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Trade linkages and supply chains of Personal Protective Equipment and vaccines in ASEAN during the COVID-19 pandemic.

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Introduction

The COVID-19 pandemic has created a global economic, finance and social crisis. Global production dropped 3.1% in 2020, and the recovery, projected to 5.9% in 2021, is threatened by global supply disruptions and the worsening pandemic dynamics (IMF, 2021). External debt grew to a record high in 2020, more than twice their value of 2009 and more than four-fold their level of 2000 (UNCTAD, 2021). Global poverty increased by around 97 million in 2020 (Gerszon et al., 2021), representing an unprecedented increase. International trade merchandise trade plunged 15.0% year-on-year in the second quarter of 2020 (WTO, 2021), causing major value chain disruptions and exposing the fragility of medical goods world supply.

In the first semester of 2020, the shortages of medical supplies climaxed because the production stoppages caused by the spread of the virus occurred precisely when global demand increased dramatically. Several countries banned or severely restricted their medical supplies exports to prioritise their own citizens (Bown, 2020; Evenett, 2020). Importing countries competed with one another to secure the much-needed volumes of masks and other Personal Protective Equipment (PPE). Some countries even went so far as to accuse themselves of diverting cargo at airports by offering a higher price to suppliers at the last moment.

These scenes of tension have revived long-standing debates about the excesses of globalisation. The global value chains (GVC) that Multinational Enterprises (MNEs) generalised from the 1990s onwards had already been accused in advanced countries of accelerating deindustrialisation, contributing to massive unemployment and leading to the loss of skills and know-how. In developing countries, they had no positive effect on employment (Pahl & Timmer, 2020). In the 2000s, when climate change and the need to decarbonise the economy became a central issue, GVCs were criticised for their contribution to global warming. The fragmentation of production networks into increasingly narrow segments and their ever wider geographic extension have led to an explosion in the transport of intermediate and finished products over ever longer distances, multiplying greenhouse gas emissions.

Advocates of GVCs, which epitomise this era of hyper globalisation, defended a contrarian view. They argued that they make it possible to organise global production in the most efficient way possible, eliminating unnecessary stocks, selling products at the lowest price, and creating jobs in the poorest countries. In practice, they extended the principle of just-in-time production at the world level. According to this view, GVCs ensured that global growth benefited everyone as a high tide lifted all boats.

The 2010s were marked by several dramatic events, which, in retrospect, are all warning signs of the current crisis. The H5N1 avian influenza outbreak in 2006-07, the H1N1 influenza pandemic in 2009-2010, the earthquake in Japan followed by the Fukushima disaster in March 2011, followed by the terrible floods in July 2011 in Thailand, revealed the fragility of global supply through value chains. Firstly, they showed that zoonoses could contribute to pandemics spreading faster worldwide thanks to air transport. Secondly, natural disasters could cause severe shortages of intermediary products leading to production stoppages in industries such as automobiles and electronics.

The energy transition and the rise of the electric vehicle in the 2020s add a new element of risk. While oil and gas reserves are relatively widespread worldwide, rare earths and most of the materials needed to produce Lithium-ion batteries are concentrated in a smaller number of countries (Jetin, 2020b). This adds a political risk that led several countries and regions to establish a list of critical materials. In some cases, new laws reinforce the use of the national security argument to restrict international trade in certain products. This occurs in a context of enhanced rivalry between big powers, climaxing in the Sino-USA trade conflict.

The COVID-19 pandemic combined all these elements and has revived the controversy about the dangers or the benefits of long-distance GVCs. The shortages of PPE, and some pharmaceutical products, have been blamed on the excessive dependence on overstretched global supply chains that broke during the crisis when they were most needed. If at least some of the most critical PPE, like masks, gowns, or gloves, had been produced locally or in neighbour countries, shortages would have been less severe. If public authorities and private companies had not maintained blind faith in the ability of just-in-time production to supply them with unlimited quantities at the very last moment, they would not have minimised their PPE stocks. This sentiment, drawn from the corner of common sense, has become widely shared in many European countries where the shortages have been most severe, where deindustrialisation was pronounced and where the authorities' top priority these last decades has been to cut expenses of the health system leading to the "hollowing-out of state capacities" (Jones & Hameiri, 2021). Reshoring, nearshoring, short-circuit from local producer to local consumer, that important civil society actors already supported before the pandemic, became centre stage during the year 2020. In an unexpected move, they were joined by executives whose businesses were affected by the disruptions and by politicians anxious for their future.

