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COVID-19 pandemic and world trade: Some analytical notes

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Abstract

The globalization of COVID-19 pandemic is en route to produce a chain of economic impacts worldwide through distortions in global trade and supply chain. The globalization of production and trade shocks in relation to China generate substantial threat to world trade. The aim of this paper is to provide a preliminary and broad-based understanding of likely trade implications of the pandemic. Beginning with an assessment on likely implications for trade between China and the rest of the world, the paper uses a standard trade analysis framework to explain the implications for world trade. The paper then presents a theoretical mapping that shows likely progression and span of trade implications and reviews emerging evidence to identify if real-life outcomes follow the map. The paper concludes that the pandemic is likely to not only introduce new patterns of world trade but also affect trade relations and globalization, making some economies winners and some losers. Given the scarcity of scholarly work on COVID-19's trade implications, the paper contributes by offering a novel broad-based understanding, which could serve as a basis for advanced analysis. Assessments of the paper could help policy-makers in preparing for a new world order of international trade.

Keywords: COVID-19, coronavirus, coronanomics, globalization, trade

JEL codes: F10, F13, F02, F42

1. Introduction

Since the first case reported in December 2019 in Wuhan, the seventh largest city of China, the pandemic of the novel coronavirus (SARS-CoV-2) disease - named as COVID-19 is ravaging healthcare systems and economies across the world. The outbreak apparently

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induces a ‘de-globalization’ process by forcing countries to lock-down borders, shutting down businesses and production, and preventing normal flows of goods, capital, and humans, at least temporarily. The devastation across economies continues till now, and it is set to produce massive and far-reaching economic cost globally, mainly through disruptions in world supply chain and trade (Baldwin and di Mauro (eds.), 2020). The pandemic forces closure of factories and businesses worldwide and restricts movement of human and goods, which threatens global trade of goods and services (Baldwin and di Mauro (eds.), 2020; Maliszewska et al. 2020). While trade is the backbone of today’s globalization, it is also considered responsible for the spread of contagious and infectious diseases through shipping functions, shipped goods, and associated human involvement (e.g., live animals, meat, material goods) (Gubler and Rosen, 1976; Mack, Choffnes and Relman, 2011; Rezza, 2008). Massive globalization and ease of trade have multiplied the potential for infectious contacts (Fidler, 1996; Frenk, Gómez-Dantés and Knaul 2011). Kimball (2006) finds that the pressure and incentive for global trade has potential for threatening bio-security of local and global population as evidenced by the H1N1 virus. Global trade is also held responsible for HIV/AIDS, tuberculosis, cholera, and malaria spreading to new regions (Wilson, 1995). Fidler (1996) considers international travel and trade together with inadequate public health capabilities to pose a greater risk of disease transmission across borders. Given this understanding, trade activities worldwide come to halt due to the COVID-19 pandemic.

Research so far portray early indications and estimates of the likely economic implications of COVID-19 outbreak, mostly addressing isolated dimensions, for example, general macro economy including production, supply chain, and policy response (di Mauro, 2020; Fornaro and Wolf, 2020; Baldwin and Tomiura, 2020; Mann, 2020; Cochrane, 2020; Barua, 2020), borders and oil market (Arezki and Nguyen, 2020; Meninno and Wolff, 2020), global GDP growth (Boone, Haugh, Pain, and Salins, 2020; McKibbin and Fernando, 2020; Wren-Lewis, 2020; and Fernandes, 2020), and financial stability and risk (Beck, 2020; Cecchetti and Schoenholtz, 2020). While trade implications are enormous, scholarly research on this issue remains limited yet emerging. However, there is a clear global consensus that the primary source of distortions in world trade is the disturbances caused to Chinese industries by COVID-19, since China is the world’s manufacturing hub. Therefore, it is pivotal to study the Chinese context while assessing the likely trade implications at the world level.

The purpose of this paper is to explore the likely trade implications of the COVID-19 pandemic that China and the rest of the world (ROW) will have to embrace in the coming days. The paper does not aim to produce any quantitative estimate, rather provides

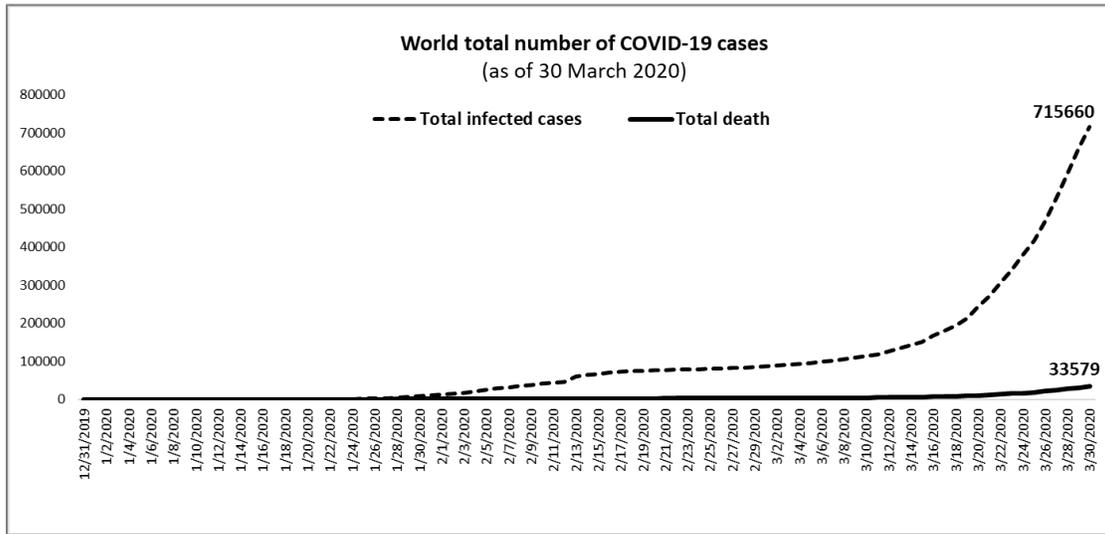
an indicative overview on the observed and future likely implications. In doing so, the paper first assesses the likely short-term and long-term effects on trade between China and (ROW). The paper then presents a standard economic analysis illustrating how the pandemic is likely to influence the world market and the exporting and importing nations, with a disaggregated view of the international market for essential and non-essential goods. Finally, the paper presents a theoretical mapping showing how possible short-term and long-term trade implications are likely to emerge and progress and also examines available evidence to identify if the real-life impacts progress in line with the mapping. Given the scarcity of research, the paper offers some key contributions by: (i) outlining possible trade consequences for trade relations between China and the ROW; (ii) showing how a standard economic analysis can be used to explain the implications; and (iii) building analysis on a unique mapping covering both short and long term implications.

The paper is structured in five sections: section 2 provides a brief of the outbreak; section 3 presents a standard trade analysis framework; section 4 presents the impact mapping; section 5 highlights some policy aspects; and a conclusion in the final section.

2. The outbreak of COVID-19

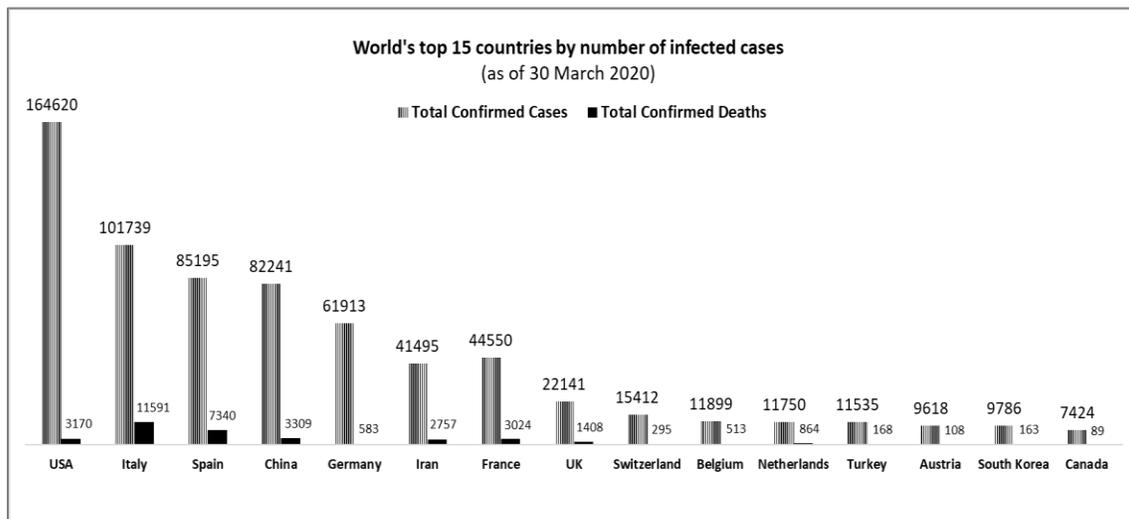
The COVID-19 pandemic has become truly globalized, unfortunately. The numbers of infected cases and death globally are increasing so rapidly that the epicenter of the pandemic is moving fast. Figures 1.1(a) shows the total number of confirmed cases and deaths at the world level. As of 30 March 2020, the number of infected cases globally stand at 715660 with 33579 deaths. While the virus has already arrived across 200 countries and territories, the US, China, and the Europe are the biggest victims. Figure 1.1(b) reports the top 15 countries in terms of infected cases. Initially, China was the epicenter, but that moved very fast to the Europe making Italy the next hotspot. At the latest, the US tops the list with 164620 infected and 3170 death cases, making the country the epicenter.

