to \$1.4 billion per month deadweight welfare costs in the United States; therefore, to verify the positive or negative impact of the trade wars on net exports for the United States and China, we focus mainly on trade in goods for both countries over the first 36 months of the Trump and Obama administrations because both Trump and Obama engaged in trade wars with China in the past two decades. In the lower part of Figure 1, we observe slight improvements in the United States trade deficits in goods with China in the second month of each administration. We observe no difference in the United States trade deficits when Trump and Obama entered into the 35th and 36th months of their administration.

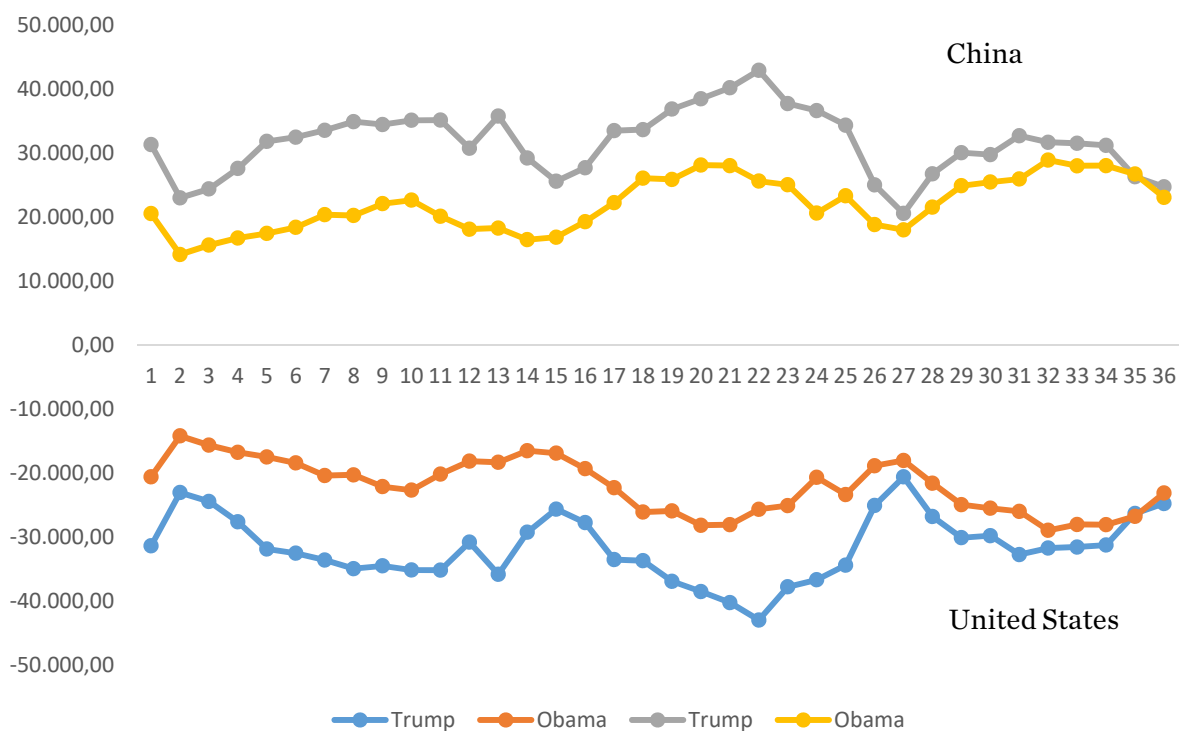
When President Trump first became specific about his plans⁶ for imposing new tariffs on about \$50 billion of Chinese goods in March 2018, the primary rationale was that the policy would reduce U.S. trade deficits. However, as seen in the upper part of Figure 1, China's trade surpluses in goods with the United States have been much larger during the first three years of the Trump's administration compared to Obama's administration despite the series of trade battles and actions taken by the Trump's administration (Tables 1-3). This being so, the pertinent question to ask is: If China still maintained a larger trade surplus in the first three years of Trump's relentless trade wars, could one construe the tariffs trade wars as strategic miscalculations? The answer to this question is not farfetched since trade balances are largely determined by many underlying macroeconomic factors, which have very little to do with how clever governments are at restricting imports or enacting subsidies, rules and policies favoring their own producers. Trump believed that the only way the United States can solve its problem of trade deficits is by imposing tariffs on its trading partners. On March 2, 2018, Trump tweeted that

"When a country (USA) is losing many billions of dollars on trade with virtually every country it does business with, trade wars are good, and easy to win. Example, when we are down \$100 billion with certain country and they get cute, don't trade anymore-we win big. It's easy!"