The movement of the pendulum is certainly going away from hyper globalisation (Jones, 2020) (Antràs, 2020) and extreme fragmentation. But how far deglobalisation will go towards onshoring and nearshoring is an open question. According to Enderwick and Buckley (2020, p. 103), "on balance, therefore, the effect of the pandemic and underlying anxieties about globalisation will push the world economy towards a more regionally-focused composition". This trend pre-existed the COVID-19 pandemic, and many scholars have argued that the world economy has followed a dual approach of global and regional integration (Coe et al., 2004; Freyssenet & Lung, 2004; Jetin, 2009). The latter have gained ground in recent years (The Economist, 2019) due to the WTO's inability to conclude a new multilateral trade agreement, as regions succeeded in strengthening their commercial (Jetin & Mikić, 2016) and institutional links (Nottage & Jetin, 2021). This deepened regional integration between East, Southeast and South Asia (Jetin, 2018).

The positive link between proximity and health security is not apparent. When the local capacities exist, producing PPE within the national borders has the following advantages: the direct relationship between the authorities and the companies facilitates the management of the crisis. In addition, it maximises the speed of response and minimises transport risks. China is probably the country that has benefited the most from these advantages of proximity during the pandemic. However, relying too much on local companies may also be a disadvantage when the country is hit by the pandemic forcing these companies to a halt. This happened to China at the end of 2019 and during the first quarter of 2020 when the country was in lockdown, and the demand for PPE skyrocketed. At the time, China was even importing PPE and receiving aid from foreign countries that were not yet affected. This shows that even in

ASEAN international linkages in medical supply before and during the COVID-19

Surgical masks are probably the most emblematic personal protective equipment used by both health workers and citizens. Like respirators, they are not easy to manufacture because “their production involves several types of inputs and the assembly of different parts in a relatively sophisticated process” (OECD, 2020). As a result, they were in dramatic shortage during the first months of the pandemic in Europe and to a lesser extent in ASEAN. Figure 1 shows that before the pandemic, ASEAN imported around 85% of its masks from Asia. China accounted for about 50% of the imports, the rest of Asia 21%, and ASEAN 15%. ASEAN is therefore far from being self-sufficient for surgical masks and is dependent on regional imports. With the start of the pandemic in 2020, ASEAN demand spiked to USD 1.9 billion in 2020, up from around US\$ 300 million in 2019. It was matched by a surge of Chinese imports which rose from US\$ 153 million to USD 1.4 billion.

In comparison, ASEAN's import from ASEAN grew from US\$ 47 million up to US\$ 200 million thanks to more significant imports from Indonesia, Singapore, the Philippines, and Malaysia. But the magnitude of Chinese imports is such that it eclipsed all other sources of supply. As a result, China's share jumped from one half to three quarters of total ASEAN imports. As a result, the shares of ASEAN and the rest of Asia declined while the supply of the EU and the USA became marginal. The reason is that China, true to its reputation as the world's factory (Jetin, 2012), was the only country able to ramp up its industrial capacity quickly and match the surge of demand from ASEAN and the rest of the world. ASEAN and other Asian countries could not put their production up to the required level when it was most needed.

Surgical gowns (Figure 2) and protective goggles (Figure 3) share the same characteristics. More than 90% of ASEAN's imports come from Asia, with China accounting for more than 60% before 2020. The rest of Asia and ASEAN supply around 20% of ASEAN's needs. During the first year of the pandemic, ASEAN relied even more on China for surgical gowns and ASEAN. The latter was able to satisfy more local needs thanks to a substantial increase in Cambodia and Vietnam's exports while imports from the rest of Asia plummeted. Such was not the case for protective goggles because exports from Malaysia, which used to be the main Southeast Asian provider to ASEAN, fell in absolute terms to a marginal level before the pandemic started.

Protective suits (see Figure 4) and respirators (see Figure 5) are also two products for which Asia is by far the largest provider. China's dominance is less as it is better balanced by supplies from the rest of Asia and ASEAN. However, when the pandemic erupted, China expanded its industrial capacities to such an extent that the shares of ASEAN's imports from ASEAN and the rest of Asia declined, although they have increased in absolute terms. Europe and the USA have a small and declining share.

The last two protective personal equipment goods have distinctive features. Surgical gloves (Figure 6) are the only product for which ASEAN is almost self-sufficient. 85% to 90% of ASEAN's imports come from ASEAN thanks to Malaysia and Thailand, respectively the top number 2 and 4 exporters at the world level. Indonesia is also a significant provider of gloves to ASEAN. Outside of ASEAN, all other suppliers play a minor role. The reason is that these three Southeast Asian countries are among the largest producers of natural rubber that they transform into several products ranging from surgical gloves to tyres.

