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INDUSTRIAL POLICY AND COVID-19 RESPONSES

The COVID-19 pandemic is not exclusively a public health crisis. It has spiralled into a complex global socio-economic crisis of a kind not seen since the Second World War. Unlike the 2008 global financial and economic crisis, the current economic crisis is interlocked with a public health emergency at a time of weak global collaboration and has exposed the vulnerability of the economic system. It has also revealed wide differences in government policy responses, highlighting various industrial policy and developmental roles of governments. This paper maps and analyses the variation in governments' responses to the public health emergency and in their economic rescue packages.

Política industrial y respuestas al COVID-19

La pandemia de COVID-19 no es exclusivamente una crisis de salud pública, sino que ha desatado también una compleja crisis socioeconómica no vista desde la Segunda Guerra Mundial. A diferencia de la crisis económica y financiera global de 2008, la crisis económica actual está entrelazada con una emergencia de salud pública en un momento de escasa colaboración global y ha expuesto la vulnerabilidad del sistema económico. También ha mostrado amplias diferencias en términos de respuestas de políticas públicas, subrayando el papel de los Gobiernos en diversos ámbitos de política industrial y de desarrollo. Este artículo muestra y analiza la diversidad de respuestas gubernamentales a la emergencia de salud pública y los paquetes de rescate económico.

Keywords: industrial policy, COVID-19 pandemic, economic recovery, Government, innovation.

Palabras clave: política industrial, pandemia de COVID-19, recuperación económica, Gobierno, innovación.

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1. Introduction: COVID-19 and industrial policy

The COVID-19 pandemic exceeds earlier pandemics in gravity and scale because of the virus's exponential spread in an increasingly interconnected world. The scientific community's current understanding of the nature of the pandemic is incomplete. Unlike SARS, Ebola, and MERS, which had national and regional dimensions, COVID-19 has engulfed all continents and countries, infecting almost 10 million people with 500,000 deaths reported by the end of June.¹ The intensity of the health crisis is unparalleled; nothing like it has been seen since the Spanish flu epidemic of 1918. The health emergency is likely to continue until a vaccine is found and made universally available to every country, or at least until effective treatments are discovered and rolled out globally at low cost.

The COVID-19 pandemic is not, however, exclusively a public health crisis; it has spiralled into a complex global socio-economic crisis of a kind not seen since the Second World War. Unlike the 2008 global financial and economic crisis, the current economic crisis is interlocked with a public health emergency at a time of weak global collaboration, making it the most complex and damaging crisis to hit the world in living memory and exposing the vulnerability of the economic system. The economic crisis has overwhelmed advanced, emerging, and developing economies alike, and is expected to have short-, medium-, and long-term consequences, as well as a disproportionate sectoral impact. With a dramatic shrinkage in the growth of advanced economies predicted, together with the slowest growth in China's economy in decades, and with emerging and developing economies hit by domestic shocks and international turmoil, the World Bank forecasts a fall in global GDP of some 5.2 per cent (as a baseline forecast around which there continues to be high uncertainty) (World Bank, 2020).

¹ The data are changing daily; the WHO situation report can be referred to for the latest Tables.

This paper maps and analyses the variation in governments' responses to the public health emergency and in their economic rescue packages, showing how governments experienced in industrial policymaking have translated industrial capability into appropriate public health emergency responses. At a time when interest in industrial policy is increasing, a key insight that may be drawn from this paper is the adaptability of industrial policy, which continues to be vital for economic catch-up and learning.

The paper is structured in seven sections. Sections 2 and 3 review the response of governments to the COVID-19 pandemic, focusing on the economies of Taiwan, South Korea, Singapore, and China, with relevant examples from responses in the United Kingdom (UK) and United States of America (US). Section 4 reviews diverse economic stimuli and economic rescue packages with a focus on the US, Germany, China, and Japan. The fifth section examines the evolving debate on global value chains and shows that COVID-19 does not herald the end of global value chains but rather their gradual transformation to improve resilience and agility. Section 6 presents examples from developing countries with a selective focus on Ethiopia to illustrate the footprint of industrial policy and how COVID-19 has influenced the adaptability of industrial policy. The final section presents concluding remarks and pathways to the future. It is hoped that this paper will inspire new research and encourage productive debate.

2. The depth and complexity of the 2020 crisis

The response to the COVID-19 crisis has the following distinctive features. First, the crisis came at a time when the international governance structure was at its weakest point in decades, when the G-7 and G-20 economies were at an impasse, consumed by their own internal challenges, and when the United Nations and international financial institutions (IFIs) such as the World Bank and the IMF had been pushed to the margins of the global economy. International posturing, particularly

among major economies, has undermined the response to both the health emergency and the economic recession. Poor international collaboration—or a complete absence of it—stands in contrast to the international collaboration of the post-Second World War recovery period (which led to the founding of the Bretton Woods institutions), the 1997 Asian crisis, and the post-2008 economic recovery, as well as the global response to the SARS, MERS, and Ebola pandemics.²

Second, unsurprisingly, lack of uniformity in government responses and policies in both advanced and developing economies reflects the types of governments, their strengths, and their political constraints. The public health emergency aspect, the emphasis on public awareness, testing and tracing, social distancing, and national lockdown strategies have varied. The scale of the economic rescue packages has varied, as has the focus on support for households, businesses and employment, and targeted investment in the new economy.