⁶ Before signing a memorandum announcing the trade actions, President Trump lamented the US' multi-hundred-billion-dollar trade deficit with China and said the action would be "the first of many". He insisted that he views China as a "friend" and said he has "tremendous respect" for Chinese President Xi Jinping, ... "But we have a trade deficit ... there are many different ways of looking at it, but no matter which way you look at it, it is the largest trade deficit of any country in the history of the world". ("Trump hits China with tariffs, heightening concerns of global trade war" Jeremy Diamond 2017, CNN Updated 6:10 AM ET, Friday March 23, 2018).

From our calculations based on the data for the first 36 months of each administration, the average monthly trade deficit was -\$31,647.99 billion under Trump’s administration compared to -\$22,032.49 billion under the Obama’s administration. Simply put, the Trump’s administration had higher monthly trade deficits with China than his predecessor, which is statistically significant.

FIGURE 1 - *United States Net Exports in Goods with China in the First 36 Months of the Trump and Obama Administrations*



4.3 The Effects of COVID-19 on the Global Economy

While it may be difficult to categorically declare the trade battles and actions articulated in section 3 above as strategic miscalculations, one glaring fact was that the COVID-19 pandemic emerged in the midst of the ongoing trade wars. This pandemic resulted in unprecedented global shutdowns and lockdowns at different levels and at varying degrees. Essentially, this is a reminder of the importance of health as one of the major determinants of economic growth and

development⁷ in all countries worldwide. To formalize the relationship between health and economic growth or development, we use a standard Cobb-Douglas production function, which takes the form:

$$Y = AF(K, L=HL, N, E, GLD) \quad (9),$$

where Y is total output or income, A is a measure of technology or total factor productivity, K is capital, L represents the conventional labor force; therefore, HL stands for the workers' healthy or healthy labor force required for optimum production in all economies worldwide, N represents natural resources, E is entrepreneurial ability, and GLD represents the global lockdown.

From equation (9), we focus mainly on two explanatory variables: (a) the health of workers (HL) because they are susceptible to infectious disease threats, either domestically or across countries due to the ease of mobility, and (b) the unprecedented global lockdown, which affected all economies worldwide at varying degrees. According to growth experts, health depends on income. Health and income are endogenous variables. Since the focus is on the healthy labor force or workers that are susceptible to infectious disease threats, we rewrite equation (9) as:

$$Y = F[HL(COVID-19), GLD(COVID-19)] \quad (10).$$

To see the relationship between the two endogenous variables: income or output (Y) and healthy workers or the labor force (HL), we initially assume an environment absent of *COVID-19* pandemic and *GLD*. Based on this assumption, we rewrite equation (10) in logarithm form and take its derivative with respect to time. That is:

