

How not to manage a pandemic, and how to recover from it: Lessons from Ecuador

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Abstract

Since the initial outbreak in December 2019, the COVID-19 pandemic has resulted in more than four million deaths worldwide. Ecuador initially experienced one of the worst coronavirus outbreaks in the world. The pandemic quickly overwhelmed health care systems resulting in excess deaths of 37 000 from March to October, 2020. The public health measures taken to stop the spread of the virus had a devastating impact on the economy. There was a sharp contraction (7.8%) in Ecuador's GDP in 2020. Furthermore, income poverty and inequality increased dramatically. The lasting effects of the pandemic will be harder to overcome. This article recounts and analyzes the COVID-19 pandemic in Ecuador, to draw lessons from this complex experience, and from the benefit of limited but important successes. We also aim to provide suggestions for best practices moving forward.

Key words: COVID-19, pandemic management, Ecuador, economic-health trade-offs, policy analysis



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1. Introduction

Since the initial outbreak in December 2019, the COVID-19 pandemic has resulted in more than two hundred million confirmed infections and over four million deaths worldwide. The first COVID-19 cases in Ecuador were recorded in late February 2020. Ecuador experienced one of the worst coronavirus outbreaks in the world. Ecuador quickly gained fame by ranking 7th in the number of cases with mortality rates being the highest in the region in early April 2020 ([World Health Organization 2021b](#)). With such figures, Ecuador became known as the epicenter of the pandemic in Latin America. The impact was most visible in the city of Guayaquil, where reports of dead bodies left in the streets and corpses piling up in shipping containers attracted worldwide attention ([Garcia and Valencia 2020](#)). By July 2020, Quito and the Pichincha province took the hardest toll.

As it spread, the pandemic quickly overwhelmed health care systems around the country, generating chaos inside and outside hospitals. In terms of deaths, from March to October 2020, about 37 000 more deaths were recorded than the average over previous years. The morgue and burial systems collapsed under overwhelming demand. The public health measures taken to stop the spread of the virus had a devastating impact on the economy. There was a sharp contraction (7.8%) in Ecuador's GDP in 2020. Furthermore, income poverty and inequality increased dramatically.

To combat the urgent situation, a series of continuous decrees of state of emergency were imposed from March to September 2020. These decrees sought to slow contagion by limiting agglomerations through strict lockdowns. The actions had a positive effect in reducing the number of new cases

and deaths. However, as measures were relaxed in December 2020, a new wave of COVID-19 infections and consequent deaths was observed, and the emergency state reestablished with a new series of decrees. Cycles of contagion, containment, relaxation of containment measures, and subsequent waves of further contagion became the norm as the government sought to balance health with economic objectives.

What the evolution of the pandemic and its impacts on the Ecuadorian population revealed is that the measures that were implemented and adjusted overtime were in many cases, adopted from other, often more developed countries. This “cut-and-paste” approach to managing the pandemic was likely in part due to the belief in the superiority of the scientific approach in developed countries, and partly due to a lack of expertise on the matter of controlling infectious diseases of such importance. The Ecuadorian context, however, provides challenges that are distinct to those in developed countries; in particular, the high level of poverty and informal employment which results in drastic impacts of enforcing a strict lockdown. The inhumane impact of enforcing a strict lockdown resulted in a laxer version of ideal lockdown being enforced and a trial-and-error approach to many other controlling regulations. Moreover, due to political pressures directed from the business sector, some often contradictory combinations of measures were imposed, such as closing schools for around 18 months but allowing bars and restaurants to open. This lack of enforcement and sometimes incoherent combination of measures reflects the often-disparate view-points on the best approach to contain the outbreak. This, in turn, indicates the many angles from which the issues can be observed and seen to be resolved. Nevertheless, the trade-offs in economic, social and health-focused welfare that are innate in the application of many of the COVID-19 containment measures means that a single-pronged approach to managing the pandemic can often result in unintended and undesirable results.

The magnitude and severity of the problem worldwide has attracted the attention of academics from various disciplines. While many approaches have been suggested to manage the pandemic, they are frequently offered from the viewpoint of one discipline or another. However, pandemic management proposals rarely integrate multidisciplinary views that consider the tradeoffs intrinsically present in the solutions proposed. The motivation for this current perspective paper was developed by the multidisciplinary group of authors of this paper in response to these disciplinary biases leading to the incorporation of inherent “blind spots” in the analysis of, and proposed solutions to, manage such complex problems as COVID-19. The pandemic, while precipitated by a health problem and impacting directly and firstly on the health of the population, requires multi-faceted solutions. Responding to and containing the pandemic requires solutions coming from the realm of economic policy, service-provision management and coordination, as well as the public health response at the front line of the pandemic. These solutions also must be integrated and coordinated to achieve the best outcomes. For example, a highly restrictive policy on mobility and agglomeration, if not combined with an economic policy of providing an income safety net, results in making the mobility restrictions unenforceable in a highly informal labor market that pays largely subsistence incomes. Households simply cannot afford to comply with the mobility restrictions; the alternative is to forgo feeding the family. This article thus presents the standpoint that in developing countries, such as Ecuador, it is necessary to view the pandemic management from an interdisciplinary framework if the measures are to have any chance of being plausibly enforced and to result in contagion containment, while at the same time avoiding historic economic crises and the long-term consequences of the same.

This article recounts and analyzes the COVID-19 pandemic in Ecuador in an attempt to draw lessons from this complex experience, and from the benefit of limited but important successes. We also aim to provide suggestions for best practices moving forward in contexts where resources to combat contagion of pandemic viruses are simply not available.