Third, it is important to distinguish the pattern and nature of policy responses and measures by governments. The response to the 1997 Asian crisis and the 2008 global economic recession essentially focused on economic liberalization and structural reform prescription, and austerity rather than economic stimulus, and for many countries this involved the imposition of conditionalities by the IMF and other IFIs. In the early 2020s, as during the depression of the 1930s and the post-Second World War recovery, states' strategic attributes illustrate their strong inclination to intervention, activism, and developmentalism.³

Indeed, the COVID-19 pandemic has reawakened a widespread appreciation of the scope of what states can do to protect welfare and stimulate, or even simply keep alive, economic activity. Even in the most liberal of economies, the US and UK, governments and monetary authorities have adopted extraordinary measures.

The Federal Reserve in the US cut interest rates to almost zero and announced unlimited purchases of government-owned debt and mortgage-backed debt, among other far-reaching measures, while the government introduced a US\$3 trillion fiscal package to support firms, local governments, and households.

In the UK, the response in some ways echoed that of World War II, when Churchill strongly opposed interventions in markets but came to realize the need for intervention (leading to the food rationing system, among other things). In 2020 the Conservative government was at first loath to introduce social controls but eventually did impose a lockdown and school closures. After years of austerity in the wake of the 2008 crisis, the government rolled out £16 billion of additional spending on the health service and related services, £29 billion of support for businesses, and an £8 billion strengthening of the social safety net. Huge new loan guarantee schemes for businesses were introduced, along with trade credit insurance guarantees, support for furloughed employees, and so on. Small middle-income economies like that of Georgia in the southern Caucasus, which have prided themselves in recent years on their commitment to small government, have revealed their capacity for swift and sweeping government action to mitigate the health shock and to prevent economic freefall as tourism receipts and foreign investment plummeted. The IMF's COVID-19 policy response tracker gives a full overview of the extraordinary range and depth of government actions globally.⁴

Interest in industrial policy has been increasing recently globally, emerging from a 'district' of heterodox economics into the mainstream (Cherif and Hasanov, 2018; Oqubay *et al.*, 2020). Arguably, the COVID-19 story highlights the industrial policy and developmental role of governments. Governments with rich experience of industrial policymaking have shown a remarkable ability to translate industrial capacity in the

² The Cold War divide and geopolitical rifts impeded global collaboration until the fall of the Berlin Wall.

³ See Mazzucato (2011) and Best (2018).

⁴ <https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19#U>

TABLE 1
COVID-19 CASES

Economy	Total cases	Deaths	Population	Cases of population (%)	Deaths of total cases (%)
US.....	1,857,872	107,911	330,878,796	0.56	5.8
Brazil	614,941	34,021	212,465,738	0.29	5.53
UK.....	283,315	40,261	67,863,678	0.417	14.2
Germany.....	183,678	8,646	83,770,211	0.219	4.7
China	84,620	4,645	1,438,984,710	0.0059	5.49
Singapore	37,183	24	5,847,237	0.636	0.064
South Korea.....	11,719	273	51,265,459	0.23	2.33
Ethiopia.....	1,805	19	114,782,302	0.00157	1.053
Taiwan	443	7	23,814,061	0.00186	1.58
World	6,663,304	392,802	7,789,615,750	0.0855	5.89

SOURCE: Computed from WHO, World Meters and World Population Review (2020).

economy into public health capacity in their response to the pandemic. Some governments have proactively repurposed their industrial capacity; some have been less affected by the disruption of global value chains.

3. Variation in government responses to the pandemic

The varied impact of the pandemic

The health toll from COVID-19 on different countries has varied enormously. The intensity of the public health crisis—infections and excess mortality attributable directly or indirectly to the coronavirus—did not map neatly onto population share or incomes per capita. The three hardest-hit countries, by early June, were the US, Brazil, and the UK, which together accounted for over 40 per cent of total reported cases and over 46 per cent of all deaths. Occurrence and fatalities in the US were 6.5 times the world average, and the country recorded 28 per cent of both total reported cases and fatalities, even though it represents only 4 per cent of the world's population (see

Tables 1 and 2). Brazil followed, recording over three times the global average occurrence and accounting for 9 per cent of total reported cases and fatalities, while its share of world population is below 3 per cent. Reported cases and fatalities in the UK were 4 per cent and 10 per cent respectively, despite its under 1 per cent share of world population.

Germany was moderately hit, and its reported infections and fatalities were around 3 and 2 per cent respectively for its 1 per cent of world population. China, which faced the initial COVID-19 outbreak, was able to contain the pandemic and accounted for 1 per cent of cases and fatalities despite its over 18 per cent share of world population. China's effective containment gave a two-months' breathing space, valuable time that could have been used for learning and for an effective response. South Korea, Singapore, and Taiwan are among the economies that were mildly affected, responding effectively despite their proximity to the epicentre in Wuhan, China. Although by June 2020 the pandemic was in the early stages in Africa, Ethiopia had only been mildly affected. Examining the

TABLE 2
COVID-19 DISTRIBUTION

Country	Cases of world total (%)	Deaths of world total (%)	Population of world total (%)	Share of world COVID-19 cases adjusted by world population share	Share of world deaths adjusted by world population share
US.....	28	27.5	4.25	6.6 times	6.5 times
Brazil	9.23	8.66	2.73	3.4 times	3.2 times
UK.....	4.25	10.25	0.87	4.9 times	12.8 times
China	1.27	1.18	18.47	0.07 times	0.06 times
Germany	2.75	2.2	1.05	2.6 times	2 times

SOURCE: Computed from data in Table 1.

policy patterns that influenced these variations will suggest lessons for policymaking, although additional research is also essential.