Figure 1(a): World's total number of infection and death by COVID-19



Source: author, based on data from European Centre for Disease Prevention and Control as of 30 March, 2020

Figure 1(b): Country-wise total infection and death by COVID-19



Source: author, based on data from European Centre for Disease Prevention and Control as of 30 March, 2020

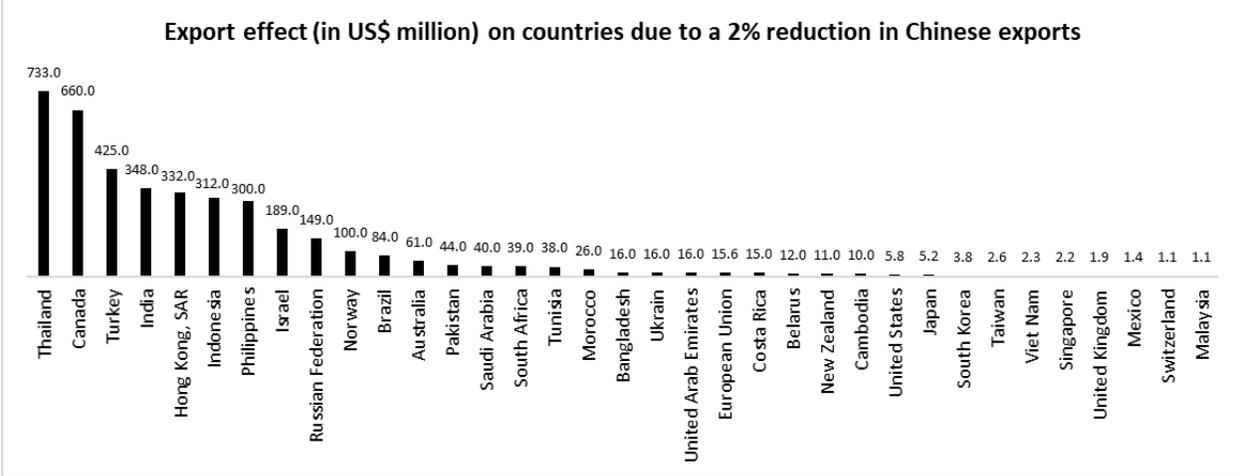
3.0 China sneezes and the rest of the world catches cold

According to WTO (2020a) estimates, world merchandise trade in 2020 is set to plummet by 13% (optimistic case) to 32% (worst case) due to the COVID-19 pandemic, a magnitude much larger than the Global Financial Crisis (2007-08). Latest data support the estimate; the WTO's Goods Trade Barometer stands at 95 in December 2019 (benchmark 100), lower than the previous reading of 96.6 in November, signaling likely weaker trade

volume growth in the early 2020 (WTO, 2020a). China, being the original epicenter of the outbreak and the world’s manufacturing hub, remains responsible for most of the shocks.

During the last two decades China has become crucial to the global economy, as the country occupies 60% of world supply and demand (GDP), 65% of world manufacturing, and 41% of world manufacturing exports (Baldwin & di Mauro, 2020). As of today, about 20 percent of global trade in manufacturing intermediate products originates in China (up from 4 percent in 2002) (UNCTAD, 2020a). The disruption in China’s supply is deemed to substantially affect producers in the ROW, as measures countries put in place to contain COVID-19 (i.e., restrictions to economic activities and movement of people) hinders the supply of critical parts from Chinese producers, and therefore affecting their own output (UNCTAD, 2020a). Figure 2 shows the likely effects of Chinese supply disruptions around the world across 13 industries of intermediate goods including machinery, automotive, and chemicals, precision instruments, and communication equipment. The figure shows that a 2% reduction in Chinese exports will have overwhelming exports effect totaling about US\$ 4 billion across selected 34 economies.

Figure 2: Global value chain effects of China’s slowdown



Source: adapted from UNCTAD (2020a)

Emerging reports suggest that world goods and services trade are slowing down due to the pandemic’s effect, mainly because of disturbed Chine-dependent global supply chain. In January and February 2020, Chinese exports declined by 17.2% and imports fell by 4%, year on year (Bloomberg, 2020a). China experiences a significant decline in shipments of almost all categories of goods including electrical equipment, machinery, furniture, lighting, plastic items, vehicles, knit, clothing, accessories, optical, technical, medical appliances and

organic chemicals. Not only China to the ROW, the reverse trade flows are also significantly disturbed. For example, the US and New Zealand face a lower demand for exports to China (Piven, 2020, February 27; Wei, Wang and Verbraken, 2020, February 17).

Table 1: Some possible sources and timeline of COVID-19 effects on trade between China and the rest of the world

Sources	Likely timeline of persistence	
	<i>Short-term</i>	<i>Long-term</i>
Bans or more stringent sanitary, phytosanitary, and technical barriers to Chinese exports to major markets such as Australia.	Immediate, mostly temporary compliance may be imposed	Some measures may be long-term for over two-three years until bio-safety is guaranteed
Reduced entry/allowance and stringent bio-safety and health compliance requirement of Chinese flag carrier ships, planes, and vehicles by countries to air, sea, and land ports.	Immediate, mostly temporary compliance may be imposed	Some measures may be long-term for over two-three years until bio-safety is guaranteed
Reduced entry/allowance of Chinese nationals to foreign countries in different visa schemes such as tourist, student, migration, and business visas; and similar conditions imposed on foreign travelers coming to China	Immediate, temporary measures due to border lock-downs and health concerns	Not likely to persist in the long-run, once crisis is over
Reduced in-person cross-border business deals between Chinese and partner country private sector and governments.	Immediate, temporary measures due to border lock-downs and health concerns	Some measures may be long-term for over two-three years until safety is guaranteed
Shift of production to alternative locations by MNEs currently operating in China; MNEs may consider safer and nearby location in efforts to reduce massive supply chain disruptions.	Not likely to see in a great number in the short-run	More permanent shifts could occur in the long-run if crisis persists
Shift of sourcing locations from China to other countries by large global importers of manufactured products.	Some temporary shift may happen due to travel bans and health concerns	Some shifts could be long-term or permanent
Higher cost of transport and logistics services due to reduced trading routes for Chinese exports and imports.	Temporary rise in cost of trade	Higher cost not likely to remain in longer period, once things get normal
Suspension of production and operation of foreign or MNEs in China; this might also reduce market opportunity for these companies in China.	Immediate, temporary measures to avoid disease spread	Some closures may be long-term causing permanent business or factory shut-down, if crisis persists