This perspective article is comprised of the following sections. Firstly, the article presents the containment strategies employed and their evolution in time. The subsequent section then outlines the economic impacts of the pandemic and the associated measures. Section four discusses the results of vaccination and the limitations of this as a fix-all strategy. The fifth section defines the critical policy challenges that remain as a result of the pandemic and how the pandemic has altered the context in which these policies will need to be implemented. In this section, we discuss the phenomenon we call “economic long-COVID”, the social-psychological burden of the pandemic, and the acceleration of the digital divide in the context of Ecuador, and the risks that what we refer to as the infodemia. We discuss how this has been presented for pandemic management, even more so in the context of the digital divide and the associated high levels of digital illiteracy. The final section concludes with a general reflection on the pandemic management in Ecuador.

2. Public health strategies deployed and lessons learned

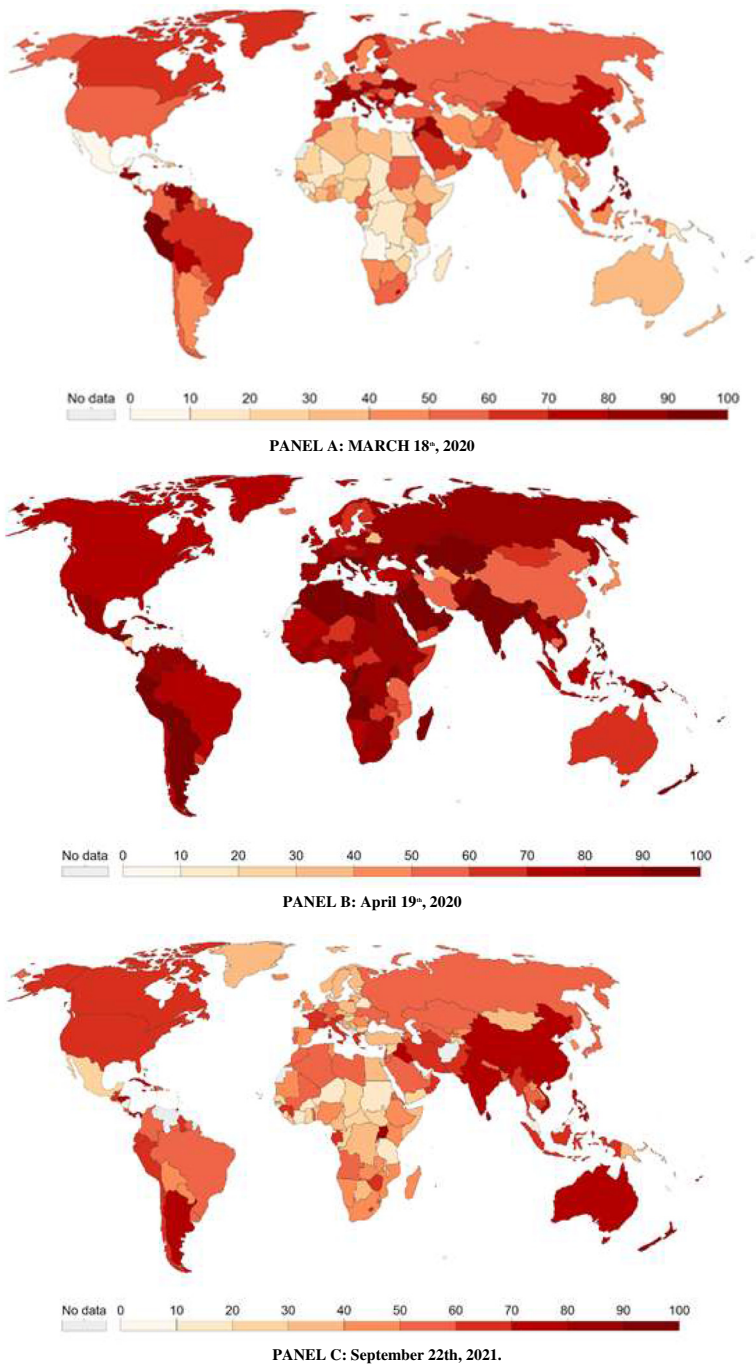
While the public health situation in Ecuador distinguished itself for the dire consequences observed, containment measures were not lax. Measures to combat the virus spread since the first diagnosed case on February 29th 2020 were initially stronger than most countries. However, by April 19, these measures were standard practice around the world. Since the official state of emergency ended in September 2020, however, measures remain moderate relative to global measures, excepting for the Christmas period where measures were temporarily much more restrictive. [Figure 1](#) displays the relative stringency of COVID-19 containment measures ([Our World in Data 2022](#)) globally for three dates: 18th of March (the day after curfew measures were imposed), April 19th (the date when most of the world was closed due to COVID-19) and September 22nd 2020, (when many restrictions in Ecuador were loosened).

With respect to its own measures, Ecuador has seen significant fluctuations in time. [Figure 2](#) shows the evolution of the relative stringency of Ecuadorian COVID-19 containment measures between January 2020 to September 2022. The steepest jump in the stringency index was seen on March 17th, 2020, when the imposition of a nation-wide curfew alongside other strong restrictions were imposed. Gradual modifications of the measures and the introduction of pilot programs loosening of some restrictions (explained below) resulted in a slight reduction in the index’s intensity. September 11th 2020 marked the end of the official state of emergency and the initial wave of curfews. Christmas celebrations, however, necessitated stricter controls on agglomeration. The second wave of high contagion conditions in April 2021 resulted in another 28 days of curfew being imposed. Since May 20th, when the curfew was terminated, controls have remained moderate until March 2022, when controls fell to low levels of stringency on average.