Efficient government and coherent responses

Despite delay and confusion in December, between January and March China acted decisively: Wuhan and the outer metropolitan area were locked down, and the public health emergency response swung into full action. The government ensured the communication of a single message, with maximum coordination among all government bodies at central, provincial, and local levels. It did not, however, place the whole country under lockdown, which would have worsened the paralysis and damaged the economy, as experienced in many industrialized West European countries. Elsewhere in East Asia, where there was a strong tradition of effective state intervention and where pandemic response planning capacity was based on the previous experiences of SARS in 2003 and MERS in 2014, governments acted effectively to contain the pandemic without total lockdowns.

By contrast, responses in the US, UK, and Brazil were slow, indecisive, and occasionally chaotic. Conflicting and often contradictory messages were

communicated to the public. The Trump administration was engaged in international posturing and finger pointing at the WHO instead of focusing on effective containment. Valuable preparation time was wasted in confusion, and government agencies suffered from poor coordination. Evidence and advice from the scientific community was not pursued consistently. The shortage of ventilators and personal protective equipment (PPE) became critical and medical resources were slow to be mobilized. The situation appeared to be little different in the UK.

Channelling technological and industrial capacity to the public health emergency

The fight against COVID-19 is a battle of technological advances and innovations and of organizational coherence. Not only the earlier experiences with SARS and MERS, but also decades of close state–business relations geared to national development goals lay behind the coherent public health, economic, and productive response to COVID-19.⁵

⁵ On East Asian industrialization, see Johnson (1982); Amsden (1989, 2001); Nayyar (2019); Ohno (2019); Oqubay and Ohno (2019); and Wade (2004).

Taiwan's coronavirus success has been based on "efficient coordination across the public and private sectors coupled with innovative deployment of advanced technology – the very same recipe that has delivered decades of economic growth" (Feigenbaum and Smith, 2020). Taiwan, which had already started to focus on bio-medicine, artificial intelligence, and digital health, used these technologies and big-data applications effectively, integrating its national databases, tracking incoming travellers, using cell phones to trace and organize quarantine, and applying digital technology to administer the demand and supply of face masks (Feigenbaum and Smith, 2020; Tseng, Cheng, and Jun, 2020).

Equally, the measures taken by South Korea were supported by advanced technologies (*Time*, 2020). Diagnostic testing capacity was at the heart of the fight against COVID-19. Big-data approaches to contact tracing and digital technology were used effectively, if somewhat over-zealously early on (Zastrow, 2020). Within a few days of the first reported COVID-19 cases, the South Korean government fast-tracked and incentivized five domestic biotechnology firms to pursue production of COVID-19 testing kits for both domestic use and export (Zastrow, 2020; *Time*, 2020). Over the last ten years, Singapore has developed a diagnostic development hub and attracted biotech firms. This was complemented by free testing with treatment costs covered by the government. Singapore used digital contact tracing with a special Trace Together app to effectively limit the spread (Hsu and Tan, 2020).

China used artificial intelligence and big data for tracing and coordination. China's significant advantage was that it was able to use its industrial capacity and scale to build new hospitals and manufacture medical equipment and pharmaceutical goods. China has emerged as the largest production hub for ventilators, PPE, and testing kits, becoming the leading exporter and accounting for more than half of global production. Even before the pandemic, China accounted for

45–50 per cent of the global output of PPE (PIIE, 2020; EHS Today, 2020; Harvey, 2020), thanks to depth and completeness of its supply chains, its highly productive industrial eco-system, and its modern connectivity infrastructure.

Learning and adaptation

According to Ken Caldor (HUB, 2020), the East Asian cases show, as during the five decades of industrial transformation and technological catch-up, that "in emergencies, there is a key potential role for government in jump-starting response, stimulating production, and facilitating supply. And there is also a role for government in planning ahead, while learning from the past, and respecting the dynamic creative potential that market forces ensure."⁶

The East Asian countries learnt serious lessons during previous recent pandemics. China learnt from SARS in 2003. Similarly, Taiwan and Singapore drew up public health emergency plans and put a command centre in place (Tay and Chen, 2020). South Korea's learning and comprehensive measures were based on MERS. According to Kent Calder (HUB, 2020), "MERS, for instance, compelled South Korea in 2015 to revise its infectious diseases laws, requiring more information disclosure to the public, and harmonizing important medical care and contingency planning policies. As a result of these legal and institutional changes, responsive to the MERS pandemic, together with its longstanding tradition of government-business cooperation, South Korea was prepared to move quickly and decisively against COVID-19."