$$y = y(hl) \quad (11)$$

and

$$hl = hl(y) \quad (12).$$

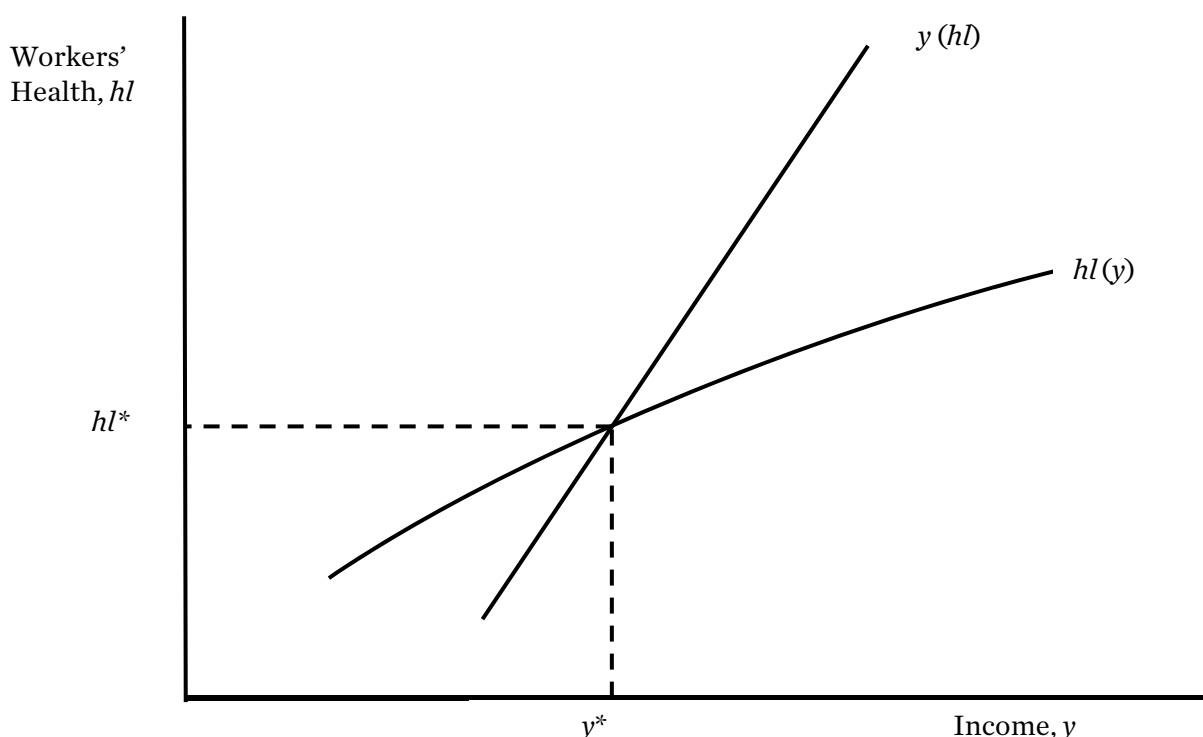
Equation (11) shows the impact of healthy workers on the level of income or output growth. This means we should expect very healthy workers to be more productive be it in advanced countries or less developed countries although at varying degrees. In other words, we expect the $y = y(hl)$

⁷ See Strauss and Thomas (1998) and Weil (2013) for more detailed discussions on the relationship between health, nutrition, and economic development.

curve to be upward sloping with no sign of diminishing returns. Equation (12) shows the impact of income on healthy workers, which means higher incomes improve the health of workers to the highest level possible before hitting the point of diminishing returns. Simply put, one should expect $hl = hl(y)$ curve to be upward sloping before it flattens out⁸, but more importantly, both equations show the feedback loop between hl and y : better health to higher incomes to better health.

In Figure 2, the intersection of the two curves given by equations (11) and (12) shows the equilibrium levels of income and healthy labor force (workers' health), which could change due to exogenous factors such as COVID-19 pandemic and GLD that hit advanced countries and less developed/developing countries one after the other. Since the COVID-19 pandemic and the global lockdowns (GLD) affected advanced countries (ACs) and less developed countries (LDCs) at varying degrees, we expect the impacts of these exogenous variables to be different across countries. Put differently, we expect COVID-19 and GLD to shift $y(hl)$ and $hl(y)$.

FIGURE 2 - *The Interaction between Workers' Health and Income*



⁸ This part is deeply rooted in Weil's (2013) modeling of the interaction between health and income because health is another form of human capital required for sustainable economic growth and development.

To put the impacts of COVID-19 and GLD on workers' health and income or GDP growth in the proper perspective across advanced countries and less developed countries, we relax the simplifying assumption made earlier about equation (10) in order to show the negative effects of COVID-19 and GLD on workers' health and income or GDP in all countries worldwide. That is:

$$\frac{\partial Y}{\partial HL} \frac{\partial HL}{\partial COVID-19} < 0 \quad (13)$$

$$\frac{\partial Y}{\partial GLD} \frac{\partial GLD}{\partial COVID-19} < 0 \quad (14).$$

Equations (13) and (14) show that COVID-19 and GLD have negative effects on workers' health and income or GDP. Panels I and II in Figure 3 provide the graphical illustrations to show that even though advanced countries have better health systems than the less developed countries in Africa, Asia, Latin American and the Caribbean, COVID-19 pandemic and GLD affected all countries negatively at varying degrees. In both panels, *COVID-19* shifted the $y(hl)$ curve while *GLD* shifted the $hl(y)$ curve with negative impacts on both incomes (y_1 falls to y_2) and workers' health (hl_1 falls to hl_2) in all countries worldwide.