PCR tests (Figure 7) are the only products for which Europe and the USA are the main albeit declining sources of supply. This is because PCR tests are medical devices that are more intensive in research and development as opposed to personal protective equipment, which is more intensive in natural resources and labour. Therefore, it is significant that Western countries are the leading suppliers, although China and the rest of Asia are catching up.

Vaccines belong to the same category of research-intensive products. Their production is concentrated in a few advanced countries (Evenett et al., 2021). The competition between big pharmaceutical companies is intense, as epitomised by the race to develop COVID-19 vaccines. Figure 8 shows that ASEAN has imported growing quantities of vaccines over 2001-2020, mainly from Europe followed by the USA. Surprisingly, India and China, respectively at the top 7 and 14 rank global exporters of vaccines, don't play the leading roles in ASEAN. This same pattern is found in Latin America and Africa, where the European Union is the main source of vaccines (Sorescu et al., 2021). One explanation is the high specialisation of the production of vaccines. Rich countries specialise in high-end and complex vaccines, while China and India specialise in the medium and low-end range.

Conclusion

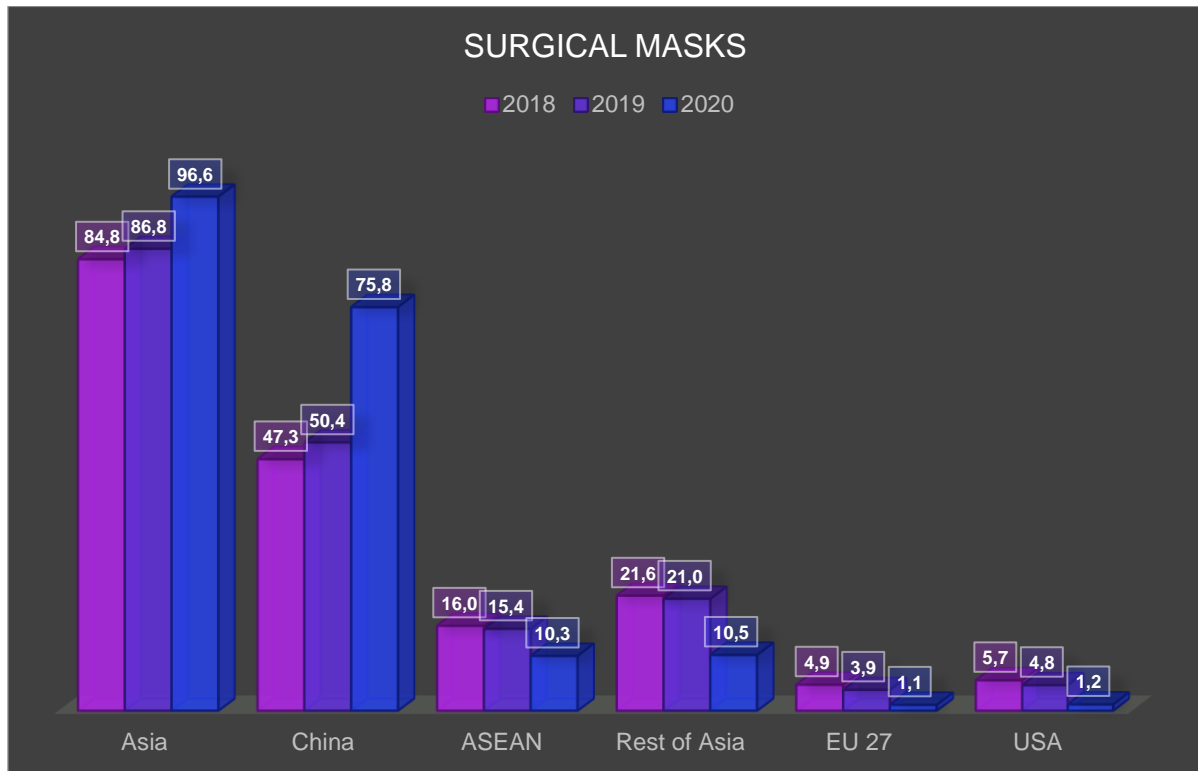
Our results confirm the primary role of the region in the supply of PPE. Asia, particularly China, Japan and Korea, are the leading suppliers of PPE to ASEAN. It is explained by the geographical proximity and the agreements between ASEAN and these three dialogue partners. It is undoubtedly an advantage for ASEAN, which is not self-sufficient for most PPE, although it counts top global exporters for some products among its state members. However, this advantage may be a weakness in a time of crisis. ASEAN is too dependent on China for certain products, which can become a problem when a pandemic hits China itself. This occurred between January and March 2020, when most of China was in lockdown, and the supply chains were stopped. Diversification of the sources of supply is desirable to minimise risks. For instance, the supply of PCR tests is more balanced. ASEAN should also develop its own production of the leading PPE and vaccines to have a more extensive set of capacities to handle health crises. Some of its member states have the scientific and industrial capacities to innovate and produce research-intensive products like medical equipment and vaccines. An ASEAN master plan of medical supplies could be elaborated and discussed collectively to assess ASEAN capabilities and potential collaborations to explore who can produce what and what kind of regional supply chains can be established. This could be achieved in cooperation with ASEAN dialogue partners, which dispose of advanced research and manufacturing capacities. ASEAN could then be better prepared to cope up with future pandemics.