Source: author developed

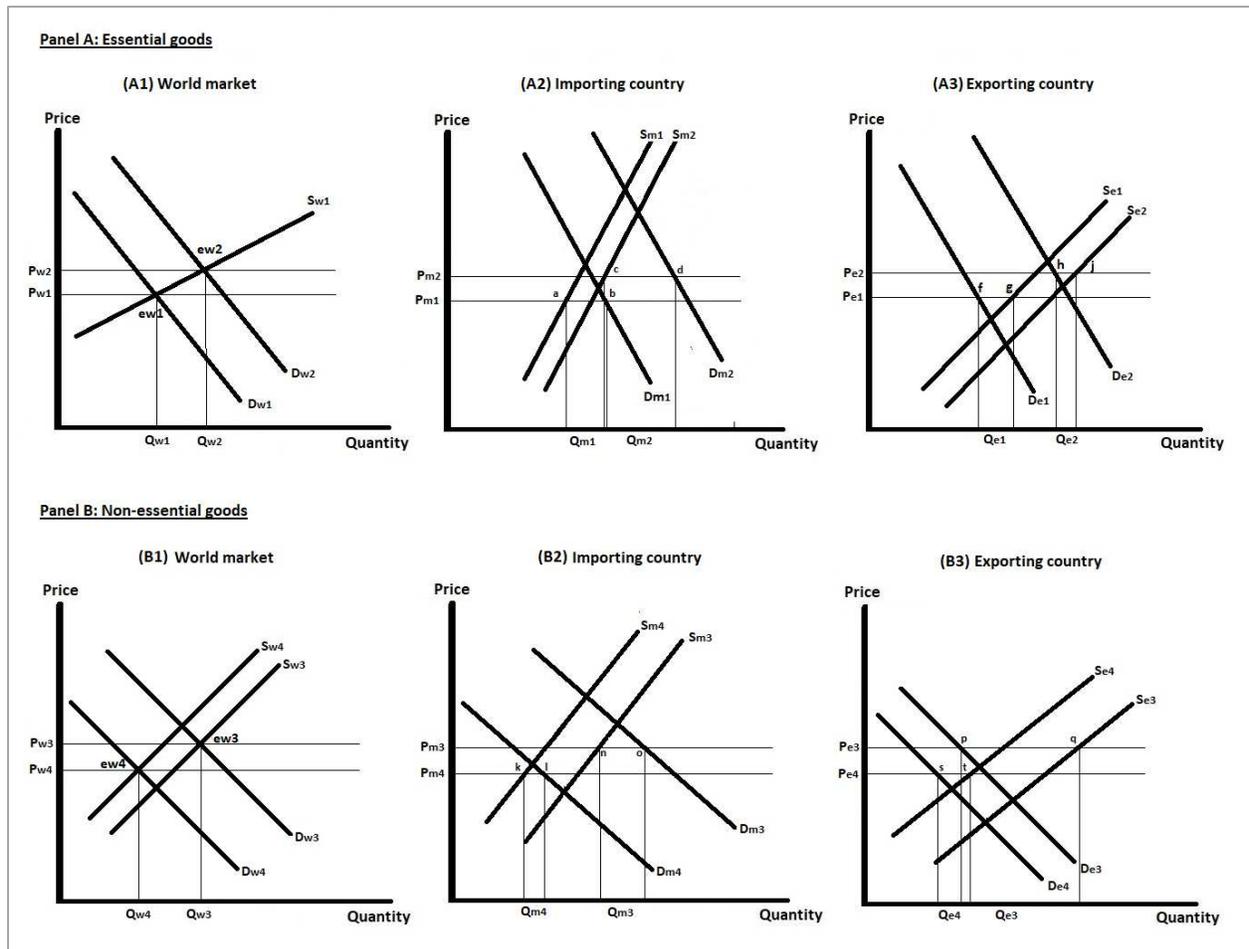
Similar to goods, services trade between China and the ROW such as travel, tourism, and transports and logistics face big shock, as economies including impose restrictions and border lock-downs. Since the outbreak, global tourist arrival has fallen dramatically. In China alone, the downfall has been as much as 10.9% (Moore, 2020). WTO (2020b) estimates that international tourist arrival could go down by 20-30% in comparison to the 2019 figures, the effect of which is enormous. Countries that are largely reliant on Chinese tourists are taking the big hit due to travel restrictions and border lock-downs in both China and the destination countries. For example, Australia's tourism faces a big shock, as about 15-16% of visitors in Australia are from China and they spend much more than tourists from the US, the UK, Japan, and New Zealand tourists put together (Farrer, 2020). Other countries such as Thailand, Italy, France, and Viet Nam may also face a similar situation. The drop in Chinese travelers could cost Japan to lose around US\$1.29 billion of tourism revenue in the first quarter of 2020 while Thailand could lose \$1.15 billion (ICAO, 2020). A similar impact is evident in cargo transportation services as well, as global container ship operators receive cancellation of more than half of the previously ordered shipments to China (Paris, 2020).

China's trade with the ROW is likely to see a diverse range of short and long term effects arising from many sources, as depicted in Table 1. While some of these effects are already evident, some are likely to emerge in the future. The short-term effects are expected to go away shortly after the pandemic is over, while some others may sustain for longer term in the post-pandemic period. For example, restrictions on Chinese travelers or tourists across borders, reduced cross-border trade agreements and deals, and increased transportation cost could sustain only temporary as long as the pandemic remains in effect. On other hand, some trade effects are likely to sustain for long-term; for example, stricter hygiene and bio-safety requirements for goods originating from China to minimize any possibility of disease spread and shifts of production and sourcing locations by some MNEs to other suitable locations in an effort to reduce overreliance of their supply chain on China.

4.0 An illustration of likely implications of COVID-19 for world trade

World trade is being severed by the COVID-19 pandemic. To understand the preliminary consequences in a simple way, a basic trade analysis framework can be used, as shown in Figure 3. The analysis shows the short-run implications for the world market, and the exporting and importing nations assuming that the world's total trade is a summation of trade of essential and non-essential goods in a free trade environment.

Figure 3: A theoretical illustration of trade implications of COVID-19



Source: author developed

Figure 3 panel A shows the trade effects for essential goods. In Figure A1, the initial world market equilibrium is at $ew1$ at price p_{w1} and quantity traded at p_{w1} . During the pandemic, demand for essential goods such as medical products and food sharply increases, leading the world demand curve move from D_{w1} to D_{w2} . The world now reaches a new equilibrium of $ew2$, where a greater quantity of Q_{w2} is traded at price P_{w2} . Although demand curve shifts, supply curve in the world market is not likely to shift since almost all countries of the world are affected by the pandemic and there is an increasingly excess demand for essential goods within every country. This situation drives countries to consume any increases in supply domestically rather than exporting; and in most cases, countries will rather import in bulk since domestic supply falls largely short of demand for these goods. Also, in the short-run, producers are unable to bring in new technology or investment to increase supply to the world market. In a free trade environment, the increased price P_{w2} in

the world market forces countries to import essential goods at a price higher than the previous level (P_{w1}).

Panel A, Figure A2 shows the case of an importing country. In the normal times, the country imports quantity Q_{m1} (equal to distance 'ab') at international price P_{m1} which equals to P_{w1} . Due to the pandemic, demand for essential goods increases in the country, leading demand to curve to shift from D_{m1} to D_{m2} ; faced by the increased demand, there could be some increases in local productions targeting primarily the local shortage of essential goods, leading the supply curve to shift from S_{m1} to S_{m2} . The shift happens as many producers may begin switching productions from non-essential to essential goods in an effort to help the nation during the emergency; for example, in the US, companies including General Motors begin producing ventilators (DeBord, 2020), and in China, many companies started producing medical supplies (Reagan, 2020). The shift of supply curve however is not likely to be too large for at least two reasons: one, producers shifting from other trade (e.g., automobile) may not have perfect technology, skill, and experience, and two, production of many essential goods may not be increased in the short run. Combined with increased import prices and increased demand and supply, the country moves to a new equilibrium where it now imports more quantity of essential goods at Q_{m2} (equal to the distance 'cd'). The country as a whole now consumes more of essential goods, with a higher level of imports ($Q_{m2} > Q_{m1}$) at a higher world price ($P_{m2} > P_{m1}$). Panel A, Figure A3 shows the case of an exporting nation that normally exports essential goods at a quantity Q_{e1} (equal to the distance 'fg'). As the pandemic spreads worldwide, the exporting nation also faces similar sharp increases in demand for essential goods, leading the demand curve to shift from D_{e1} to D_{e2} . Faced with increased demand both locally and export demand globally, some producers may intend to produce more, leading the supply curve shift from S_{e1} to S_{e2} . The country now moves to a new equilibrium where it now consumes more locally and exports Q_{e2} (equal to the distance 'hj') quantity which is lower than what it normally used to export ($Q_{e2} < Q_{e1}$) and export at international price (P_{e2}) which is higher than previous price P_{e1} . A lower export indicates that the country uses more of its produced essential goods to meet the local demand, which is what countries are expected to do (as a priority) to protect their citizens during an emergency like the COVID-19 pandemic. Furthermore, production increases may not end up entering the world market in the real world as governments may impose different trade related measures such as exports ban or restrictions in an effort to meet increases in domestic demand. Leading producing countries export restrictions on exports of 15 out of 17 medical products used for COVID-19 causing significant disruptions in world supplies, particularly for developing countries, forcing prices to increase (Espitia et

al. 2020). Estimates suggest that prices for medical supplies may rise by up to 23% on average (ranging from 6.6% to 51.9%) (Espitia et al. 2020), even when tariffs and other restrictions to imports are not considered (Espitia et al. 2020).