The remainder of this section describes the evolution of the health emergency measures over the pandemic duration as well as lessons learned in the process.

2.1. Lockdowns

As shown below in [Fig. 2](#), the most drastic change in the strictness of COVID-19 containment measures was seen on the 17th of March 2020, when a national curfew came into place and initiated a 6-month period of lockdowns. Initially, the curfew was mandated between 21h00–5h00 every day. However, a week after the initial curfew was imposed, this strict in-house lockdown was extended to 14h00–5h00 with all non-essential and “non-strategic sector” workers required to stay home. Schools were closed prior to lockdown, on the 15th of March, and most are yet to reopen fully more than 18 months later. Church services were banned, and supermarkets and pharmacies required to mandate a strict 50% of maximum patronage limits. All social meetings outside existing house structures were made illegal. On the 2nd of April, large and public events were suspended. The official state



SOURCE: The source is Our World in Data. The index is a composite measure based on nine response indicators including school closures, workplace closures, and travel bans, rescaled to a value from 0 to 100 (100 = strictest). If policies vary at the subnational level, the index is shown as the response level of the strictest sub-region.

Fig. 1. World map of the COVID-19 Stringency Index from Our World in Data, in March 2020, April 2020 and September 2021.



SOURCE: Our World in Data, COVID-19 Stringency Index. "This is a composite measure based on nine response indicators including school closures, workplace closures, and travel bans. If policies vary at the subnational level, the index is shown as the response level of the strictest sub-region."

Fig. 2. COVID-19 Stringency Index for measures in Ecuador, January 2020 – September 2022.

of exception, which permitted authorities to impose curfews legally, ended on the 11th of September. Nevertheless, restrictions on travel, purchases of alcohol on the weekends, social gatherings, school openings, beach access and public agglomerations remained suspended. More than a year after the first curfew was introduced, on the 21st of April 2021, 16 provinces (of the 24) were again placed under curfew. The last curfew ended on 20th of May 2021.

2.2. Province “color coding”: a traffic light system for containment measures by location

Exactly two months after the first curfew was imposed, the National Emergency Operations Committee in Ecuador (COE) began to explore ways to permit service provision more flexibly, especially in low-contagion locations. A traffic light system was developed to categorize the severity of contagion and the need for measures by geographical location, considered at the canton level. The 3-tiered traffic light system initially determined the severity of differential curfew impositions, where green denoted curfew between 00h00–5h00, yellow between 21h00–5h00, and red between 14h00–5h00. The system was brought into place on the 20th of May 2020. It was permitted that some commercial centers were opened in green and yellow cantons, with capacity limitations. For the public holiday in early August, the curfew was reduced to 19h00–5h00 for cantons still in code red. However, five days later, it was recommended to extend the official state of exception along with the curfew imposition. The curfews, along with the national traffic light system, ended on 11th of September 2020. Province and city level authorities were then put in charge of containment measures.

2.3. Aerial and terrestrial border closure

Three (3) days before national lockdown measures were initially put in place, on 14th of March 2020, travelers entering the Galapagos Islands were required to self-quarantine for 14 days. Those entering the mainland by air were required to quarantine for 21 days. Land entry was limited to three entry points with Colombia and three with Peru. On the 15th of March, the national transit association required special permission for inter-provincial travel. And on the 16th, travelers entering by land

were obligated to undertake self-quarantine measures, although it is unclear how this was enforced. On the 18th of March, urban transportation was allowed to service but with reduced capacity and timetables. On the 23rd, protocols for entrance into the country by air were developed to allow nationals such as children without parent supervision, pregnant women, people with disabilities, and those over the age of 60 to enter the country. On the 30th of March, it was clarified that people entering the country would have to undertake their 14-day quarantine within authorized sites.

A relaxation of mobility measures was finally enacted from the 1st of June when visitors could enter the country upon presentation to health and migration authorities of a “negative” result of the COVID-19 PCR test obtained 72 h before the trip. Antigens were also tested at entry and travelers required to quarantine for 14 days. The flights ran at 30% of normal flight frequency. On the 12th of June, inter-provincial travel by land was approved for personal vehicles between provinces sharing green and yellow traffic lights. On the 1st of August, the frequency in international and domestic commercial air operations was permitted to increase from 30% to 50% of regular capacity at all airports in the country. As of September 10th, 2021, the status of travel by air to Ecuador was that two requirements were needed: a PCR COVID-19 test with a negative result within the last 72 h as well as a vaccination certificate with the complete schedule 14 days after completing it. Only on the 11th of February 2022 were these entry requirements reduced to one of the two previous requirements, in line with many international regulations ([Ministerio de Salud Pública \(Public Health Ministry\) 2022](#)).

2.4. Testing (PCR, Ab, and Ag)

Due to the improbable elimination of COVID-19 in Ecuador, a successful diagnostic strategy remains crucial to contain contagion. The costs and benefits of different strategies present trade-offs. Until now, the dominant strategy has been based on PCR tests for their level of diagnostic precision. The two problems with this process are the time between the test and receiving the results, and the cost of the test that is not affordable for the Ecuadorian population. Specifically, initial prices of PCR tests were capped at \$120 when prescribed by private sector doctors and \$80 when prescribed by the public sector ministry of health doctors. However, this cost, relative to the minimum monthly wage, represented 30% and 20%, respectively, as only in April 2021 were PCR tests capped at a price of \$45. This, although substantially cheaper, remains prohibitive for the poorer and often more exposed groups within the community. Thus, COVID-19 testing was prohibitive for most Ecuadorian households already experiencing strong financial stress due to lockdown measures. Moreover, the delay between the PCR test and the results of 48 h often led to substantial contagion as those infected remained in circulation until their results came through. The problems related to rapid and widely available diagnosis were perhaps the most significant in reducing the ability to contain the contagion within the country.