In summary, the East Asian cases show how the industrial policy approach and the industrial and technological transformation capacity translated into an effective and coherent government response to the

⁶ <https://hub.jhu.edu/2020/05/13/east-asian-response-to-coronavirus/>. See also Cimoli, Dosi, and Stiglitz (2009); Cherif and Hasanov (2018), and Lee (2019).

public health emergency. Learning from past pandemics has invigorated the knowledge base and response to Covid-19.⁷

4. Economic stimulus and response to the crisis

Governments worldwide —mainly those of industrialized economies— have earmarked a total of over US\$8 trillion, though primarily financed by debt at low lending interest rates enacted by reserve banks. However, with ineffectual worldwide coordination, diverging economic stimuli and rescue plans are expected to produce differing impacts on economic recovery. The biggest economic stimuli (US\$ 6.5 trillion), accounting for two-thirds of the total package, have been allocated by the US, Japan, and Germany. The economic stimulus broadly consisted of three components serving different aims: supporting households to survive the crisis; providing resources for businesses to support employment; and targeting investment to create a new economy with a particular focus on innovation and technological capability, productive capacity, and high-quality infrastructure. In the long term, it is the investment in the new economy that will determine the landscape of international competitiveness.

The productive response in other major global economies has been more varied, but it is clear that the pandemic has concentrated minds and given a boost to those pushing for renewed attention to industrial production, technical progress, and competitiveness. Germany's economic stimulus package is Europe's largest, amounting to US\$1.5 trillion and including support for the digital economy, expansion of the auto industry, a major subsidy for electric cars, and measures to combat climate change, as well as family

support for every child and a reduction of value-added tax.⁸ The German package benefits from negotiation and agreement between the major political parties, consultation and negotiation between the federal government and states, and dialogue with industry. Support is given to small and medium firms, and other 'old' industries that impact on employment creation have also been targeted, such as Lufthansa (DW, 2020). Germany has drawn on a long tradition of long-run finance (e.g. through KfW) and of close relationships between finance and business. And it appears that the pandemic has accelerated a shift away from austere macroeconomic policy towards a more expansionary fiscal stance.⁹

The rationale and guiding principle outlined by Chancellor Merkel is that "it's clear that all of this requires a bold response [...] it's about securing jobs, and keeping the economy running, or getting it going again".¹⁰ In addition to this, Merkel is focusing on support for the new economy and global champions: "We have seen that others, whether the United States of America, South Korea, Japan, or China, have relied very heavily on global champions [...] I believe that this approach is the necessary answer."¹¹ These measures focus on strengthening Germany's innovation, and the manufacture and export of industrial technology and equipment, one of the leading contributors to its GDP and employment.

The coronavirus has shifted the conversation, with the vision "*Made in Germany: Industriestrategie 2030*" championed by Merkel's activist strategy.¹² The strategy

⁸ See <https://www.wsj.com/articles/germanys-second-coronavirus-stimulus-package-brings-total-support-to-1-3-trillion-11591226131>, accessed on 6 June 2020.

⁹ 'The minds behind Germany's shifting fiscal stance' (*Financial Times*, 9 June 2020).

¹⁰ See <https://www.google.com/amp/s/amp.dw.com/en/germanys-angela-merkel-unveils-stimulus-package-to-kickstart-economy/a-53677420>, accessed on 6 June 2020.

¹¹ See <https://www.aljazeera.com/ajimpact/germany-bold-economic-plan-post-coronavirus-world-200529073603746>, accessed on 6 June 2020.

¹² On big businesses and national champions, see Chandler (2004) and Nolan (2014).

⁷ See also Johnson (1982); Amsden (1989, 2001); Nayyar (2019); Ohno (2019); Oqubay and Ohno (2019); and Wade (2004).

includes “a 100 billion-euro fund to buy stakes in companies, to be increased if needed; German states encouraged to set up similar funds to safeguard local champions; takeover controls are being extended to give the government authority to block foreign purchases for ‘potential interference’; seeding burgeoning industries like artificial intelligence, battery-cell production and clean energy; promoting local suppliers to reduce reliance on companies outside the EU”.¹³ COVID-19 economic measures have also included a restriction on takeovers by Chinese firms, with the aim of “protect[ing] critical European assets and technology in the current crisis”.

The focus on the green economy, innovation, and support for the auto industry has been followed by other European countries such as France. President Macron highlighted: “We must not only save the industry, but transform it”.¹⁴

Similar ideas have emerged in the US, but the actual policy response thus far has been less strategically coherent. While the size of the economic stimulus is significant (US\$3 trillion) and it was passed with relatively little conflict, it has, according to Joseph Stiglitz and Larry Summers, major flaws.¹⁵ The recovery package was “badly designed”, leading to delays during implementation and making it difficult to measure outcomes. The stimulus contains components of household support, support for firms to maintain employment levels, and new economy. However, insufficient conditions are imposed on firms seeking to access support to preserve employment. Ailing big businesses in the air industry, including commercial aircraft manufacturers who have failed to be competitive, are among the beneficiaries. Some big businesses have shown reluctance to accept conditions and have ignored calls not to lay off their workers.

¹³ See <https://www.aljazeera.com/ajimpact/germany-bold-economic-plan-post-coronavirus-world-200529073603746.html>, accessed on 6 June 2020.

¹⁴ See <https://www.fr24news.com/a/2020/05/france-unveils-8-billion-euro-stimulus-package-for-the-automotive-industry-news-dw.html>, accessed on 6 June 2020.