Panel B shows the case for non-essential goods. Figure B1 shows the world's normal equilibrium is at ew_3 at price P_{w_3} and quantity Q_{w_3} . During pandemic, both production and demand for non-essential goods (such as electronics, luxury items) face big slump worldwide, leading both the world demand and supply curves shift leftward from D_{w_3} to D_{w_4} and from S_{e_3} to S_{e_4} , respectively. Both demand and supply fall as borders close down, factors and business are shut down, people remain lock down at homes and movement of human and goods become heavily restricted, in response to the outbreak. At the new equilibrium, the world now trades fewer quantity of non-essential goods at Q_{w_4} ($Q_{w_4} < Q_{w_3}$) at a lower price P_{w_4} ($P_{w_4} < P_{w_3}$). The worldwide demand and supply fall extends to both non-essential goods markets in importing (Figure B2) and exporting (Figure B3) nations. Figure B2 shows that in normal times, the country imports Q_{m_3} quantity (equal to the distance 'no') at international price P_{w_3} . However, as both demand and supply decreases sharply domestically and globally, now the country's import shrinks to Q_{m_4} quantity (equal to the distance 'kl') at lower international price P_{m_4} . The figure signifies that during the pandemic, total consumption of non-essential goods will be lower than the normal times with a lower import demand or quantity of imports. Figure B3 shows the case for an exporting nation, where in normal times the country exports Q_{e_3} quantity (equal to the distance 'pq') at world price P_{e_3} . When both domestic and international demand for non-essential goods sharply decline, demand curve shifts leftward from D_{e_3} to D_{e_3} . Furthermore, factory shutdowns, restrictions of movement of goods and human, and business closures cause production to fall, leading the supply curve to shift leftward from S_{e_3} to S_{e_4} . The overall outcome is a new equilibrium where total consumption of non-essential goods decreases in the country and exports shirk to quantity Q_{e_4} (equal to the distance 'st') which is much smaller than the normal time exports quantity Q_{e_3} . The effect overall signifies that the country will face a lower domestic consumption of and export demand for non-essential goods.

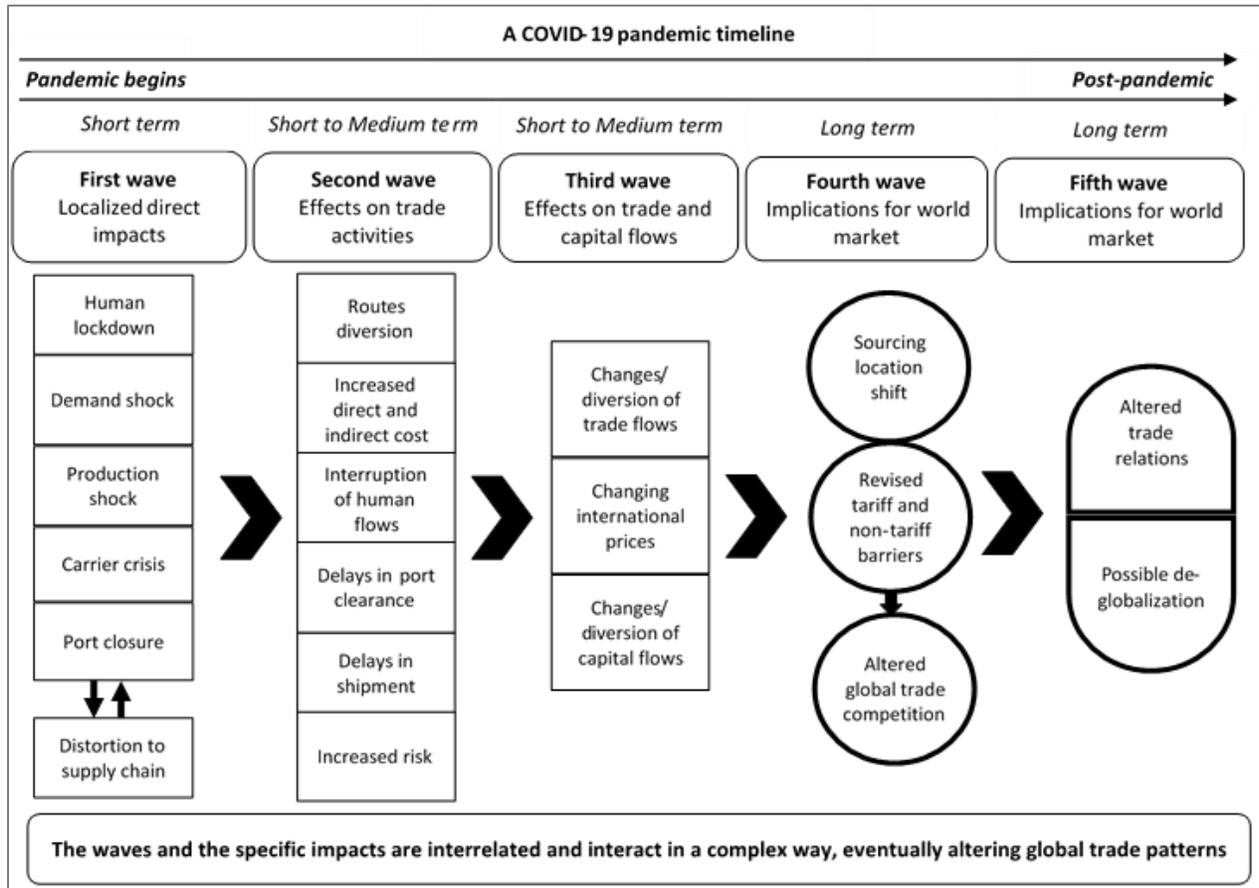
The overall outcome in the world market is an increased level of trade for essential goods at a higher price, while a reduced level for non-essential goods at a lower price. This is what the latest available data and reports suggest (for example, WTO, 2020c). Increases in demand for essential goods are not likely to improve total trade volume at the world level since global trade for essential goods is significantly smaller compared to that for non-essential goods. For example, WTO (2020c) suggests that medical goods trade accounts for only 5% of world's total trade. In other words, the world's total trade volume is likely to

keep declining, unless an effective and well-coordinated worldwide recovery plan is implemented at the world level. This outcome is also echoed by assessments at the world level (WTO, 2020a) and for trade between China and the ROW (Bloomberg, 2020). It is worth noting that for essential goods like medical products, developing countries - most of who largely rely on imported medical supplies - face higher prices, due to export restrictions imposed by leading producing countries (Espitia et al. 2020). The short-run implications presented in this section indicates that, as trade flows continue to surge, prices will keep increasing for essential goods; and as trade flows declines, prices for non-essential goods will keep plummeting. In the long-run, world supply and prices may return to normal after the pandemic is over; however, the timing remains uncertain.

5. A possible mapping of COVID-19's implications for world trade

The trade effects depicted in Figure 3 can show only how trade flows and international prices will respond to the pandemic. However, trade implications are not as simple as that and could include a wider range of effects on, for example, trade relations, competition, and welfare of nations. Trade analysis framework like Figure 3 is not sufficient to reflect and explain majority of these effects, given the fact that most of these effects are yet to emerge and impossible to quantify. Furthermore, much of the wide spanning trade implications could follow a sequential process, one or more producing the other, which is difficult to explain by standard trade analysis framework like Figure 3. Against these challenges, this section presents in Figure 4 a theoretical mapping of the likely short and long term trade implications of the COVID-19 pandemic that can help to understand what 'could be' the trade implications' span and progress line for world trade. The implications are considered in five different waves that could emerge over a shorter to longer time period (beginning from start of the pandemic to the point it is over). Since real life scenarios are driven by complex interactions of many factors, some of the wave-wise implications may happen concurrently while most sequentially. In the following discussion, available evidence is also reviewed to understand if COVID-19's real life impacts are following the map. It is worth noting that most of the implications shown from the first to third wave are already visible. Since the fourth and fifth waves show mainly long-term implications, most of them remains yet to be visible.

Figure 4: A general mapping of the likely trade implications of the COVID-19 outbreak



Source: Author developed

First wave:

To begin (first wave), the immediate and direct impact of the outbreak is imposition of lockdowns and social distancing coupled with shutdown of factories and businesses across economic including China resulting in sharp declines in production activities. One estimate suggests that about one third of the world’s population so far are in locked-down condition, forcing people to suspend work and causing no to fewer labor supply in the affected economies (AFP, 2020, March 25). The production shock is further amplified by a large demand shock due to the pandemic. During a pandemic, demand shocks are different for (i) essential goods that are necessary for living (for example, food and medicine) and (ii) non-essential goods that are not (such as cars, tourism); demand for essential goods sharply increases, while that for non-essential good sharply declines, since people tend to save money for their emergencies, and shopping, travelling, and outdoor entertainment are restricted (Baldwin and Tomiura, 2020).

The production shock has direct interaction with global and local supply chains; however, the interaction with international supply chain depending on the degree of influence of an economy in the world market. Due to massive globalization of production, an economy's production and the global supply chain can affect each other. For example, for countries like China on which global supply chain depends significantly, a large production shock will force global supply chain to collapse as supply of raw materials, production inputs, and finished goods supply to the ROW will be interrupted. It is however true that worldwide supply chain disturbance could also endogenously affect production in countries, particularly in sectors that depend on imported raw materials and inputs. For example, for countries with fewer share in the world market, a domestic production shock may not produce a major impact at the world level, but a disruption in global supply may induce large production and supply shocks to the economy. All considered at the world level aggregates, further to production shock, global supply chain disturbances could be aggravated by transport and logistics disruptions due to port closures and travel restrictions imposed by different countries.