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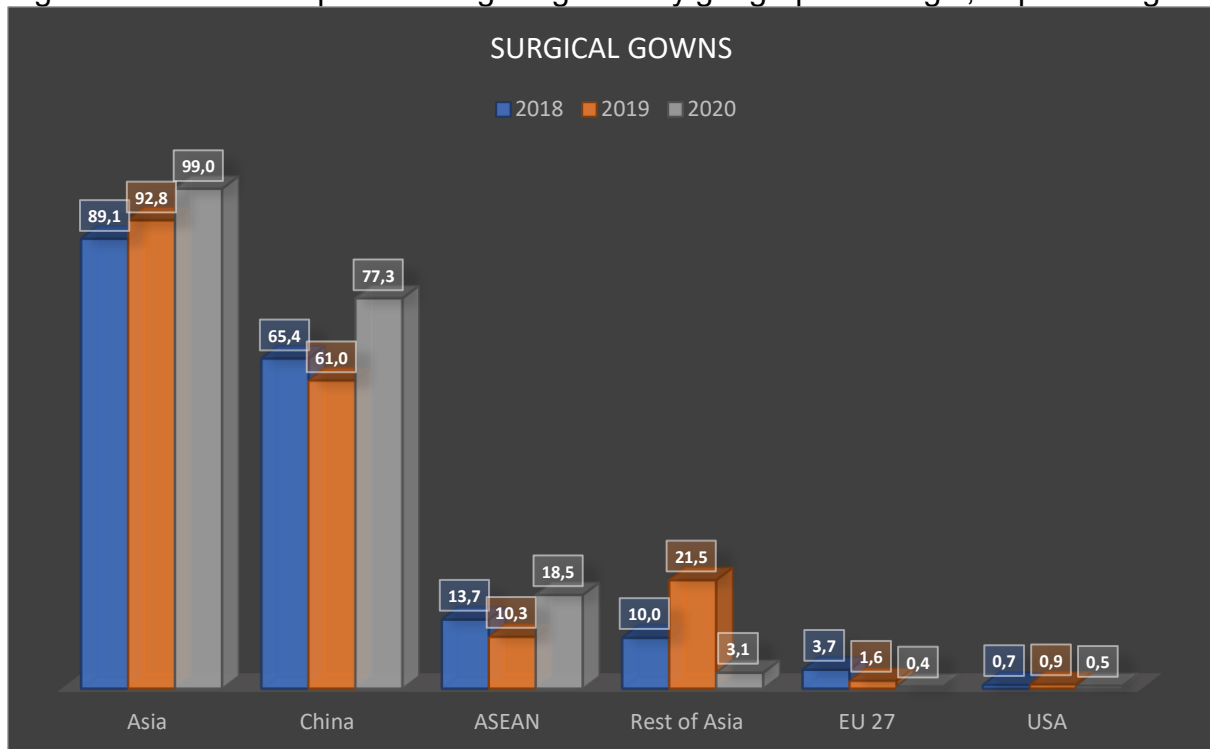
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Figure 1: ASEAN's imports of surgical masks by geographical origin, in percentage