¹⁵ See Bloomberg (2020); CNBC (2020); and Pulse (2020).

However, the resources allocated for the creation of the new economy are too little and too late. The bipartisan Endless Frontier Act initiative promises to focus on driving innovation, science, and technology in “strategic technologies central to the competition”, including artificial intelligence and machine learning, advanced and quantum computing, advanced manufacturing, disaster prevention, advanced communications technology, biotechnology, cybersecurity, and advanced energy.¹⁶ The legislation proposes the re-establishment of the American Science and Technology Foundation.

According to Schumer (2020): “The coronavirus pandemic has shown the science and technology gap between the United States and the rest of the world is closing fast and that threatens our long-term health, economic competitiveness, and national security. [...] To ensure our advantage, our bill treats scientific research as a national security priority and provides substantial new investments into funding critical research and development to build the industries of the future in regions across the country.”¹⁷

However, the bill has yet to be approved by both the Senate and the House of Representatives. Even after approval the scale of the resources will be too small to achieve the ultimate goal of building a new economy, and much will depend on effective implementation. Meanwhile, MIT president Rafael Reif has argued: “unfortunately, much of the resulting policy debate has centred on ways to limit China’s capacities — when what we need most is a systematic approach to strengthening our own”.¹⁸

¹⁶ See <https://www.congress.gov/bill/116th-congress/house-bill/6978>, accessed on 6 June 2020; <https://www.congress.gov/bill/116th-congress/senate-bill/3832>, accessed on 6 June 2020; and <https://www.young.senate.gov/newsroom/press-releases/young-schumer-unveil-endless-frontier-act-to-bolster-us-tech-leadership-and-combat-china>, accessed on 6 June 2020.

¹⁷ <https://www.young.senate.gov/newsroom/press-releases/young-schumer-unveil-endless-frontier-act-to-bolster-us-tech-leadership-and-combat-china>, accessed on 6 June 2020.

¹⁸ See <https://www.google.com/amp/s/thehill.com/opinion/technology/500417-is-the-endless-frontier-at-an-end%3Famp>, accessed on 6 June 2020.

The outcome will be determined by three key factors. First, while the three components are critical for curbing the crisis and introducing a gradual recovery, the size and nature of each component will shape the outcome. How well the stimulus package is designed is as important as the speed with which measures are put in place. Second, the presence of effective governments is essential to ensure the success of economic recovery in the soonest possible time. Extraordinarily effective government has been the hallmark of those East Asian countries with proven record of effective policy, it will have an equal bearing on the outcome. Third, how public health measures and economic measures are integrated and harmonized will be key to the outcome. However, preliminary signs are that countries with strong manufacturing sectors have done better in terms of both public health mobilization and speed of recovery from the economic impact of the pandemic, Germany and China being typical examples.

5. Global value chains

In the last four decades, global value chains and global production networks, driven by the pursuit of ever lower production costs and global specialization, spearheaded by multinational corporations, and coupled with flexible just-in-time production systems, have become all-pervasive (Akyüz, 2017; UNCTAD, 2013; Gereffi, 2018). Building resilience has become a key concern for advanced and emerging economies, including those national governments and firms that have questioned the unfettered global value chain system. This pattern has been entrenched by the rise of protectionism, populism, economic intervention, and anti-globalization sentiment.

Globalization, featuring the mobility of capital, goods, and information, has been the dominant economic force of the last four decades. At its peak in 2007, a total of US\$2 trillion of FDI was recorded. This process has been facilitated by ICT and advances in transportation, and spearheaded by transnational and multinational

corporations with global production networks. Opportunities have opened up for developing countries to be inserted into global value chains, although few have managed to upgrade their role. These global value chains exhibit different structures and global production systems, in what Peter Nolan termed a “global business revolution” (Nolan, 2014). The pattern of global value chains across different industries has varied. While some are buyer driven (such as the apparel sector), others (such as commercial aircraft manufacturers) are technology or producer led.

However, global value chains, which have brought immense benefits for production efficiency and trade, have now become vulnerable and are among the weakest links in the global economy. GVCs accounted for around 50 per cent of global trade by the time of the 2008 financial crisis, but for a number of reasons, including rising protectionism and US–China trade tensions, their share of world trade has been declining ever since. COVID-19 has exposed the vulnerability of global value chains. Supply chains have been interrupted by health concerns and travel restrictions. Major transportation firms at the heart of GVC activities have suffered existential threats. Countries exporting commodities that feed into upstream GVC activities have suffered from falling demand. Supply has slowed down in countries dependent for their output on imported inputs. Dollar finance in emerging-market GVCs has become more costly as risk spreads have increased (World Bank, 2020, pp. 117-120).

Among the significant implications for firms and governments are, first, that regional economic integration and regional value chains will be reinforced. ASEAN has been a thriving regional value chain and will have more scope going forward. It has been the strongest regional value chain worldwide and lessons may be learned from its evolution. However, as lead firms diversify their risk, regional value chains in other continents and regions will have the opportunity to expand. Second, there will be a move towards a simpler, shorter value chain and robust vertical value chains in some industries, although this is not possible in all industries.

Third, value chains will be redirected towards home markets, with production elements reshored that can be substituted by advanced industrial technologies such as automation, robotization, and digital technology (Seric and Winkler, 2020). This will have implications for developing countries who are competing on low labour costs.