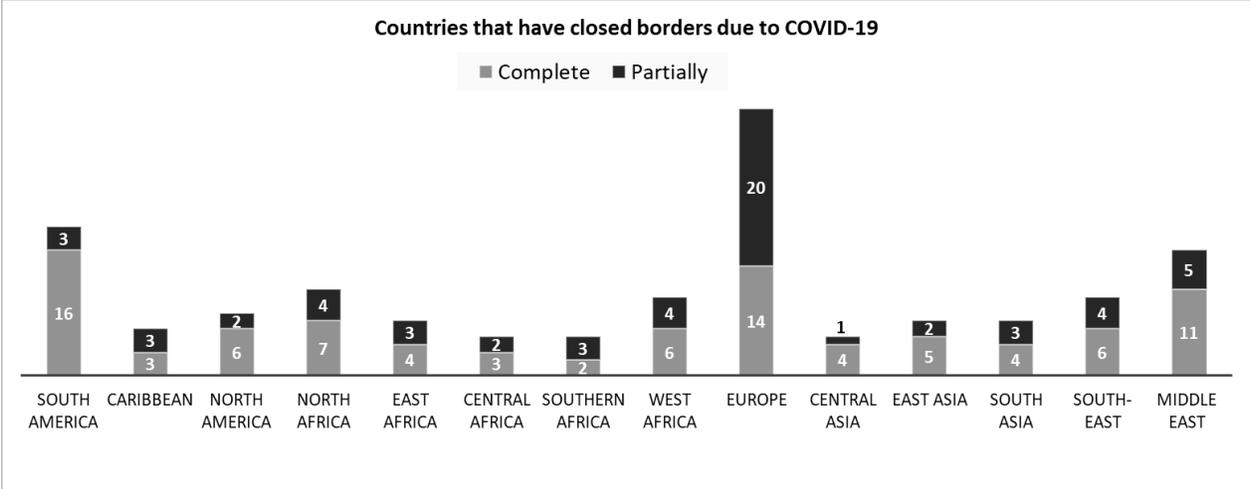
It could be useful to examine the available evidence on China - the world's manufacturing hub. Chinese factories are affected by human lockdowns and quarantines at home and slowdown in production sites in other countries mainly due to shortage of inputs from China, for example, raw materials, machineries, and equipment (Fernandes, 2020). The scale of the production shock in China worldwide is large, as China occupies 60% of world supply and demand (GDP), 65% of world manufacturing, and 41% of world manufacturing exports (Baldwin and di Mauro, 2020). Reports show that the production shock in China is also contributed by a large reduction in global demand for goods and services. For example, demand for non-essential goods such as Car has fallen substantially in China and the US (Jones, Brown and Palumbo, 2020; OECD, 2020; Santos, 2020), while domestic and import demand for essential consumables in China has exceeded supply (Petro, 2020; Wood and Sweney, 2020; ITC, 2020). Also, Chinese and global import demand for certain COVID19-related products from selected countries increased in Jan 2020 as compared to Jan 2019, particularly sterilizer imports almost tripled (ITC, 2020; WTOc, 2020). In January and February 2020 Chinese import demand fell by 4% year on year, which is less than a quarter of declines in Chinese exports; this is because a bigger fall in import demand for non-essential goods is offset by significant rise in essential commodities imports (Bloomberg, 2020b). On the other hand, an increasing number of reports show that demand for transportation, restaurant, travelling, tourism, and cinemas have declined sharply in the affected economies including China, as people maintain social distancing and lock down at

homes; while staying home have caused increased demand for internet, television programs, and video games.

The production shock in China drives a ‘Bullwhip effect’ in the global supply chain by forcing firms to reduce or shut down operations. Large multinational enterprises (MNEs) (e.g., Gap, Uniqlo, Hugo, Ralph Lauren, Nike, Airbus, Damien Klassen, Toyota, General Motors, and Volkswagen) shutdown factories and stores in China (The Manufacturer, 2020; Biron and Zhu, 2020). German logistics group DHL, UPS and FedEx reported to face severe disruption in inbound and outbound logistics to and from China in air cargo shipments, trucking, and rail cargo services (Tirschwell, 2020). The unexpected supply chain breakdown have reportedly impacted industrial productions severely in not only China but also in many other economies, particularly in countries where producers have a backward or a forward linkage with the Chinese market across industries including automotive, pharmaceuticals, medical supplies, and high-tech manufacturing.

The collapse of the global supply chain is amplified as passenger and cargo transport and logistics for goods and human have become largely restricted and countries closedown ports and borders. According to one account shown in Figure 5, 91 countries so far have imposed complete lockdown and 59 countries imposed partial lockdown due to the COVID-19 outbreak. The figure shows that borders have been closed-down across all regions, with the largest number of countries in the Europe (34), followed by South America (19) and the Middle East (16).

Figure 5: Number of countries closing border due to COVID-19 by region; as of 9 April 2020

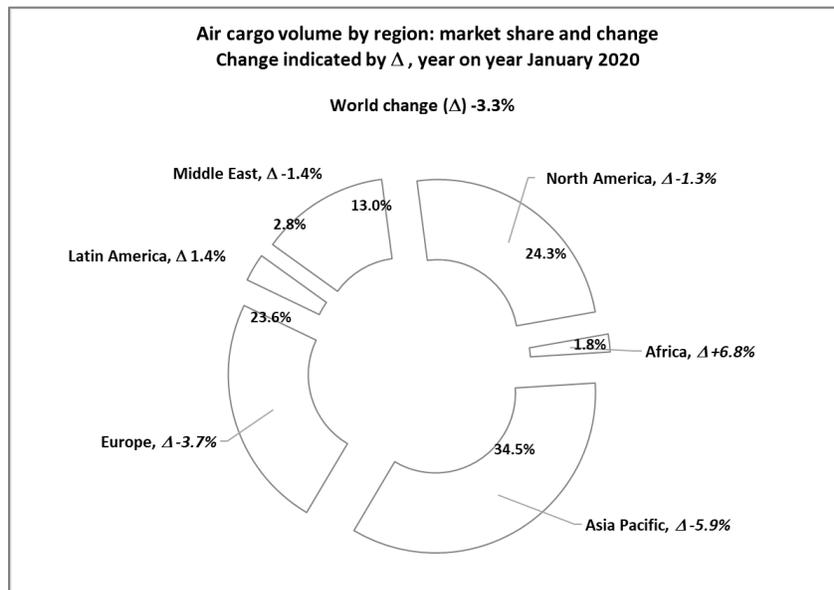


Source: author developed based on Agility map available at: <https://www.agility.com/insights/COVID19/useful-resources/>

Second wave:

As countries impose partial and full lockdowns and restrict or ban movement of people across borders and within countries, international movement of passengers and goods to significantly drops. Airspace closures, travel bans, and slump in travel demand have forced almost all global airlines to stop international and domestic flights (Leigh, 2020; Pallini, 2020, March 26). Many international trade routes have become limited or restricted due to port closures, foreign ships not being allowed to dock in the port of arrival, and cargo carrier and freighters suspend services due to sharp fall in demand (WorldACD, 2020; DHL, 2020). According to the International Air Transport Association (IATA, 2020), demand for global air freight - measured in cargo tonne kilometers (CTKs) - decreased by 3.3% in January 2020, compared to the same period in 2019. Figure 6 shows that air cargo shipment volume has decreased in almost all regions in January 2020 year on year, with the largest declines in the Asia Pacific (5.9%) and the Europe (3.7%).

Figure 6: World air cargo volume change year-on-year, January 2020

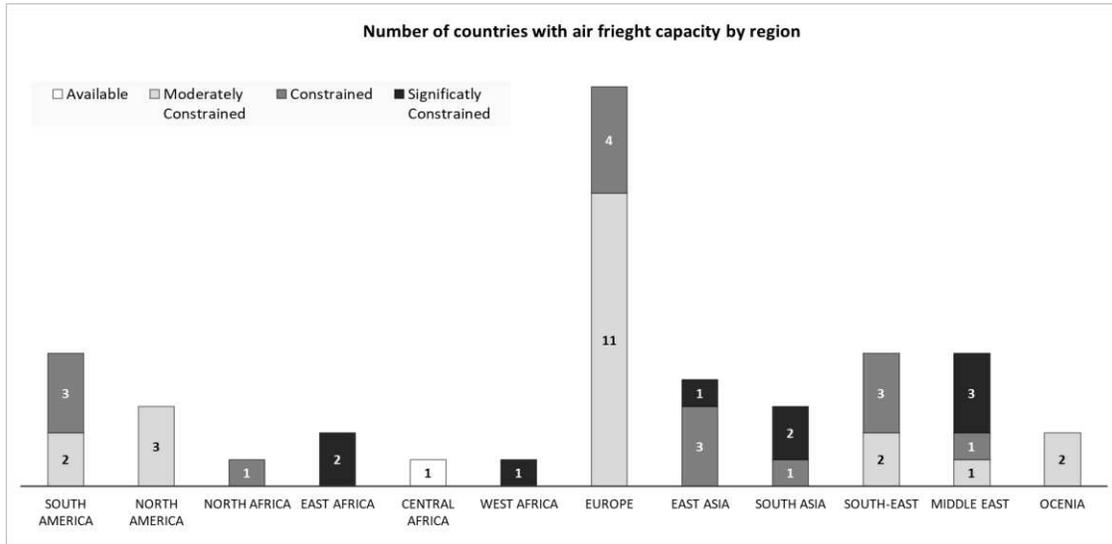


Source: author developed based on IATA (2020) data

Furthermore, in ports still remain open, goods shipment (e.g., loading/unloading) and necessary documentary clearance require additional days due to reduced port capacity and functionality. Figure 7 shows the available air freight capacity in different countries across regions caused by port restrictions and closures. One account shows that out of 47 countries, 46 countries have reduced capacity where 25 have constrained or significantly constrained capacity. Figure 8 shows the RWI/ISL Container Throughput Index, which