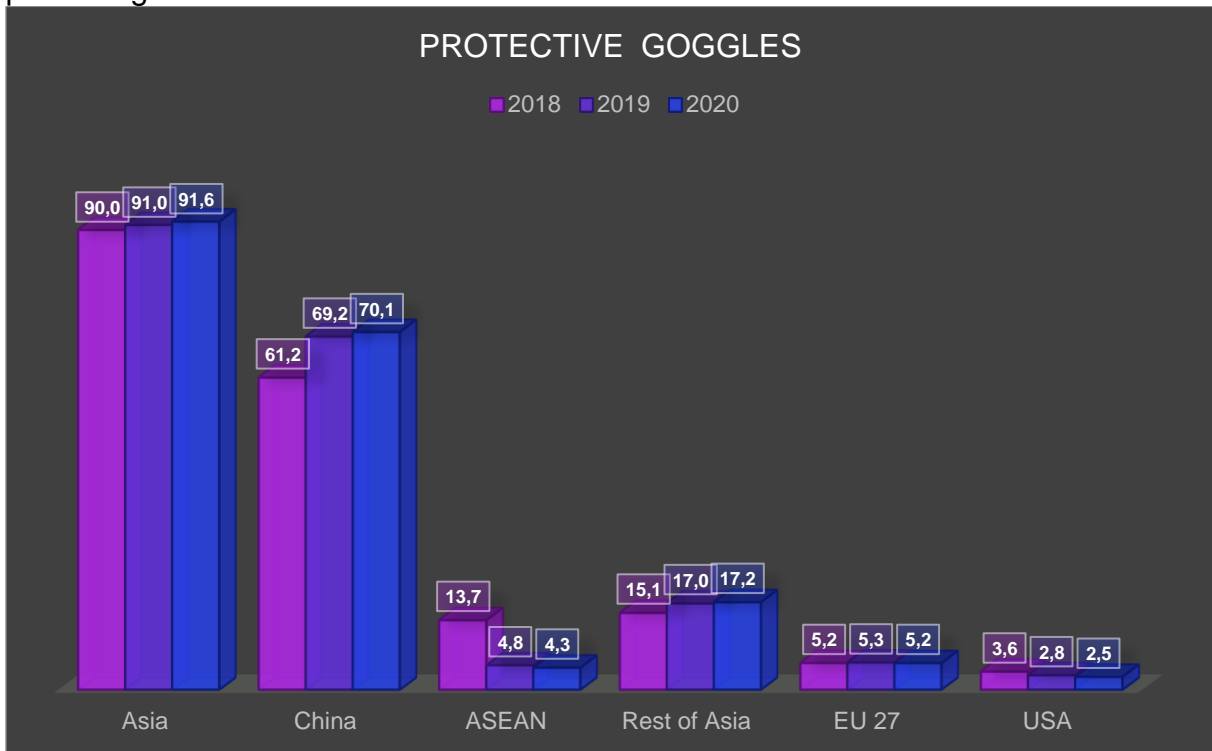
Source: Author's calculations with Trade Map, International Trade Centre, based on the Harmonised System (HS) and UNCOMTRADE, maintained by the United Nations Statistics Division.

Figure 2: ASEAN's imports of surgical gowns by geographical origin, in percentage



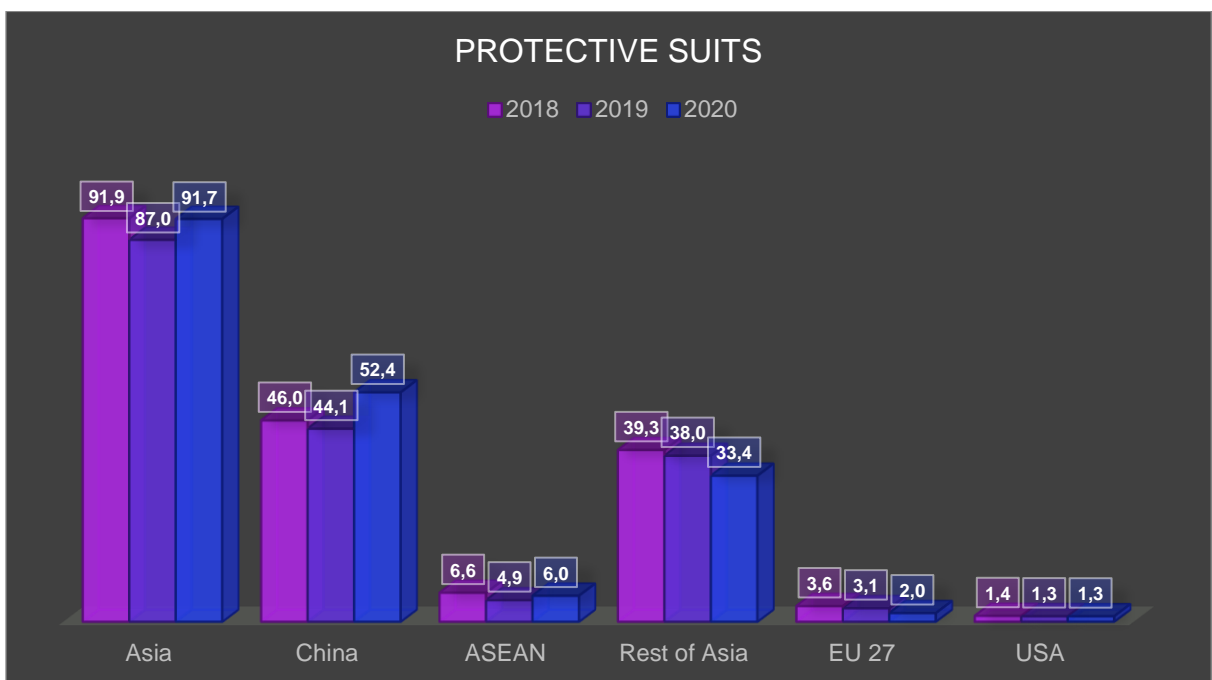
Source: Author's calculations with Trade Map, International Trade Centre, based on the Harmonised System (HS) and UNCOMTRADE, maintained by the United Nations Statistics Division.

