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November 2021

A "Hidden Front" in the Battle Against COVID-19: How Behavioral Data is Helping Contain the Pandemic and Improve Policy

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COVID-19 has provided a sharp reminder of the key role citizens' perceptions and attitudes play in shaping the outcomes of public policy. This experience is changing the way governments use data to combat the pandemic and set priorities for the recovery.

Data has been a key resource in the battle to contain the COVID-19 pandemic. Faced with a fast-evolving crisis, governments and data providers have expanded their efforts to collect and mobilize evidence. These efforts raise broader challenges in terms of public trust, with data becoming a "contested" resource in highly polarized environments, and of data protection, with a delicate balance to be struck between privacy rights and the public good. However, they have also highlighted important avenues for improving policy.

Two lessons can already be drawn. First, the past eighteen months have underlined the need for more timely and detailed data. Standard indicators of economic activity (such as quarterly GDP and monthly employment figures) were initially outpaced by the effects of the pandemic. The frequency of these indicators, as well as the time-lags with which they are produced, have limited their usefulness for policymakers who needed to take crucial and immediate decisions affecting public health, economic activity, and citizens' well-being. To fill this gap, new alternative sources of data have been explored, including Google Trends and Google Mobility. These new sources provide a "real-time" picture of economic activity and other relevant outcomes (such as mobility and social mixing) which can be used to inform decisions and rapidly assess whether the measures taken are effective or not. In the longer-term, as highlighted by the World Bank's World Development Report 2021, these data sources can help tackle broader developmental challenges by ensuring the availability of and access to high-quality, timely, and reliable data, as called for by the United Nations' Sustainable Development Goals (SDG 17.18).

A second lesson is that improving policy decisions and outcomes requires more than just timely data. Governments must also pay attention to the "human side"

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of the pandemic. Increasingly, they are taking account of a broad range of behavioral data to understand how citizens perceive public health and socio-economic risks, along with how they respond to the measures taken to contain COVID-19. The progress made here is likely to extend beyond the current crisis, as the use of behavioral data can help address many immediate and long-term challenges. Furthermore, greater use of behavioral data may promote a more people-centered approach to policymaking by putting greater emphasis on citizens' expectations and demands. Three challenges can help illustrate this.

First challenge: Revisiting familiar dilemmas: Lockdowns in the third wave of COVID-19

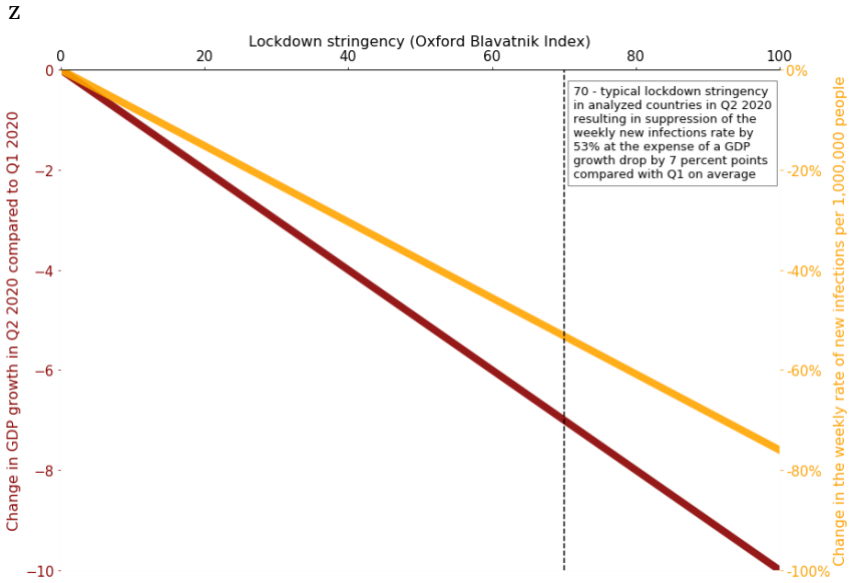
Following the emergence of new, more infectious strains of COVID-19, such as the Delta variant, and a surge in cases in spring 2021, governments were forced to revisit the same hard choices as in 2020 while they ramped up vaccination campaigns. Lessons on what worked and what did not during the first phases of the pandemic have provided useful guidance to inform policy decisions. In particular, a growing body of evidence has helped quantify the economic costs of containment measures and their expected benefits for public health. These lessons however must be put into context.

Analysis by the OECD confirmed the overall effectiveness of containment measures in reducing the spread of COVID-19 during the first wave in 2020, while also highlighting their negative impact on the economy and on citizens' well-being. The "typical lockdown" applied between January and August 2020 succeeded on average in reducing the spread of COVID-19 from an initial reproduction number R of 1.5 to just over 1.0, even before the effects of additional restrictions on gathering and traveling, and of public health measures such as mandatory mask wearing were taken into account[1]. At the same time, for a given level of mobility, tightening containment measures by 10-points on the Oxford COVID-19 Government Response Tracker's Stringency Index led on average to a fall in quarterly GDP growth of around 1 percentage point. On this basis, lockdowns would on average present the following trade-off in terms of their impact on public health and on economic activity:[2]

[1] The "typical lockdown" combines stay-at-home requirements with school and workplace closures, see OECD (2020). Other studies have compared the relative effectiveness of different interventions, see Haug et al. (2020). The "effective reproduction number" R is a key epidemiological variable representing the number of new cases of disease generated on average by each infected person under current conditions, including containment measures and immunity acquired through vaccination or past exposure to the disease. Maintaining R below the 1.0 threshold is a key objective as it marks the difference between a state in which the disease spreads epidemically through the population and a state where the disease fades.