At present, intra-Africa trade constitutes 16 per cent of total African trade — the lowest of any region. If African countries do not expand their productive capacity and diversify their economies, the prospect of increasing intra-Africa trade will remain a dream. Interestingly, nearly half of Africa's intra-Africa trade is in manufactures. Moreover, informal cross-border trade in Africa accounts for more than formal intra-Africa trade and some of the goods traded informally are also manufactured within Africa. Thus, pushing diversification into the manufacturing agenda and the pursuit of exports in Africa is critical for future growth and the success of the African Continental Free Trade Area (AfCFTA).¹⁹

6. Industrial policy and COVID-19 in Africa

African governments have taken swift and bold measures to curb the pandemic and economic measures to reduce its economic impact and cost. The responses are as diverse as the continent itself, revealing local conditions, the evolution of the pandemic, resource constraints, and broader socio-economic issues. The number of reported cases in Africa in late June 2020 was 350,000 and fatalities stood at 9,000, considered very low in terms of worldwide trends.

Public health emergency response

On the health emergency side, most African governments have taken community awareness and social distancing measures. The three countries with the

highest number of reported cases were South Africa, Egypt, and Algeria, accounting for nearly 45 per cent of total. According to the Africa Centres for Disease Control and Prevention (Africa CDC), diagnostic tests were extremely low at continent level, with 2,700 tests per 1 million population and a positivity ratio of 7 per cent. However, there is major disparity between African countries, South Africa recording the highest number of diagnostic tests at 20,000 tests per million, while Ghana and Ethiopia averaged 3,000 tests per million, and Algeria and Nigeria have been limited to 500 tests per million population. However, an isolated example of Ethiopia's response illuminates a different policy approach and outcomes.

Ethiopia, Africa's second most populous country, has had 2,000 cases and 20 fatalities, among the lowest both globally and in Africa. The government is among the exceptions in not having implemented a national lockdown, because effective implementation is not only complicated but causes serious and far-reaching damage to the livelihood of the poorest people. Sustaining the gains registered by Ethiopia in the last two decades was essential for maintaining economic growth, reducing poverty, and accelerating economic transformation. Its "sustained medium to strong measures" strategy recognized that Ethiopia primarily relied on its preventive and primary health care system to respond to the pandemic. For a decade and a half Ethiopia's government has been using active industrial policy to pursue developmentalism and economic transformation, and the country has emerged as one of the world's fastest-growing economies (Oqubay, 2015, 2019).²⁰ A review of Ethiopia's response is likely to reveal how industrial policy is pursued by developing countries in Africa.

From January 2020, the government introduced selective measures, principally focused on public awareness and voluntary public action. Rapid

¹⁹ Thirlwall (2013) highlights the vitality of exports in terms of relaxing balance-of-payment constraints and sustaining rapid growth.

²⁰ See *Financial Times*, 23 December 2019, 'Ethiopia seizes crown as fastest-growing country in the 2010s'. <https://www.ft.com/content/c71cd2e5-7e32-4675-9680-e94bfd7f055d>

mobilization of quarantine, isolation, and treatment centres was achieved by converting facilities such as public universities. Door-to-door screening was established involving over 50 million people.²¹ Transparent information was given on a daily basis by the health minister, with regular announcements made by the Prime Minister. The ministerial cabinet provided overall leadership with various ministerial subcommittees. The government introduced effective coordination among federal agencies and the different levels of government. Collaboration with the private sector, faith communities, and development partners was emphasized. In short, Ethiopia's approach was unconventional.²²

Economic measures

African governments face major resource and fiscal constraints when it comes to providing effective economic responses, and priority is a highly political issue (Chitonge, 2020). South Africa and Egypt announced the biggest stimulus packages, about US\$26 billion and US\$6.2 million respectively. However, it is too early to review how effectively they are being implemented or which social group the packages target. Effective lockdowns are constrained not only by the low economic levels but also by living conditions and community trust in national institutions (Egger, Jones, Justino, Manhique, and Santos, 2020).

In Ethiopia, the government reallocated the budget in response to the pandemic and mobilized voluntary resources. From the outset the government made a conscious decision that it is impossible to provide economy-wide support to all affected households and firms, and to the informal sector.

It was not possible to regard all firms as equal and the government had to prioritize manufacturing exporters and industrial parks. Through industrial parks, one of the country's key industrial policies, Ethiopia had attracted FDI and exports, developed domestic linkages, created a learning eco-system, and pursued green industrialization. In early March, many global buyers and brands abandoned firms in their supply chain, risking widespread worker lay-offs. Support packages were agreed in collaboration with industrial leaders, with the single aim of reducing factory closures and protecting employees from lay-off. Rail fares were reduced to zero for a few months, and dry port and air freight charges reduced by half.

The government developed a new package of measures to repurpose industrial parks, selecting factories to produce and export PPE both to improve capacity utilization and to increase export earnings. Developing PPE manufacture required the reorganization of material sourcing, inbound and outbound logistics, worker training, and aggressive marketing. The closure of firms and lay-off of workers could only be prevented by developing a comprehensive action plan to prevent the spread of COVID-19 to industrial parks and protect the workforce. Maximum focus was given to this endeavour from early January and the results have been encouraging, with a positive effect on the development of the industrial workforce, which is a major constraint for developing countries in the early stages of transition from an agrarian economy.