2.5. Hospital resource allocations

The COVID-19 pandemic caused scenes within and outside Ecuadorian hospitals which were extremely grim, especially during the first wave of contagion when the health system was completely unprepared. Many people died waiting for a hospital bed as the health services could not cope. Many of the dead were left to pile up in shipping containers as the system collapsed under the pressure. Moreover, even for those who succeeded in obtaining a hospital bed, appropriate treatment was often not available. This situation was aggravated by accusations of cases of corruption in medical supply purchases. The outfall of the pandemic resulted in an estimated 909 excess daily deaths at its peak (relative to average deaths pre-pandemic), and nearly 37 000 excess deaths over the March to October period in 2020 ([Cevallos-Valdiviezo et al. 2021](#)). Effectively, Ecuador ranked as the 8th country worldwide in excess deaths according to the World Health Organization in 2020 ([World Health Organization 2021b](#)). The pandemic effectively revealed an already under-resourced health system

in Ecuador. According to data from the World Health Organization ([World Health Organization 2021a](#)), of the 104 countries for which there is data, Ecuador falls in the lowest 14 countries globally in the ranking of hospital beds per capita. Regionally, however, Ecuador outperforms 10 of its peers, which reflects the low level of investment in health services in the region. Accordingly, when the pandemic reached the region, it is not surprising that many Latin American countries were disproportionately impacted as hospitals were saturated and health professions and medications exhausted equally as rapidly, particularly in the public health system.

2.6. Limitations of the public health strategy and lessons learned

Perhaps the most important lesson learned in Ecuador's experience is that management strategies copied and pasted from other (especially developed) countries are not always suitable out of context. A key example of the obstacles in applying "developed world" measures is that of the imposition of lockdown measures. While in higher income countries with better resourced welfare systems, it may be possible to strictly impose a curfew and stay-at-home restrictions. In countries such as Ecuador, this is nearly impossible without incurring very large costs. In fact, it is akin to sentencing many very poor families to starve. As reported by the [Technical Planning Secretariat of Ecuador \(2020\)](#), 2.3 million or 13% of the population was likely to be suffering food insecurity during the crisis. Under such circumstances, strict lockdown measures cannot be effectively enforced. Targeted measures alongside similarly directed assistance may be more appropriate, and even more effective.

In a similar vein, the diagnostic strategies often used in other countries centering on gold-standard PCR tests may not be optimal in a country with substantially limited resources. A change in strategy to more intensive use of antigen testing could be more appropriate and effective, given the costs. In modeling undertaken by the authors to compare costs between rapid antigen tests and PCR tests, the cost per correctly diagnosed patient is estimated at \$39.05 US and \$59.01 US, respectively. In summary, 50% more cases can be diagnosed using antigen tests than with PCR tests. This was based on a model that assumed the cost of a PCR test is \$40 and an antigen test is \$20, and with an incidence of infection of 6.58 per 100,000 people. If self-administration of antigen tests was prevalent and mass purchases reduced prices, this figure could be significantly improved. However, to reduce contagion using rapid antigen testing, the number of tests per capita needs to be extended. In the case of Ecuador, targeting highly exposed groups and subsidizing testing of low-income groups may be necessary to make this strategy effective. Nevertheless, it may produce more effective results at a lower cost than previous strategies and could be useful for controlling possible future waves of contagion.

3. Economic implications of the pandemic and its mismanagement. Where do we stand?

In Ecuador, the COVID-19 pandemic crisis triggered a deep recession when the country was already facing economic difficulties. [Figure 3](#) shows the virus-provoked crisis reduced real economic growth by 7.8%, or \$ 7.7 billion US in 2020, with a recovery of only 4.2% in 2021 made possible due to the low base effect of 2020, calculated from the national quarterly accounts of the Central Bank of Ecuador ([Banco Central de Ecuador 2021](#)). In 2022 and the following years, the economy is expected to show very modest growth. Most of the economic loss experienced in 2020 was concentrated in the lowest income deciles. On average, deciles 1, 2, 3, 4 and 5 lost around 17% of their income during 2020, while those of the highest decile lost 6%. The uneven distribution of losses comes from the prevalence of informal and manual labor in Ecuador, from which many workers live from day to day. Such workers were disproportionately impacted during the initial strict lockdown due to their inability to work. These losses have significantly increased in poverty in Ecuador. As displayed in [Fig. 4](#), extreme poverty, characterized as living on less than \$149 US a month per household, which is meagre relative to the market cost of living of \$508.09 US per month

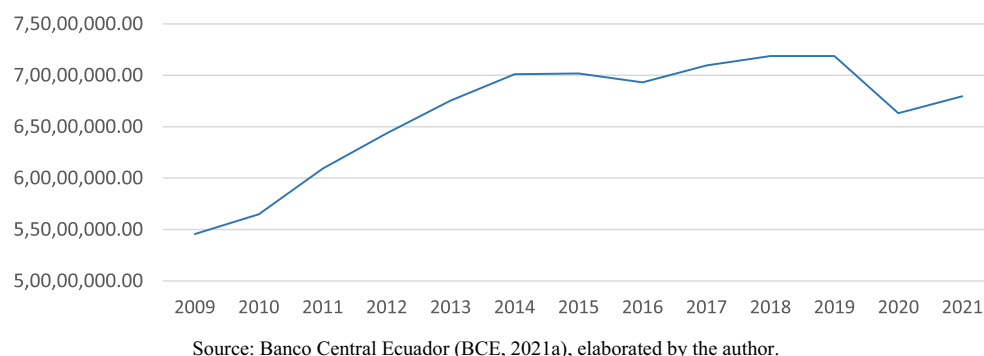


Fig. 3. Ecuador's real GDP (in constant 2007 dollars): 2009 – 2021.