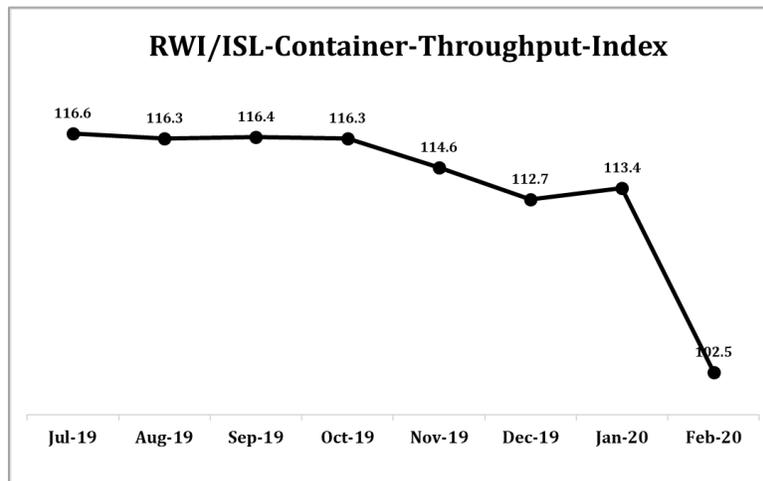
accounts for 60% of global container shipments through 89 international ports, dropped significantly since December 2019, with a recent fall by 10.9 in February from 115.4 points in January, 2020. The fall indicates a major reduction in international port and shipment activities, which is expected to aggravate further (Knowler, 2020).

Figure 7: Air freight services capacity across regions due to COVID-19; as of 9 April 2020



Source: author developed based on Agility map available at: <https://www.agility.com/insights/COVID19/air-freight/>

Figure 8: RWI/ISL Container Throughput Index, July 2019 to February 2020



Source: author developed based on Institute of Shipping Economics and Logistics data available at <https://www.isl.org/en/containerindex/>

Due to worldwide port restrictions and closure, particularly in or through China, exporters and importers look for alternative routes (Tan, 2020; Mento, 2020). For example, New Zealand live animal exports, destined for China, are diverted towards the Middle East (Wright, 2020); U.S. chicken shipment to China are being diverted to ports in Hong Kong, South Korea, Taiwan and Vietnam as ports run out of space for refrigerated containers (Huffstutter, 2020). However, trades through alternative routes require additional days to arrive or deliver as container depots become congested resulting in extra transport and logistic charges (O'Byrne, 2020; Saul and Baertlein, 2020; Mento, 2020). For example, from February to March, there was a 24% increase in late loads in the US and Europe, due to extended dwell times - the time spent waiting at facilities for pickups and at intermediate stops, which produces repercussions up and down the supply chain (Vaid, 2020; Berman, 2020; O'Byrne, 2020). These delays and route closures eventually increases direct (e.g., port charges for additional days) and indirect costs (e.g., extra insurance premium for additional days). In many ports, inward foreign cargo ships are stuck for days or months drawing extra cost, just because port functionality is down to zero or minimal level or they have to go through strict hygiene and bio-safety check or both.

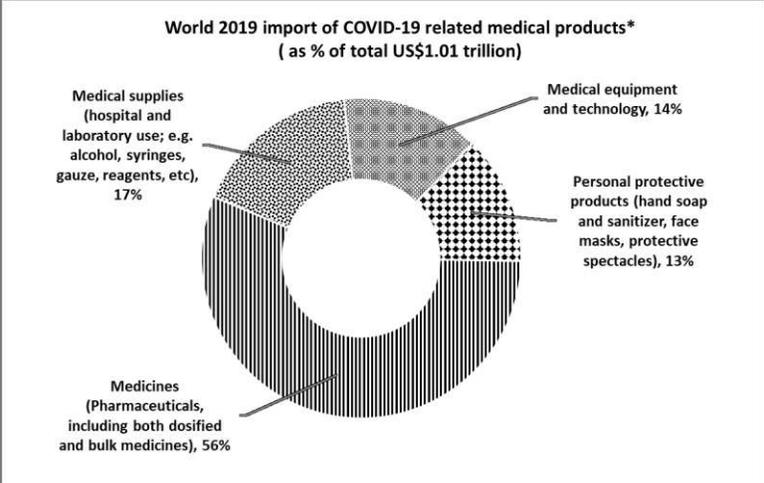
There is also increased risk in transporting goods across borders; for example, goods and staff members carried by cargo ships are in high risk of COVID-19 infection as they keep travelling different countries and are considered highly contagious (Miller, 2020). For many of the past epidemics of communicable diseases, trade is considered a major avenue for aggressive transmission; for example for, malaria and yellow fever (Porter, 2005) and Black Death (Boerner and Severgnini, 2011). This risk of potential transmission of COVID-19 forces many countries to take additional measures. For example, initially, port shipments to Wuhan were suspended, diverted or notified to take additional security measures, and are forced to receive Force Majeure Certificates (Dryad Global, 2020). Gradually, the level of precautionary steps and shipment restrictions expanded from China to other shipping points. A number of ports worldwide have begun sanitary inspections and crews are taken to quarantine (Budd Group Bulletin, 2020).

Third wave:

A combined effect of the first and second waves is interruptions in international trade flows. Three likely effects could emerge in the international market: (i) distortions in the volume of trade flows, (ii) shocks to international trading prices, and (iii) diversion of trade flows from one route or country to the others.

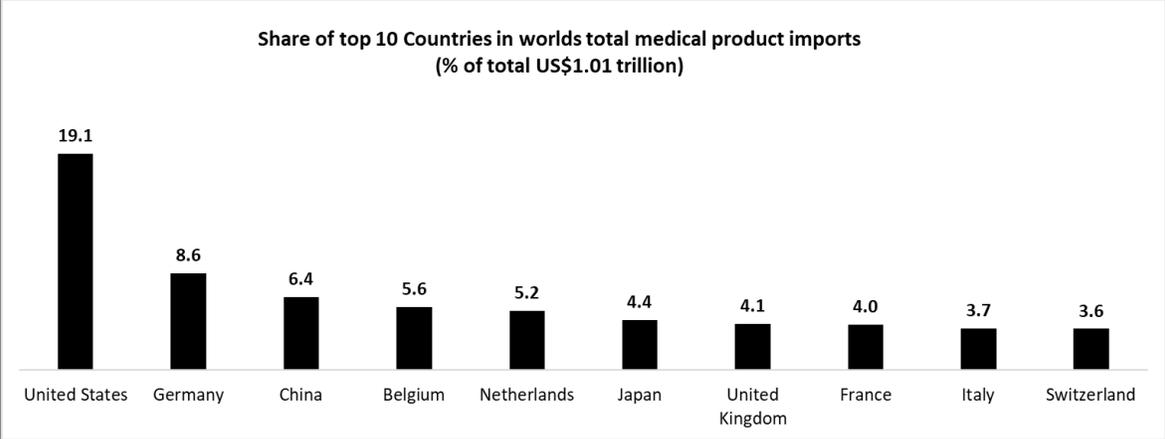
Although complete world trade data is yet to emerge, several estimates suggest that global trade flows are set to fall by a larger magnitude. According to WTO (2020a) estimates, world merchandise trade is set to plummet by between 13% (Optimistic estimation) and 32% (Worst Case Estimate) in 2020 due to the COVID-19 pandemic. The WTO’s Goods Trade Barometer stands at 95 in December 2019 (benchmark 100), lower than the previous reading of 96.6 in November, signaling weaker trade volume growth may continue in the early 2020 (WTO, 2020d). There will be however differences once trade flows are disaggregated between essential and non-essential goods, as discussed in section 4; while trade for essential goods (such as food and medical products) are likely to rise, that for non-essential goods (e.g., automobiles, tourism) should go down.