When output falls from y_1 to y_2 in LDCs and ACs (panels I and II in Figure 3), it is expected that unemployment rates would rise since unemployment is countercyclical with output or GDP. Indeed, several economists and policy analysts point out that workers in the United States, China, and trading partners caught in the retaliatory trade wars suffered the adverse effects, and that the emergence of COVID-19 pandemic, which led to an unprecedented global shutdowns and/or lockdowns of all sectors contributed to further worsening the labor market outcomes as the unemployment rates increased in several countries and regions. To examine the effects on the labor markets, we compile and compare the monthly data on unemployment rates in December 2019 – prior to the declaration of COVID-19 as pandemic – to the unemployment rates in April 2020 when the global economy was already embroiled with COVID-19 pandemic.

FIGURE 3 - *The Impacts of COVID-19 and Global Lockdown (GLD) in Advanced Countries (ACs) and Less Developed Countries (LDCs)*

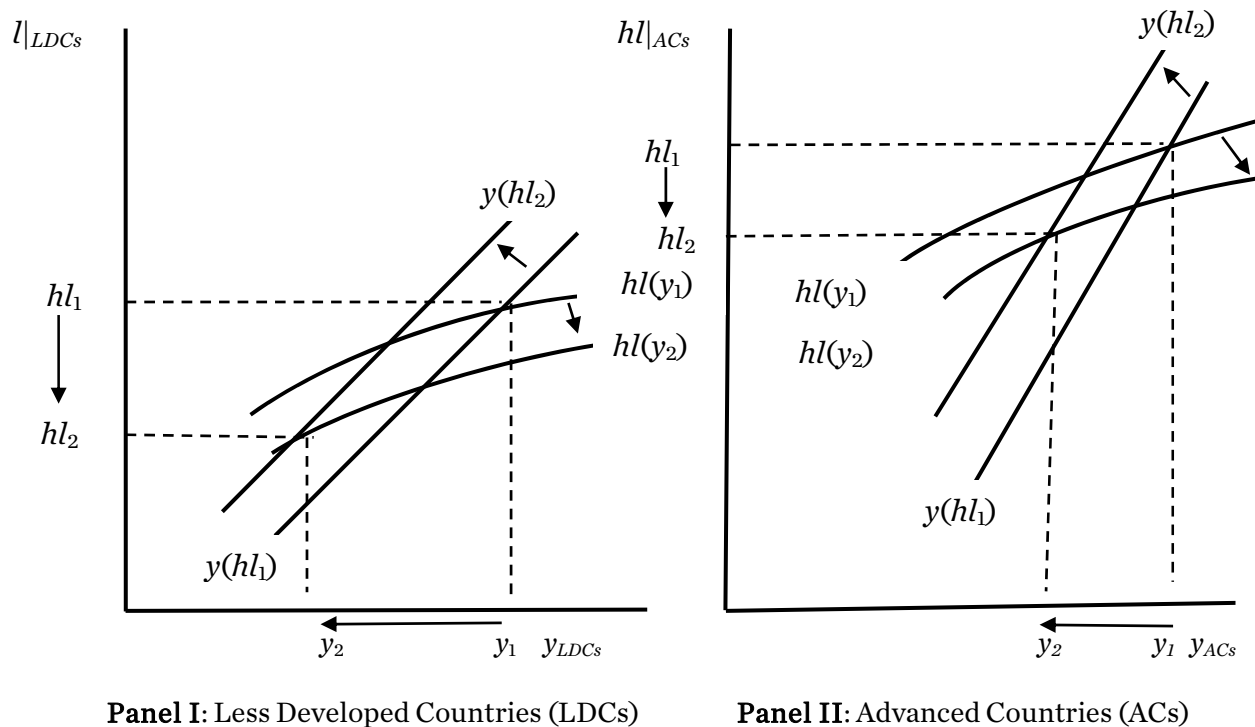


Table 5 shows that the European Area and European Union, which consist of 19 and 28 countries, respectively, experienced no significant change in their unemployment rates due to the trade wars and the global COVID-19 pandemic. This also holds true for China. Even though the unemployment rate in China only increased slightly from 5.2 percent in December 2019 to 6.0 percent in April 2020, over 460,000 businesses declared bankruptcy according to China's National Bureau of Statistics. In contrast, Canada and the United States experienced remarkable increase in their unemployment rates; and since both are members of the G-7 and OECD countries, this can also explain why the unemployment rate more than doubled for the G-7 countries and close to being double for the OECD countries. Similarly, the Asian unemployment rates increased almost in the same magnitude as that of the United States. In essence, one can infer that unemployment rates increased significantly in Asia and among the three major economies in North America (Canada, Mexico, and the United States) due to the trade wars and the shutdowns and lockdowns from the global COVID-19 pandemic.