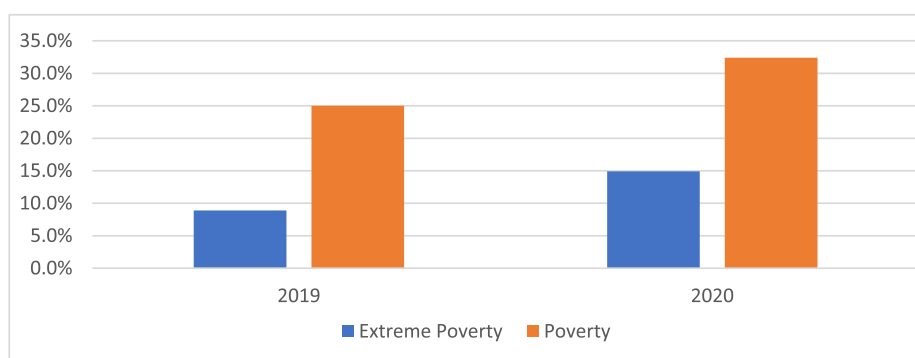


Fig. 4. Increase in Poverty and Extreme Poverty in Ecuador between 2019 – 2020.

per household, increased severely in 2020; from 8.9% to 14.9%. The poverty rate also increased by 7%, to 32.4%, effectively reversing more than 10 years of progress in poverty reduction ([Instituto Nacional de Estadística y Censos 2021](#)). This translates into more than 1.3 million people falling into poverty, resulting in a total of more than 5.7 million people living in poverty. Estimates by the Technical Planning Secretariat of Ecuador in May 2020 suggest that the middle class was reduced by 12% within the first five months of 2020.

The crisis also magnified the Ecuador's pre-existing macroeconomic imbalances. The [Banco Central del Ecuador \(2021\)](#) published that the public sector lost an estimated \$3.5 billion dollars (or 3.6% of GDP) between March and December 2020. The pandemic also forced the government to reach new agreements with creditors to restructure its debt. These public sector losses were mirrored by significant losses in the private sector. The wide-spread contraction in economic activity resulted in a large fall in formal sector production. As of July 2021, the minister of Production and International Trade, Julio Prado, stated that more than 22,000 formal firms were closed during the pandemic ([Deutsche Welle 2021](#)). Full time, formal sector employment during 2020 fell from 38.8% to 30.4% and has only recovered to around 35% since this time. These figures maintain levels at the lowest end of the spectrum since comparable figures have been collected from 2007. Unemployment also increased from

3.8% to 5% in the same period ([Instituto Nacional de Estadística y Censos 2021](#)) and many people who kept their jobs saw their hours and earnings decrease.

The unprecedented reduction in economic prospects has been felt more strongly among the young and female population. Female workers have often had to postpone their return to employment more than male workers. This was not only due to reduced demand but their disproportionate share of domestic responsibilities, which increased because of school closures and the in-house care work, implied. Vulnerable migrant populations, mainly Venezuela and Colombia, have been particularly impacted during the crisis ([United Nations High Commissioner for Refugees 2021](#)). Eighty percent (80%) of this group are without employment or access to health care. This has resulted in an estimated less than thirty percent (30%) of Colombian, Venezuelan, and mixed households having had access to a sufficient food supply ([Technical Planning Secretariat of Ecuador 2020](#)).

In what follows, Ecuador needs to balance its economy to avoid unsustainable debt increases. Furthermore, it needs to strengthen confidence in macroeconomic stability. It is important also to consider that the poor are more vulnerable than any other group to the disastrous effects of the pandemic. Hence, it is necessary to design public policies to protect the most vulnerable population and improve access to economic opportunities.

4. Vaccination: a new hope and limitations

In the first trimester of 2021, Ecuador finally received its first doses of Pfizer-BioTech vaccines. The arrival was, however, accompanied by uncertainties in distribution and corruption complaints. Despite this troubled start, vaccination campaigns slowly, initially reduced the incidence of COVID-19 cases. In September 2021, a significant decrease in reported COVID-19 cases and deaths was attained. The current situation in Ecuador seems promising. Hospitals are no longer saturated, excess deaths have returned to pre-pandemic years, lockdowns are over, and all of this is taking place alongside a relaxation in control measures.

Given the dire situation in Ecuador due to the pandemic's health, social and economic consequences, and the lack of success in containing the contagion sufficiently, the real and only hope to overcome the virus' impact was the introduction of a vaccine. SARS-CoV-2 vaccines were available globally by the end of 2020 and arrived in Ecuador in March 2021. Vaccines are the most effective prophylactic measures to control and eliminate infectious diseases, providing acquired immunity to specific infectious agents at the individual level. This reduces the risk of transmission in large crowds, allowing the community to return to activities that require close contact. Thus, the arrival of vaccines was a game-changer to fight the COVID-19 pandemic.