Figure 3: ASEAN's imports of protective goggles by geographical origin, in percentage



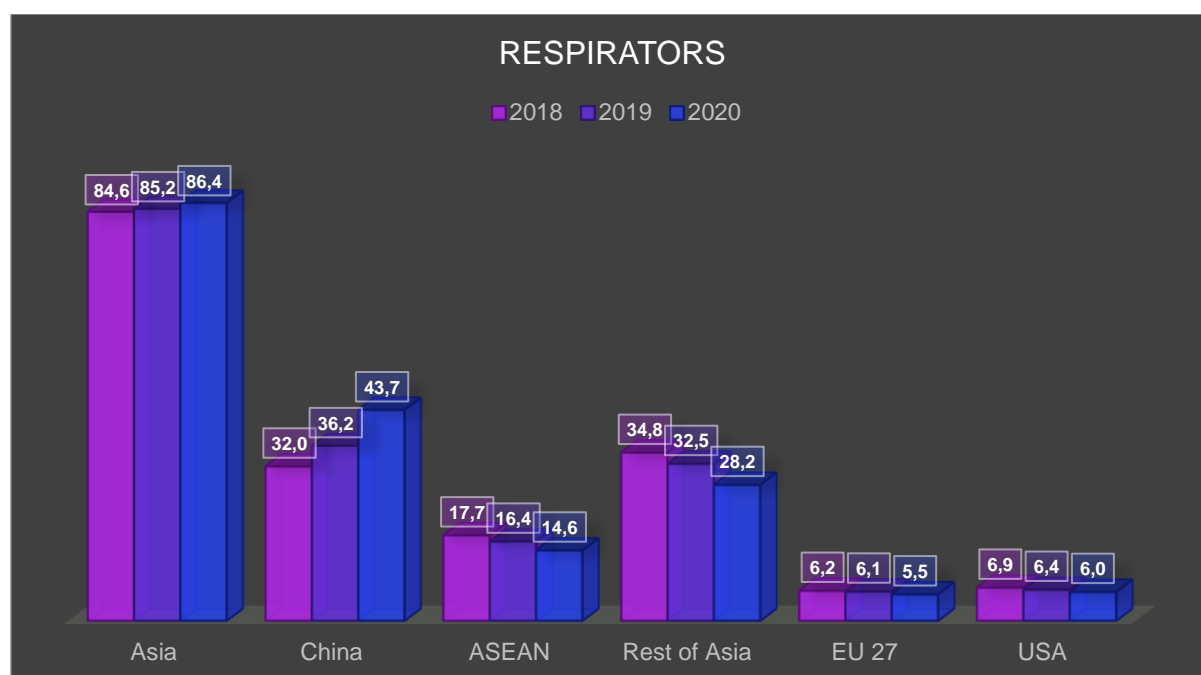
Source: Author's calculations with Trade Map, International Trade Centre, based on the Harmonised System (HS) and UNCOMTRADE, maintained by the United Nations Statistics Division.

Figure 4: ASEAN's imports of protective suits by geographical origin, in percentage