In a landlocked country, Ethiopian Airlines (EAL) is a strategic asset that supports the export sector and generates foreign exchange earnings, building efficient export logistics and contributing to national security. It is the country's largest services-exporting company and one of the largest direct and indirect employers. It has acquired significant technological capabilities, and is a major contributor to GDP. Despite its vital strategic contribution, the government's scarce resources did not permit a rescue package for its flagship carrier. Ethiopian Airlines had to park its growth strategy and

²¹ See 'Ethiopia's Unconventional Covid-19 response'. <https://www.project-syndicate.org/commentary/ethiopia-successful-unconventional-covid19-response-by-arkebe-oqubay-2020-05>, accessed on 6 June 2020.

²² See *Financial Times*, 27 May 2020, 'No lockdown, few ventilators, but Ethiopia is beating Covid-19' <https://www.ft.com/content/7c6327ca-a00b-11ea-b65d-489c67b0d85d>

focus on a survival strategy to adapt and build resilience by ensuring cash flow, reducing losses, and maintaining a healthy balance sheet.

EAL diversified its passenger capacity by rapidly shifting to the cargo business in line with market demand. It doubled its productivity and earnings from cargo by converting passenger aircraft to cargo. It also pursued a diversification strategy with a focus on technical services and a hotel subsidiary. It maintained its workforce and avoided lay-offs, as skill building will be a critical driver of future expansion. In pursuit of its commitment to serve and connect Africa with the world, it has been a major transporter of pharmaceutical goods to fight COVID-19. It has also sustained its commitment to the export sector, supporting exports of meat, and horticultural and other goods.²³

It is difficult to imagine the Ethiopian government's response to COVID-19 without the capability of Ethiopian Airlines, a critical policy instrument and strategic asset central to Ethiopia's industrial policy. Unlike many airlines that went bankrupt or were rescued by their respective governments, EAL was quick to adapt to the new environment and build resilience.²⁴ The case of Ethiopian Airlines suggests the importance not only of regional integration but also of reaching beyond regional integration. Regional integration is part of EAL's success but only because its global freight network connects to the rest of the world, including Latin America, strengthening Ethiopia's roles in global supply chains, such as high-value agriculture.²⁵

Industrial parks serve as the most effective industrial eco-system, capable of adapting to new opportunities and developing versatility. The process involved piloting and experimentation, dialogue, and learning from

others, illustrating the centrality of learning for industrial policy in a highly dynamic environment.²⁶

In summary, the discussion of the Ethiopian case makes the wider point that state capabilities —health and economic— are often present and effective not just in the 'obvious' cases such as China, South Korea, and Germany, but even in some low-income countries. COVID-19 has probably been a wake-up call to governments in low-income as well as rich countries that they need to protect, have confidence in, and develop these capabilities. This is a profound moment of truth for impotent ideological neoliberal fantasies.

Vulnerabilities of the African economy

The COVID-19 crisis was also a wake-up call for African governments on a number of fundamental levels. First, the urgent need to build a resilient prevention-oriented public health system with emergency capability. Failure to do so will lead to a continuing erosion of human capital, as well as economic gains being wiped out during times of public health emergency. Member countries must strengthen Africa CDC under the African Union Commission.

Second, with the worst-hit economies seen to include the oil-rich and the commodity exporters, the economic crisis starkly illuminated the vulnerability of African economies. Economic diversification is at the heart of Africa's structural transformation, and the increasing focus on building productive capacity and industrial upgrading requires an active industrial policy and development path, as well as effective government (Oqubay, 2019; Cramer, Sender, and Oqubay, 2020). It has been fashionable in the last few years to undermine the merits of manufacturing.²⁷ However, in

²³ See <https://www.floraldaily.com/article/9218599/ethiopia-secures-400-million-from-horticulture-export/>, accessed on 6 June 2020.

²⁴ See IOL 'Ethiopian Airlines had adopted while SAA may die', 26 April 2020, <https://www.iol.co.za/sundayindependent/analysis/ethiopian-airlines-has-adapted-while-saa-may-die-47211065>

²⁵ See Financial Times, 22 May 2020, 'Ethiopia steps in to deliver respirators to Latin Americans', <https://www.ft.com/content/c17614d0-cd94-4160-af0b-32dae6940253>

²⁶ See Marshall (1920); and Jacobs (1969). For comprehensive and global research on industrial hubs, see Oqubay and Lin (2020) *The Oxford Handbook of Industrial Hubs and Economic Development*.

²⁷ Manufacturing continues to feature special properties and understanding interdependencies is important. See also Hamilton (1934); List (1856); Kaldor (1967); Pasinetti (1981); Andreoni and Chang (2019); Cramer and Sender (2019); and Cramer and Tregenna (2020).

economic structures dominated by the informal sector and with Africa's youth requiring 20 million jobs annually, African countries cannot afford to ignore manufacturing and other, similarly 'industrial', higher-productivity activities, including high-value agriculture. Industrial activities not only create jobs directly but have huge indirect employment effects. Countries will experience improvement with the shift from commodity and raw materials export to a focus on value addition.