TABLE 5 - *Unemployment Rates in Countries or Regions of the World*

Countries or Regions	Unemployment Rates in December 2019	Unemployment Rates in April 2020
Asian	2.40	14.30
China	5.20	6.00
European Area (19)	7.30	7.30
European Union (28)	6.50	6.60
G-7	4.129	9.107
OECD (37)	5.197	8.445
Canada	5.60	13.00
Mexico	3.21	4.70
United States	3.50	14.70

Source: Data on monthly unemployment rates compiled from Statista.com, Data.OECD.org, and <https://fred.stlouisfed.org/series/LNU04032183>.

5. CONCLUDING REMARKS AND POLICY IMPLICATIONS

There is a consensus among economists and international trade experts that trade wars are counterproductive on several grounds. The central question is: Is the United States better off by engaging in retaliatory trade tariffs with China? As shown in Figure 1, the United States trade deficits position in goods with China were less severe in the first three years under the Obama's administration in comparison to the Trump's administration despite Trump's relentless trade battles and actions since launching the solar panels and washing machines tariffs. More importantly, one can surmise that the trade wars between both countries undermined global cooperation, coordination, and information sharing with WHO, national CDCs, and other public health care systems when infectious disease threats loom.

The confluence of the United States-China trade wars and the global COVID-19 pandemic necessitates a reexamination of the relationships between workers' health and income at the global stage. In other words, we can no longer take for granted the relationships between workers' health and income or output in developed and less developed countries in this era of globalization where infectious diseases from one country can easily be transmitted within a short period due to the ease in international mobility. The unprecedented global shutdowns or

lockdowns, which caught the attention of experts in the medical and other related professions, underscore the significance of global cooperation, coordination, and transparent information sharing in order to fight against infectious disease threats irrespective of the geographical locations or origins. Arguably, the information distortions, which the United States and China perpetrated through various social media outlets contributed to the inability to curtail or mitigate the severity of COVID-19 pandemic and global lockdowns, which affected countries at varying degrees worldwide.

More importantly, the world is in a pandemic crisis, which means the world may not have an elaborate global health system as a bulwark against known and unknown infectious disease threats. Given the ongoing division with respect to the role of the World Health Organization, governments worldwide may want to consider Bloom and Cadarette's (2019) call for

“the need for a (possibly self-standing) multi-disciplinary Global Technical Council on Infectious Disease Threats to address emerging global challenges with regard to infectious and associated social and economic risks.”

This call is particularly important now that the Trump's administration notified Congress and the United Nations that the United States would withdraw, effective July 2021, from the World Health Organization. Essentially, this move to withdraw the United States from WHO reinforces the inability to achieve collaboration, coordination, and information sharing as countries continue to struggle to develop effective vaccines against COVID-19 pandemic.

When countries embroiled in trade wars engage in ceaseless information distortions through different social media platforms, it hampers collaboration, coordination, and the relevant information sharing among the CDCs, WHO, and public health care systems worldwide. Additionally, when simple symmetric information necessary for cooperation and coordination turns to asymmetric information due to trade wars aimed at promoting national political interests, the global economy is exposed to adverse external shocks such as COVID-19 pandemic and future infectious disease threats. Above all, when countries engage in trade wars, the consumers and producers or farmers are the losers; and the subsidies to the affected workers and producers or farmers are merely Band-Aid solutions.

There are policy implications that must be articulated in order to guard against the adverse effects of trade wars and external shocks that may emerge in the process. The United States-China trade wars show that this is not the most effective way to resolve the issue of trade deficits between two trading partners because of the inherent spillover effects. In this instance, the United States launched trade wars, which in confluence with COVID-19 pandemic, worsened its unemployment rate, the number of workers who filed for unemployment, and the deaths from the pandemic. This global pandemic may have been curtailed, just as Ebola was curtailed at its geographical local, had it not being for the trade wars. Trade disputes between countries can easily be resolved through the World Trade Organization if countries come to the negotiating table with true openness and transparency. Furthermore, trade wars can undermine global alliances and the effectiveness of international organizations such as the World Health Organization.

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