Four different vaccines were used in the country including Pfizer-BioTech, AstraZeneca, Sinovac and CanSino. Each differed in their composition and effectiveness. However, all are significantly effective against the symptomatic disease and can prevent the infection at satisfying levels where ample commitment from the community to attain a desirable level of protection exists. For this reason, vaccine hesitancy and vaccine misinformation used by anti-vaccination groups are important challenges to achieving efficacy. Authorities must address vaccine misinformation by opening strategic and permanent communication channels with the community with respect to the costs and benefits of vaccines to the individual and the community.

In Ecuador, vaccine hesitancy has not been as obvious and problematic as in other countries. The government reported 9 million of fully vaccinated individuals by August 2021, which is almost 50% of the population in a short time horizon. This impressive immunization campaign could be the result of the fear of the population after having lived through the 2020 tragic COVID-19 events in the country, or

the result of an effective communication campaign, or both. Either way, the positive results are reflected in the dramatic reduction in hospitalizations and deaths since September 2021.

In conclusion, for a successful acceptance of vaccinations, it is important that health authorities maintain a permanent, updated, science-based and clear communication channel directed to fight misinformation, present an honest acceptance of the limitations and uncertainties of vaccines to maintain the trust from the general population, and remind the population the severity of the pandemic and the risks of non-vaccination. Reduced emphasis on the need to receive booster doses has resulted in substantially decreased proportions of the population receiving reinforcement vaccines and as a consequence, the sharpest increase in new cases of COVID-19 during the entire pandemic. Specifically, between the 29th of December 2021 and the 2nd of February 2022, Ecuador averaged 5626 new cases daily, which compares to an average of 476 cases on average over the whole pandemic ([Our World in Data 2022](#)). Communicating the importance of maintaining up-to-date vaccines needs to be persistent to maintain contagion and to keep infection complications low.

5. Current challenges and critical policy areas

While the most serious consequences of an uncontrolled pandemic can largely be minimized where the population maintains updated vaccinations, the longer-term consequences of the initial wave of contagion will have persistent impacts in economic and social dimensions that pose significant policy challenges.

5.1. Economic long-COVID-19: a decade of social and economic regression

While GDP growth may recover quite quickly, the distributional and compositional consequences of the shock are likely to linger for several years. Much of the damage to the economy caused by the pandemic is largely irreversible in the medium term. Impacts that will take years to address include the previously unthinkable amplification in poverty levels and the resulting increased inequality, the substantial shrinkage of the formal sector, reduced employment prospects and experience for the youth population, and declines in average human capital accumulation both in terms of health and education outcomes. Thus, in the same way that COVID-19 has been seen to have long term, incapacitating impacts on those that have been infected with COVID-19, the economy can also expect to see enduring weaknesses in the medium- to longer-term.

Such dire economic consequences have important impacts on economic vulnerability, health, and education, which themselves have persistent effects into the future. Health outcomes in the present are important determinants of future prospects and the sanitary crisis experienced in Ecuador had strong, differential impacts on access to health care services. The saturation of the health care sector due to the direct effects of COVID-19 cases in 2020 resulted in a displacement of health care services for other conditions. While all individuals suffering illness during the peak pandemic period were likely to have experienced displacement in the health care system, the [Technical Planning Secretariat of Ecuador \(2020\)](#) report that family planning and reproductive health, gender-based violence and mental health services were those most affected. Due to reduced service provision, many mental health issues and especially gender-based violence (GBV) events were not reported, leaving the impression that their incidence was reduced. However, it is well accepted that GBV and mental health conditions such as depression and anxiety increased substantially during the pandemic. A survey sample suggests that 47.7% of women experienced difficulties in accessing sexual and reproductive health services during the pandemic, with 36% of respondents discontinuing their contraceptive methods mainly due to lack of access ([Committee for the Elimination Discrimination Against Women 2020](#)). The unknown but probably significant number of unplanned pregnancies consequent

of the lack of access to health services is likely to be higher, once again, amongst disadvantaged and rural women. The costs of unplanned parenthood are particularly high in a country where abortion is in nearly all cases illegal, and the teenage pregnancy rate is around 18% (INEC 2019).

Access to nutrition, especially for infants, is also a key determinant of future health and wellbeing. In a report by the [Committee for the Elimination Discrimination Against Women \(2020\)](#), it was reported that, during the pandemic, only 54% of households had enough food, 11% did not have food access and 35% had it partially. Consistent with the growth in poverty, consequent malnutrition amongst children is likely to have grown to substantial levels from the already high level reported in 2018. Chronic malnutrition was reported at 27.2% for children under the age of 2 and 23% for children under the age of 5 ([Technical Planning Secretariat of Ecuador 2020](#)).

Impacts of school closures have also put at risk the human capital accumulation of the current school-age population. After 18 months of school closures, many of Ecuador's 4.6 million students had disconnected physically and, in many cases virtually, from learning activities. Only 59% of students have both internet connection and access to a computer or tablet in their household ([Asanov et al. 2021](#)). After 18 months of school closures, according to the then minister of Education, María Brown Pérez, 1 in 6 students had reported that they were learning less than what they were before the crisis and 15% stated that they had not had habitual contact with their teachers in the last two weeks of the reference period ([El Universo 2021](#)). The reduction in educational participation is higher among those in the poorest quartile and those self-identifying as indigenous or from other ethnic groups. Many falling into these groups informed that they had not partaken in any online or tele-learning in the survey period ([Asanov et al. 2021](#)). In addition to those persisting in school, more than 100,000 students have failed to re-enroll in their educational institutions ([Cooperative for Assistance and Relief Everywhere 2020](#)). Of the survey undertaken by [Asanov et al. \(2021\)](#), 16% of the respondents informed having mental health issues characteristic of depression. The employment prospects and income earning potential of this generation of students is likely to be reduced, especially if catch-up efforts are not successful and lead to further school dropout rates in the future.