Long-term investment in education, the development of human capital, green infrastructure that energizes industrialization, and economic diversification are essential (Mathews, 2016, 2017). While macroeconomic stability is necessary, the ultimate aim must be to develop productive capacity and the transformation of production. African countries will also benefit from mutual policy learning.

Third, the disruption in global value chains is an important alert for African countries to increasingly rely on building regional value chains through AfCFTA and sub-regional economic integration initiatives. It also has implications for building verticality and the important domestic linkages that are increasingly promoted by buyers. Africa's regional supply chain may be energized by buyer interest in diversifying risks from the Asia-Pacific as well as by domestic demand. However, it should be noted that economic integration and building regional value chains requires investment in infrastructure to improve connectivity and intra-Africa trade. The building of regional value chains implies vital and sustained investment in skills and manufacturing capabilities by African governments, as well as improved investment conditions.

Fourth, the wider use of industrial policy in advanced economies will encourage African governments to create the national space to pursue active industrial policy. In terms of design of industrial policy, the disruption of global value chains also heralds limitations on scope for insertion into them. The focus on domestic capabilities and domestic linkages is becoming ever more

urgent and vital for building competitiveness in a world of increasingly stiff competition.

7. Conclusion: pathways to twenty-first-century industrial policy

Examining the connections between industrial policies, the COVID-19 pandemic and the deep economic crisis is an important subject that will provide insights for policymakers and in-depth understanding for policy researchers. It is hoped that this paper will stimulate additional research and contribution.

Adaptability of industrial policy

Industrial policy continues to be vital and must adapt to new situations (Chang and Andreoni, 2020; Andreoni and Chang, 2019). The complex crisis triggered by the pandemic has exposed the vulnerability of the economic system, and the wide differences in government measures and industrial policies. The new landscape appears conducive to state activism and industrial policy (Wade, 2004, 2019; Schwartz, 2010). However, industrial policy has to be based on a pragmatic approach, adapting to the evolving situation, and in the new decade it will need to focus on structural transformation and economic catch-up.²⁸ Economic diversification of production and trade in developing countries will be both challenging and vital for structural transformation.

In advanced economies, investment in innovation and technological capability in frontier technologies and the industrial base will be useful.²⁹ The middle-income trap that can plague emerging economies will necessitate a focus on innovation and technology (Lin and Treichel, 2012). China poses both threats and opportunities for advanced, emerging, and developing

²⁸ See Gerschenkron (1962) and Hirschman (1958) on conceptual origins of catch-up and the advantage of newness or backwardness. See also Lee (2019); and Oqubay and Ohno (2019).

²⁹ See also Schumpeter (1934); Lee (2019); Cimoli, Dosi, and Stiglitz (2009).

economies (Paus, 2019). Aiginger and Rodrik (2020) highlight the significance of a Sino-centric world: “For developing nations, meanwhile, China is both a threat and an example to emulate. On the one hand, Chinese success in manufacturing has made it more difficult for many middle-income countries to compete on world markets and has contributed to premature deindustrialization. On the other hand, Chinese industrial strategies are yet another powerful example of how concerted government action can stimulate rapid economic diversification and structural change.”

COVID-19 has affected and may transform the way we live, work, and learn. The advance of the digital economy will transform education, work, and e-commerce. Health is an increasingly key driver of scientific breakthrough, and COVID-19 will further invigorate this trend. In fact, if there is one thing we all have learned from the COVID-19 shock, it is that digital transformation is vital for any economy to move forward in the twenty-first century. COVID-19 has put the spotlight on digitalization. At least in developed economies, working from home, educating children from home, e-shopping from home, participating in meetings and seminars from home, and searching for a vaccine using rapid information flow through AI would have been impossible without advances in digital technologies.

Safety and health care will be more central in the design of production systems and the development of the industrial workforce. During the COVID-19 pandemic, the combination of a plummeting oil price and reduced electricity consumption due to the economic slowdown has made coal less viable and has accelerated the transition to clean energy. Support for climate change action and electric cars will further accelerate this momentum. Traction is being created that makes carbon-neutral industrialization and green industrial policy a necessity.

The resilience of global value chains

We are living in an increasingly interconnected world. While the blind belief in unfettered globalization

may be challenged, an interconnected global economy will continue to exist. The global governance system and the structure of global production systems will evolve, improving resilience and reducing vulnerability. However, to hope for a fragmented economy driven by self-reliance would be unrealistic. According to economic historian Adam Tooze (2020), “Comparisons with the 1930s should not be taken too far. We do not live under the shadow of total war, and there are good reasons to welcome the end of 1990s-style hyper-globalization. But we should not underestimate the break with the recent past or kid ourselves that there is any obvious alternative on offer.”

A paradigm shift — and rethinking capitalism

The vulnerability of the world economic system and the weakness of functioning international collaboration and governance mechanisms are noticeable. Widening inequality among nations and within each society, the fragility of the global eco-system illustrated by global threats such as climate change and virus pandemics, and increasing financialization and predatory value extraction raise fundamental issues. The fragility of the post-2008 economic recovery has been evidenced during the 2020 crisis and it will be impossible to build inclusive sustained development. Here are big questions beyond the bounds of industrial policy that will lead us into a new paradigm. Soul-searching and debate must and will continue, although paradigm shifts take a little longer.

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