Figure 9: World 2019 import of COVID-19 related medical products



Source: adapted from WTO (2020)

Figure 10: World 2019 import of COVID-19 related medical products by country



Source: author developed based on WTO (2020) data

According to the WTO, world imports of medical products totaled \$1.01 trillion in 2019 a 5% increase from 2018; together with exports, total trade amounts about \$2 trillion. Figure 9 shows the composition of total imports of medical products that are generally used for COVID-19 prevention and treatment globally. The figure shows that medicines accounted for 56% of the total, followed by medical supplies (17%), and medical equipment (14%) and personal protective equipment (13%). Trade of products that are critical and in global shortage (e.g., protective supplies like face masks) in COVID-19 crisis stands at about \$597 billion (1.7% of total world trade) in 2019. The US and Germany are the biggest bilateral trade partners for medical products and both are the main suppliers to China, while the three countries remain the biggest importers of medical products in the world (Figure 10). Chinese import demand of certain COVID19-related products from selected countries increased in Jan 2020 as compared to Jan 2019, particularly sterilizer imports almost tripled (ITC, 2020). These data indicate substantial increases in global demand for medical products in the face of COVID-19. In contrast to essential goods, trade of non-essential commodities declines as many countries impose lockdown and closure of shops, businesses, and factories (Labiak, 2020). For example, Chinese total import demand already shows a significant fall in the early months of 2020, mainly due to large fall in non-essential commodities (ITC, 2020). According to WorldACD (2020), world total air cargo shipment of non-essential commodities such as high-tech manufacturing and dangerous goods have declined by 11.4% and 6.1%, while that for medical pharma items rose by 7.5%.

Similar to goods, services trade are also severed, international tourism and travelling being the worst hit. WTO (2020) estimates international tourist arrival to go down by 20-30% in comparison to the 2019 figures, the effect of which is enormous. Countries such as Australia, Thailand, Italy, France, Japan, and Viet Nam are set to lose billions of dollars of tourism business as a result of the pandemic (ICAO, 2020; Farrer, 2020). The magnitude of loss keeps increasing as the end to the pandemic remains complete uncertain. Airspace closures, travel bans, and slump in travel demand have forced almost all global airlines to stop international and domestic flights and bear trillions of dollars of loss (Leigh, 2020; Pallini, 2020; ICAO, 2020). A similar impact is evident in cargo logistics services as well, as global container ship operators receive cancellation of more than half of the previously ordered shipments to China (Paris, 2020). World services trade are set to aggravate further through a large reduction in other sectors also, for example, education. Countries where international higher education is a key contributor to their economy are set to see big shocks, as they impose harsher restrictions or bans on international arrivals which are unlikely to return to previous condition in near future. The US, the UK, and Australia may find zero arrivals of international students during the pandemic and significantly less in

months after the pandemic recovery. Among other categories of services trade that are likely to be affected could include decline in in-person management consulting and international employment services in China-backed projects in different countries and foreign country or institution backed projects in China.

International trade flows could also be impacted by reduced capital flows amidst the pandemic, investors are likely to take strategy to hold back, watch, and decide later on their investment plans. In many countries, shut-downs prevent businesses to carry normal business operations including progressing on their investment plans. The impacts of these however may take time to emerge since investment plans involve long-term orientation. Increasing uncertainty about the end to the pandemic and its economic consequences will increase risk and cost and reduce private sector investment, particularly foreign direct investments (OECD, 2020; UNCTAD, 2020b). Furthermore, investments could decline due to delays or reductions in earnings reinvestment by MNEs, as a result of likely decline in earnings in 2020 and beyond. The world's top 5000 multinational enterprises (MNEs) have already announced a 9% average decline in earnings globally; the biggest hit on earnings is likely in Asia (-18%), followed by transition economies (-16%), while in the decline is about 16% in developing and 6% in developed economies, particularly due to effects on production, sales, and both (UNCTAD, 2020b). Due to increased uncertainty and earnings slowdown, the downward investment pressure on FDIs particularly could range from -5% to -15% from previous marginal growth projections for 2020-2021 (UNCTAD, 2020b).

As discussed in section 4, disruptions in trade flows cause changes international prices for both essential and non-essential goods. According to the International Trade Centre (ITC 2020), the current pressure on the international trade through temporary trade measures, transport and production constraints started being reflected in the prices. An increased global demand relative to supply of essential goods such as food and medicine cause price of these goods in the world market to go up. In contrast to this, a large drop in global demand for and supply of non-essential goods are likely to push international prices of these goods to go down. For example, the ITC Market Price Information portal (mpi.intracen.org) reveals that prices of essentials such in many rice exporters such as USA, Thailand and Vietnam registered a strong increase since the beginning of the pandemic in January 2020. Estimates suggest that prices for medical supplies may rise by up to 23% on average (ranging from 6.6% to 51.9%) (Espitia et al. 2020). On the other hand, global equity prices and non-food commodity prices fell by 10% by the first three months of 2020 (OECD, 2020). Shut down of economic activities worldwide have plummeted global oil demand, forcing prices to decline; Brent crude oil price sharply dropped by 66.7% in the last week of March from its US\$65.6 January price, the lowest level since 2001 (Jones, Brown and

Palumbo, 2020). On a similar ground, declining patterns in prices were observed for other major commodities in the international market from January to February 2020; for example, Silver spot price (XAG) (19.6%) and Copper (22.2%).

Prices are also responding similarly at the country level. Chinese producer prices fell by 0.4% into deflation territory in February year-on-year, as a result of sluggish demand for non-essential manufacturing products and prolonged shutdowns, according to the National Bureau of Statistics of China. On the other hand, the consumer-price index slowed by 0.2% in February 2020 as non-food prices outweighed the impact from mounting food inflation (Market Watch, 2020, March, 10). Food prices in China surged 21.9% February from a year earlier, outpacing January's 20.6% gain and hitting the highest level since April 2008 (Market Watch, 2020, March, 10). Thus, China's inflation slowed because of larger decline in demand for non-food products relative to that for food (Bloomberg, 2020b). Similar reactions are evident in other economies also. In the US, in the first week of March 2020, gasoline price fell sharply by 2.01% to US\$2.38/gallon compared to the week before as demand for travel comes down to nearly zero (Crudele, 2020).

Fourth wave:

In the fourth wave, the world could see long-term changes in at least three dimensions: global sourcing and production patterns, standard trade barriers, and global trade competition. Many argue that the COVID-19 outbreak finger points the overdependence of the global manufacturing on China, and that global supply chain takes a massive hit when China shuts down factories and businesses. This causes MNEs to actively consider shifting their sourcing, procurement, and production locations alternative to China, most of which will be permanent (Nakafuji and Moriyasu, 2020; Tan, 2020, JOC, 2020). Many US buyers have already started moving their sourcing away from China to Southeast Asia, South Asia, and Taiwan (Tan, 2020).

Table 2 reports some recent updates of some of the world's major manufacturers who consider shifting their production and sourcing from China to suitable alternative locations. Given the lessons of the outbreak, the choice of the alternative location is primarily driven by: (i) the proximity of the potential new location to the output market and/or (ii) prior availability of the company's facilities outside China. However, many of the firms considering such move are concerned about rising cost due to the shift; for example, in the form of additional transportation and logistics charges (Tajitsu and Shiraki, 2020).

Table 2: Recent reports on shifting supply chain dependency from China

Company	Shifting trends
Komatsu	The company is shifting production of metal parts used in the body of the vehicles as well as wire harnesses from China to Japan and Vietnam and aims to prevent Chinese-shipment delays from spilling over to the rest of the world
Daikin Industries	The electronics company is considering moving assembly of commercial air conditioners to Malaysia or elsewhere from the Hubei Province capital of Wuhan, which remains under lockdown (Nakafuji and Moriyasu, 2020).
Asics	The sportswear maker looks to move production to Vietnam and Indonesia that had been outsourced to facilities in Wuhan (Nakafuji and Moriyasu, 2020).
Google and Microsoft	The companies announced shifting productions of new phones, laptops, and other devices from China to other Southeast Asian nations, with factories particularly in Vietnam and Thailand to be benefited (Ting-Fang and Li, 2020).
Mazda Motor Corporation	The auto supplier cranked up output of the part at its Mexico plant by 50%, airlifting the products to Mazda’s assembly line in Japan, costing the company more than \$5 million as extra shifts and air freight charges. (Tajitsu and Shiraki, 2020)
Kasai Kogyo	The parts supplier to Honda is looking at shifting production from its Wuhan plant to one of the many plants it operates in North America, Europe, and Asia, although doing so would drive up costs and take months to organize. (Tajitsu and Shiraki, 2020)
Koito Manufacturing	The company, the world’s biggest maker of automotive lighting and a supplier to Toyota, Nissan and others, is preparing to move some production from Hubei, China to elsewhere to fulfil export orders. (Tajitsu and Shiraki, 2020)

Source: author developed based on different industry and news reports

Apart from shifting globalization of production and sourcing, a high possibility brews of seeing new patterns of trade barriers in the advent of the outbreak. While reducing tariff barriers by countries is a long-debated issue at the world stage, even during the pandemic, tariffs remain high for many medical products that are used to fight COVID-19. WTO (2020) reports that average tariff rate applied on medical products is 4.8% in 2019 while for some medical products some countries impose very high tariffs; for example, hand soap (ranges from 17% to 65%); protective supplies (ranges from 11.5% to 27%).