5.2. Economic policies to move forward

In 2022, Ecuador still faces a significant challenge to return to a sustainable and robust growth path. The COVID-19 pandemic revealed the structural weaknesses in the already fragile Ecuadorian economy. As emphasized by the ([International Financial Corporation of the World Bank Group 2021](#)), the largest obstacles to growth since the 2014 oil price bust have been a volatile and unpredictable policy environment, a lack of competition, low product and labor market flexibility, and a shallow financial sector. Additionally, the State also lacks fiscal space to stimulate the economy directly in the wake of the crisis and monetary policy is limited due to Ecuador's dollarization.

Nevertheless, some policy reforms, essentially low cost in terms of finances although potentially higher cost in terms of political capital, could be undertaken to foster employment and investment growth. With respect to addressing the impacts of Economic Long-COVID-19, these reforms should aim to reduce the economic and social regression brought about by the last two years of crisis.

There are three key areas where economic policy reforms could make a large difference. Firstly, to address the shortage of quality job creation, labor market regulations and business regulatory compliance need to be revised and reduced. Lower costs of employment – particularly in making employment decisions more flexible – can bring about more rapid and higher levels of new employment when the economy rebounds. Reduced complexity and costs of starting and maintaining a formal business can also increase formal sector activity and quality job creation. The combination of these red-tape reductions can also make the formal sector more resilient to future shocks. This will also

not only produce higher future tax revenues but can promote stronger and more diverse economic activity. These reforms together can help to provide more paths out of poverty in the medium to long term as employment opportunities and income levels grow and become less volatile in time.

Secondly, recent falls in educational attainment may result in lower overall average capital accumulation in the current school-age generation. Economic conditions may also be promoting early school dropout due to the need to maintain income flows in poorer households. To recuperate these educational losses, the education system may need to look to diversify its range and type of programs provided in terms of content, hours of provision and length of program and title levels. In this way, those that have been forced into reduced learning due to the pandemic can have the opportunity to “top-up” their education at a later stage.

Thirdly, the health sector will also need to recover from the crisis it faced in 2020 and rebuild with the aim of being more efficient, resilient, and prepared. Although further waves of COVID-19 have been less taxing on the hospital system, there remains moments in where hospitals are saturated at a regional level and supplies of medication and other key inputs are insufficient. A more resilient system would require not only achieving better quality of service and cost control but ensuring better and broader access to vulnerable groups within the society.

5.3. COVID-19 psychological burden of disease

The COVID-19 pandemic has had a substantial psychological impact on Ecuadorians that may take years to be fully revealed. Studies early in the pandemic indicate the high levels of depression and anxiety in populations under epidemiological surveillance (Paz et al. 2020). The prevalence of clinically significant symptoms of depression and (or) anxiety was likely many times over that of baseline in people suspected to have or diagnosed with COVID-19 (World Health Organization 2017). Emotional distress levels were also associated with living in coastal regions, where the pandemic had a higher toll early on. Other research involving a general population revealed similar or higher levels of clinically relevant anxiety and (or) depression (Mautong et al. 2021). Mautong et al. (2021) found 17.7% had moderate to severe levels of depression, and 30.7% had moderate to severe levels of anxiety. In a recently published study with a large general population sample, more than 62% were presented with high psychological distress (Gómez-Salgado et al. 2021). What's more, certain populations, such as healthcare workers, showed even greater amounts of psychopathology during the pandemic. Erazo et al. (2021) found 27.3% had depression symptoms, 39.2% anxiety symptoms, 16.3% insomnia and 43.8% symptoms of PTSD in a sample of 1028 healthcare personnel in Ecuador (Erazo et al. 2021). Women also stood out as another vulnerable population, with higher levels of sleep problems, anxiety, depression, and perceived stress in several studies (Gómez-Salgado et al. 2021; Mautong et al. 2021; Paz et al. 2020; Ramos-Padilla et al. 2021). It is possible that work from home regimens may have increased stress levels for women as they often took on multiple roles simultaneously. Past research has shown women in Ecuador overwhelmingly do most of the housework (Comisión Económica para América Latina y el Caribe 2019; United Nations Women and Economic Commission for Latin America and the Caribbean 2020). Consistent with the experience in Ecuador, a recent systematic review found women to be an at-risk group for mental health problems during the pandemic globally (Tibubos et al. 2021).

Indicators of levels of trauma and anxiety in Ecuador were higher than those in other regions in a multi-country study (Ho et al. 2020; Landaeta-Díaz et al. 2021). Consequences of trauma are often felt months after the event, so it is to be expected that prevalence of PTSD will grow and persist. Likewise, healthcare workers are likely to experience complex PTSD as a result of chronic exposure to traumatic events. This is concerning not only for the direct impact on the mental healthcare workers, but also because of the domino effect this may have on provision of services in a country with comparatively

limited healthcare accessibility. Although mental health overall is to be expected to improve as the pandemic weakens, the psychological consequences may be lasting for segments of the population, and prevalence of mental disorders will likely increase as well.