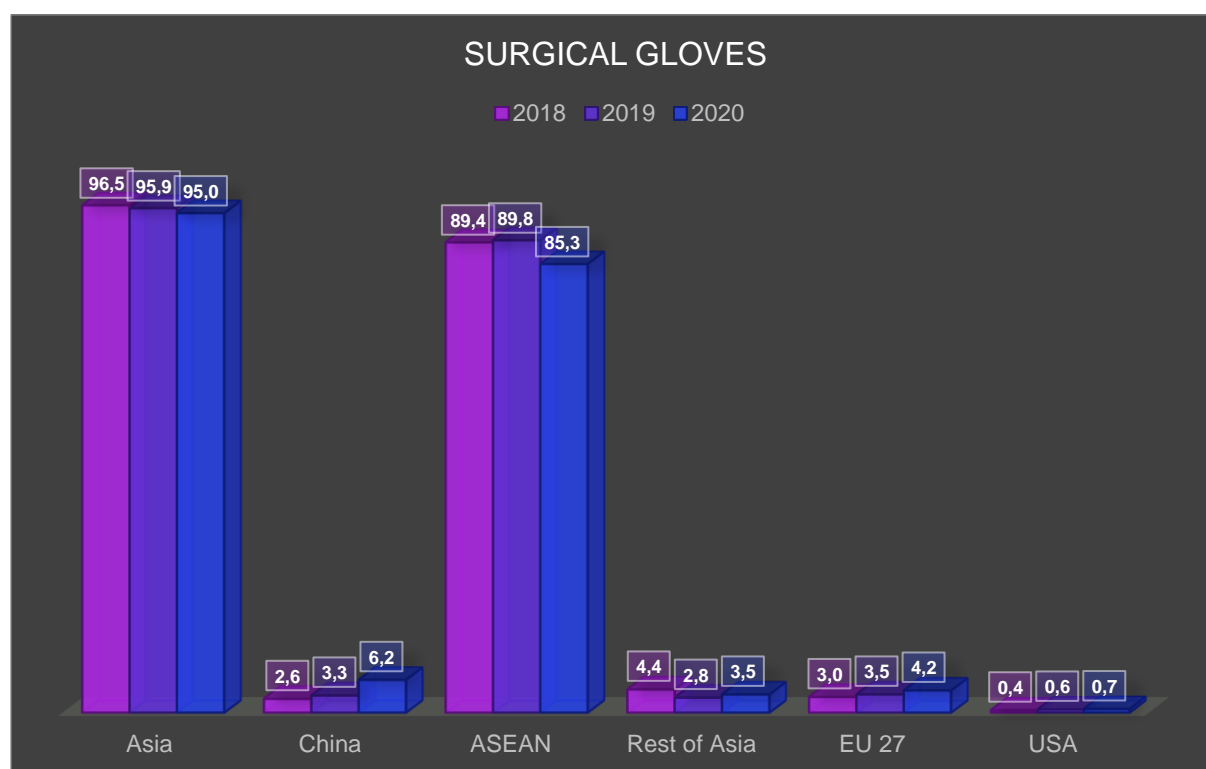
Source: Author's calculations with Trade Map, International Trade Centre, based on the Harmonised System (HS) and UNCOMTRADE, maintained by the United Nations Statistics Division.

Figure 5: ASEAN's imports of respirators by geographical origin, in percentage



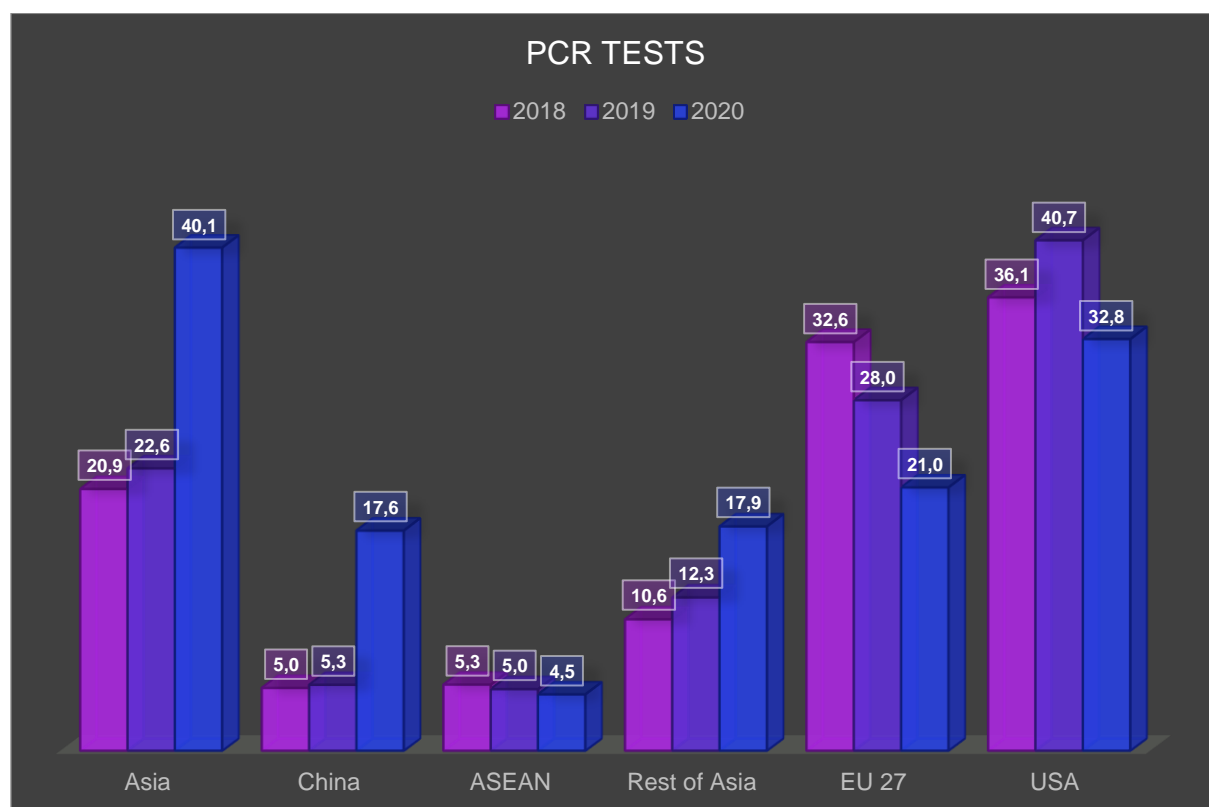
Source: Author's calculations with Trade Map, International Trade Centre, based on the Harmonised System (HS) and UNCOMTRADE, maintained by the United Nations Statistics Division.