In the face of the COVID-19 pandemic, at least two possible changes could emerge in the future with respect to trade barriers:

- (i) Many countries may impose higher restrictions or bans of exports of medical supplies that are critical to COVID-19 prevention and treatment in an aim to meet the growing demand in the domestic market during the pandemic, causing spirals in prices of these emergency goods. Exports bans and restrictions already imposed by many countries have reduced global supply of medical products, leading to higher prices in the short-run (Espitia et al. 2020). Espitia et al. (2020) show that exports restrictions have been imposed for 15 out of 17 medical products by leading producing countries, which is likely to raise prices in the range of 7.5% to 51.9% across the products.
- (ii) Many countries could lift prevailing tariff and non-tariff barriers on imports of medical supplies. Given the lessons learned in the outbreak, many countries may maintain high export restrictions or zero tariff or non-tariff barriers on imports of such medical supplies even in the post-pandemic world to keep the nation ready to fight future emergency situations.
- (iii) COVID-19 is highly contagious; it can spread not only by sneezing or coughing, it can also spread by just a touch and the virus can live on different surfaces (e.g., metals and plastics) for days and weeks (ECDC, 2020). As a result, goods imported from widely affected countries have chances to spread the virus to the destination ports or countries, as the virus may remain alive on the packaging surfaces (WHO, 2020). This chance is higher particularly for exporting countries or intermediary ports where hygiene and bio-safety screening is not properly maintained or ensured before shipment. This concern may force many countries - particularly those that maintain stricter hygiene and biosafety nation-wide - to impose new forms tariff and non-tariff barriers (e.g., sanitary and phytosanitary) on imports from a severely COVID-19 infected country. Such measures could include a higher tax imposed on goods imported from a country with poor bio-safety environment or widespread infection or requiring a mandatory pre-shipment inspection report or certificate evidencing that the goods have been disinfected in line with bio-safety requirements of the destination country. However, any tariff or non-tariff measure to prevent epidemic spread may make world trade system vulnerable during such outbreak (Kimball, 2019; Kimball, Wong and Taneda, 2006). For example, during Cholera crisis, the European Union (EU) imposed phased embargo on fresh fish imports from East Africa which produced trade loss up to 20.7% of total exports and reduced incomes of fishermen by up to 80% in Tanzania (Henson, 2000; Kimbal, 2005). To prevent the Mad Cow disease originated in the UK in 1980s, the US banned European cattle imports which resonated globally and evolved

into a trade epidemic, threatening EU and US relations (Freeman, 2002). It is worth noting that biosecurity measures in response to epidemic does not always work, as was the case of Russia banning pig and pig products from Africa to eliminate the risk of Swine Flu spread (Mur, Martínez-López and Sánchez-Vizcaíno 2012).

Changes in production and sourcing locations by MNEs globally coupled with changes in trade related measures could change the competition dynamics in world trade. The changes could take at least the following forms:

- (i) Due to production and sourcing location shifts by MNEs, China faces threat of losing its position as the world's manufacturing and supply chain hub; making other nations, such as the Southeast and European ones, gain in world trade (Tan 2020).
- (ii) Increased hygiene and bio-safety requirements on goods shipped from Chinese ports may make Chinese imports costlier for the ROW relative to imports from other sources. This could hurt China's exports to the ROW.
- (iii) Countries that cannot maintain or ensure hygiene and bio-safety requirements, predominantly developing and poor nations, may significantly lose their market in world exports, particularly, their exports to developed countries requiring stricter and high level of bio-safety (e.g., Australia) could see decline in the post-pandemic world.
- (iv) Furthermore, as the disease is highly contagious through human-to-human transmission, countries that rely on highly labor intensive exports (e.g., apparels in Bangladesh) may be subject stricter bio-safety requirement at the production stage. This is because labor intensive exports would involve human touch and engagement of thousands of labors during the production process. While a stringent cleaning requirement may be met before exporting for many products (e.g., clothing), for many others it may not be possible clean thoroughly before exporting (e.g., crops). As a result, countries that will not be able to satisfy the stricter bio-safety and hygiene requirements will lose international market to their rivals who can do so.

Fifth wave:

In the long-run, particularly in the post-pandemic world, changing dynamics of world trade due to changes depicted in the fourth wave may bring altered trade relations between countries. There are some key ways how international trade relations could change:

- (i) Shifts in production and sourcing of global MNEs to suitable locations from China and changes in tariff and non-tariff trade barriers, as explained before; these changes may happen not only to merely reduce overdependence on China but also with the aim to ensure smoother supply chain during emergency. The pandemic could faster the

process of moving away from China, particularly by US companies, which began due to the US-China trade war (Rapoza 2020).

- (ii) The existing and upcoming economic programs under government to government framework, particularly involving China, are largely affected. China-backed 7000 projects in 69 countries, including the Belt and Road Initiative, already face disruptions (Fazl-e-Haider, 2020). Any post-pandemic delay or cancellation of Chinese aid or investments into existing partner countries while China focuses on recovery may shuffle the list of trading partners that are most and least important for China.
- (iii) Renewed friendship influenced by assistance and aid exchanges between governments. For example, China extended large medical assistance to Italy before anyone else did in the Europe; this carry two important attributes - first, China helped Italy when no other immediate neighbors in the European Union responded (Wood, 2020); and second, Italy is the first European nation endorsing the BRI (Giuffrida, 2020), indicating that economic interests may have played a role in motivating China to act. Although, China's such friendly gestures towards many other economies have a humanitarian and solidarity aspect, they could play a role in developing or renewing China's trade relationships during the post-pandemic world.
- (iv) A rise of nationalism could emerge to some degree, as countries realize their overdependence on globalization, which may encourage many countries to invest and begin producing more essential products like medical-related items domestically which they currently import at a large scale (Varoufakis 2020). This process could alter trade relations for a country by changing the existing portfolio of trade partners.

In general, reports suggest a de-globalization process may have begun due to COVID-19. As countries brings their supply chain closer, invest in forward and backward linkage industries within the economy, and tend to produce more domestically, the current form globalization may begin to shrink noticeably (Legrain 2020).

5.0 What's next?

The biggest challenge in responding to the pandemic is that the crisis is rapidly globalized, totally unprecedented, and it is not like an economic crises driven by known causes such as banking or financial crisis. While trade policies are considered vital for mitigating the effects, they are also considered part of the problem; many countries have adopted sicken-thy-neighbor policies that are damaging others, particularly the developing and poor ones (Evenett, 2020; Epsitia et al. 2020). A number of issues should be remembered when setting up approaches to manage the pandemic's effects:

- During the pandemic, the WTO needs to act fast and take the lead to ensure all countries are fairly treated and emergency supplies continue flow more with least possible barriers; the WTO should consult with leading producing countries of essential commodities such as medical and food products to reconsider any export restriction put in place so that unnecessary and unfair treatments to importing countries can be avoided;
- To deal with a globalized pandemic like COVID-19, responses needs to be at the international level for common good, and countries should consider trade related policy changes that benefits not just themselves but all in general. The WTO should take the lead role to ensure this practice at the world level. Furthermore, additional discussions, negotiations, and agreements for collection actions may happen at different levels; for example, regional (e.g., Asia, Latin America), economic union (e.g., EU, African Economic Union), or others (e.g., G20, SAARC);
- Poor and most developing economies by default are economically fragile with poor health infrastructure; to help them survive, the WTO needs to consider possible favorable treatments (like the Generalized Systems of Preference) in international trade for them during the pandemic and in the post-pandemic period.
- While in the post-pandemic period, the world may see a new world order of trade, the WTO needs to stay ready to lead it and ensure that the global trade system achieves greater resilience in order to fight such global-scale crisis in the future.

6.0 Conclusion

COVID-19 threatens to jeopardize economies - no matter large or small, developed or developing - as the end to this remains uncertain. As long as economies suffer, world trade flows will dip, mainly through demand and supply shocks. In the world market, while demand for essential commodities is likely to keep rising relative to supply (raising prices further), that for non-essentials is set to dip further (with lower prices) in the near future. However, the two combined, world aggregate trade flows will decline as non-essential goods constitute the majority of world production and trade. There are other important changes imminent in addition to changes in trade flows. A significant alteration in the nature of competition and trade relations is likely in the world market through; for example, reduction of Chinese dominance, new forms of trade barriers, and renewed trade agreements and relationship between nations. Furthermore, a de-globalization pattern may emerge, where countries may focus on producing essential goods more domestically in an effort to reduce dependence on other countries in case of an emergency. All considered, a new world order of international trade is imminent in the post-pandemic world.

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