5.4. The growing digital divide

The abrupt lockdown in 2020 due to the explosive COVID-19 contagion resulted in an unprecedented disruption in production and service provision in Ecuador. From one day to the next, Ecuador went from 100% production to nearly zero. Only few businesses in Ecuador had an online presence before the crisis. This was driven in part by a very low client demand. The low level of access to banking products (approximately 1 in 2 Ecuadorians have bank accounts) (Rubio et al. 2021) also negated the possibility of many online purchases due to the inability to make electronic payments (Zambrano Velasco et al. 2021).

The radical change in circumstances pushed many firms into adapting an online business model to maintain customers and income flows. This movement online precipitated the development of new economic activity previously insignificant in Ecuador. The most notable development is that of delivery services for products ordered online. In Ecuador, services such as GLOVO, Uber Eats, and RAPPI are some of the many platforms offering an integrated service of product purchase and home-delivery ranging from restaurant food to just about any product that can be bought at a physical point of sale and delivered by form of motorcycle. Consequent to the growth of delivery services, new low-cost product niches were developed to take advantage of increased acceptance of online purchase. Amongst these products are prepared food designed to be delivered and not consumed in restaurants, which was made financially viable due to the reduced need to pay high rental and service costs in production.

However, while the pandemic pushed public service provision and the business community in Ecuador to finally adapt to an online sale culture, the lack of access for many Ecuadorians means that the economic divide that precipitates the limitations on access evolves into a digital divide. This digital divide in terms of access to public services, education, and a large and growing online business sector could exacerbate the already large economic divide by amplifying the tendency towards a dual economy. This divide, driven by the increasing range of transactions taking place in the online environment, is defined by those with formal sector work, digital literacy, and easy access to online service provision, and those with largely informal sector work with limited capacity to access online services.

Accordingly, an important policy platform on which to build a more equal economy that can integrate more readily into the global economy is that of enhancing digital literacy and access, especially amongst the less advantaged groups. Recent and ongoing digitalization of many industries requires the average Ecuadorian citizen to have sufficient digital skills to be able to participate in the new growth economy. As this move online is only likely to accelerate over time, the skill development is an urgent policy challenge.

5.5. Infodemia

One tendency that builds upon poor digital literacy and has been starkly brought into focus globally during the pandemic is that of how information is filtered, understood, and used by individuals living in a world that bombards us with information at an alarming rate. The model of human beings as rational actors making decisions based on available information has been rightly questioned for some time across many disciplines (Dhar and Novemsky 2008; Gold and Hohwy 2000; Schuck-Paim et al. 2004). In the context of health technology and pandemic containment, clear and consistent messaging from the part of the authorities is indispensable. In Ecuador, especially early in the pandemic, rules abounded, and changes were as prolific, leaving the public at times confused about the right course of action. Some information provided by public authorities reflected an inconsistent approach which

avored saturating the public with information and mandates. Alas, “infodemic”, a portmanteau combining information and pandemic, was coined to describe the rapid transmission of information, both accurate and inaccurate. Of course, social media platforms played an important role in the dissemination of information, not all of which was accurate. Misinformation can result in the population adopting behaviors contrary to overcoming the pandemic, such as vaccine hesitancy, outright denial, self-medication, use of fraudulent products, or perceptions of public health mandates as violations of individual freedoms instead of rules for a common good.

Ultimately, the behavioral effects of public policy depend on various factors, many of which are beyond reasonable attempts at control. Research supports several strategies for shaping behavior during a health crisis (Vai et al. 2020). Of note, the application of behavioral economics principles to a public health framework may prove useful (Diamond and Vartiainen 2007; Rice 2013). This discipline challenges long-term held assumptions about individuals being rational actors trying to maximize their long-term interests. If anything, behaviors exhibited during the pandemic by several actors should be enough to challenge this assumption. Anti-vaccination stances, marked by a dogmatic anti-science stance, have curtailed progress in several countries, most notable in those with sufficient resources to vaccinate their entire population.

6. Reflections on the aftermath

The global response to the pandemic in many locations appeared to be initially in denial of the severity of the situation and the profound changes in everyday activities necessary to contain the contagion of COVID-19. The Ecuadorian experience highlights just how quickly a pandemic situation can get out of control and result in extreme costs in terms of loss of life, economic losses, educational deficits, and increased poverty rates. Many of these costs will continue to have impacts over several years. While various costs may have been largely unavoidable given the context of an under resourced health sector, restricted fiscal resources, and limited internet access amongst the population when the pandemic hit, the copy-and-paste policy responses of underdeveloped economies from more developed economies is likely to have exacerbated the economic and social costs of the pandemic in Ecuador. Local, more targeted adjustments to the policy responses have allowed for a gradual recuperation of some of these losses without necessarily large costs in health outcomes.

Thus, while Ecuador was initially one of the worst examples of management of the health crisis, its adjustment to the local implications of the global pandemic have seen important improvements in the national situation. Perhaps, paradoxically, looking forward, Ecuador has an advantage because it has seen the worst, understands the consequences more than others, and is maybe better situated, psychologically, to take on further challenges. The uncertainty of the situation has now been reduced to a manageable risk. The lessons learned in Ecuador can have important implications for ongoing management of the COVID-19 situation and for responses to potential future health threats – not just within country but for many countries with underdeveloped economies.

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Author contributions

SJC and VDC-Y data collection. MC-A, SJC, VDC-Y, and GM conception or design of the work. MC-A, SJC, VDC-Y, and GM contributed resources. MC-A, SJC, VDC-Y, and GM drafted or revised

the manuscript. MC-A, SJC, VDC-Y, and GM final approval of the version to be submitted. SJC critical revision of the article. MC-A, SJC, VDC-Y, and GM drafting the article.

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No ethical approval was obtained for this research because it is not required for this type of research.

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