Figure 6: ASEAN's imports of surgical gloves by geographical origin, in percentage



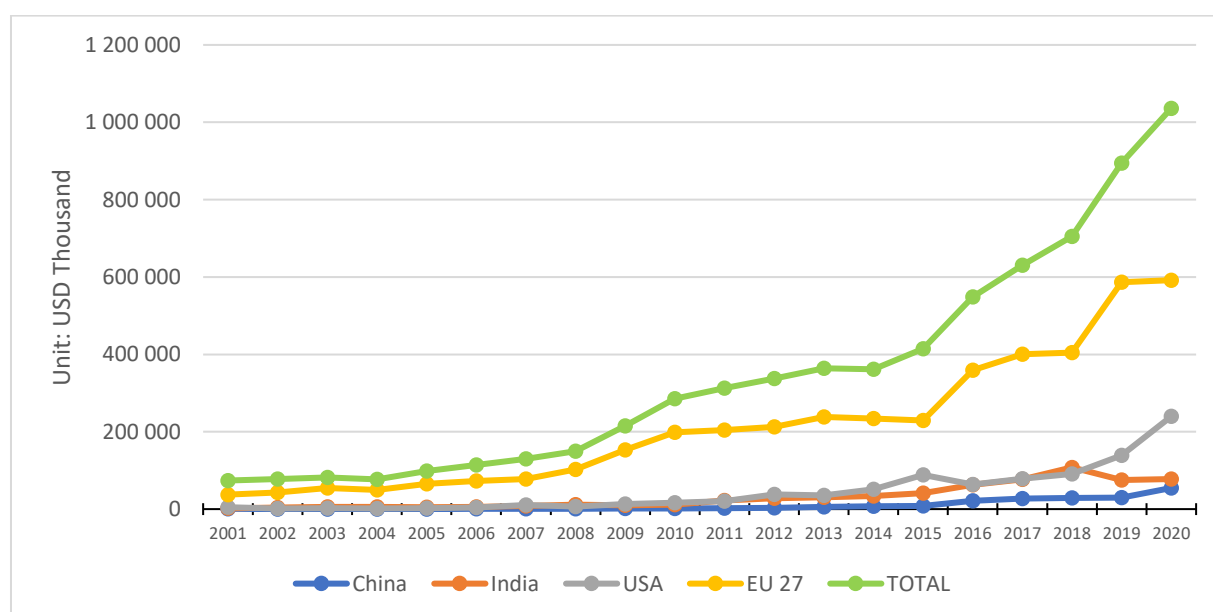
Source: Author's calculations with Trade Map, International Trade Centre, based on the Harmonised System (HS) and UNCOMTRADE, maintained by the United Nations Statistics Division.

Figure 7: ASEAN's imports of PCR tests by geographical origin, in percentage



Source: Author's calculations with Trade Map, International Trade Centre, based on the Harmonised System (HS) and UNCOMTRADE, maintained by the United Nations Statistics Division.

Figure 8: ASEAN's imports of vaccines for human medicine by geographical origin, USD thousands, 2001-2020



Source: Author's calculations based on Trade Map, International Trade Centre, based on the Harmonised System (HS) and UNCOMTRADE, maintained by the United Nations Statistics Division.