[2] The analysis in Figure 1 is based on dynamics among the OECD member states and selected other high-income and upper middle-income countries (53 in total) over the period April-June 2020. The estimates represent the average effect across the spectrum of the Oxford University Blavatnik School's COVID-19 Government Response Tracker Stringency Index.

Figure 1: Trade-off between GDP growth and the infection rate during the first wave of COVID-19 pandemic



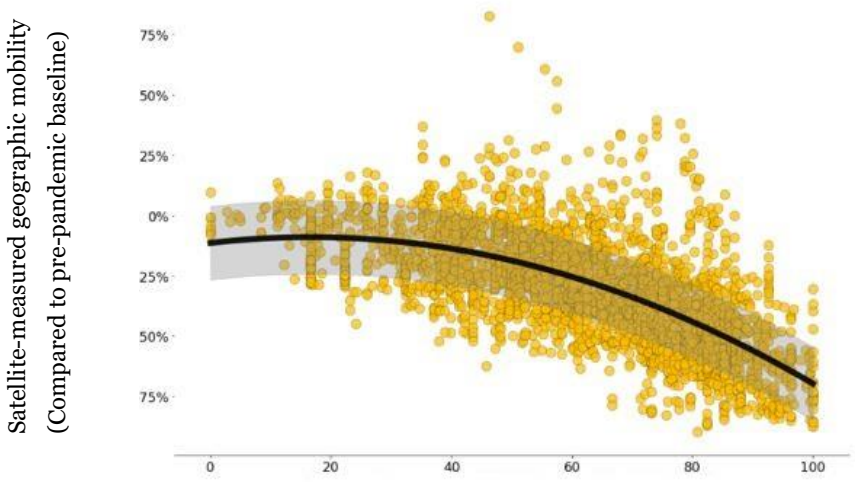
Source: Paul von Chamier, NYU Center on International Cooperation, 2021; Pain, Nigel and Łukasz Rawdanowicz, "Explaining cross-country differences in growth performance in the second quarter of 2020," *OECD Economic Development,* December 18, 2020, https://oecdecoscope.blog/2020/12/18/explaining-cross-country-differences-in-growth-performance-in-the-second-quarter-of-2020.

However, in drawing lessons from this evidence, policymakers must also be aware of the limits of the guidance it provides. First of all, it is important to bear in mind that the relation between the health and economic impact of policies is not a straightforward and deterministic one. For instance, some evidence suggests that strategies aimed at eliminating COVID-19 were more effective during the first wave, both in terms of saving lives and of protecting the economy, than ones aimed at containing its spread. However, changes in the underlying variables—such as a higher reproduction number R reflecting greater virulence—can also change these calculations and modify containment strategies, as highlighted by South East Asian governments' recent experience with the Delta variant. Similarly, as leading behavioral scientist Pete Lunn argues, policymakers should avoid thinking about containment measures in terms of a simple quantifiable trade-off between economic costs and expected benefits to public health. Containment measures rely on large-scale behavioral change to be effective. As such, while their economic costs may be predictable, their outcomes remain more uncertain and depend on the individual and collective responses of citizens. This helps explain why the effectiveness of containment measures has varied both across and within countries, as well as over time, and why greater stringency did not automatically translate into positive health outcomes. Research by New York University's Center on International Cooperation (NYU CIC) illustrates this. It shows that by keeping the level of lockdown stringency constant, a 1 percentage point increase in the

spatial mobility of citizens (as a result for example of falling compliance) translated into an 0.7 percent rise in infection rates in the following week during the second quarter of 2020 (see Figure 3).

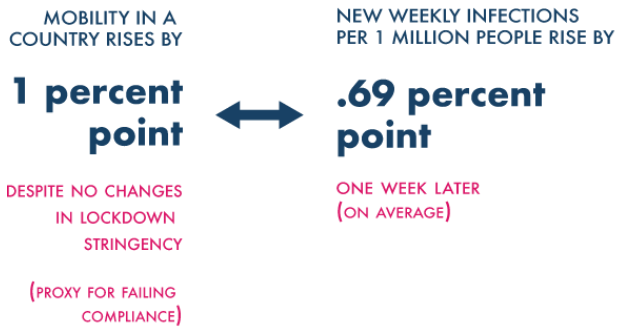
High-frequency data has helped governments monitor levels of mobility and assess the effects that containment measures have on them. Figure 2 below matches changes in lockdown stringency with changes in spatial mobility for Q2 2020 (the first wave of the pandemic) compared to pre-pandemic baselines across a number of countries, using real-time daily satellite tracking data. It shows that there is a robust link between the two variables, but also that there is significant variation in the strength of the link across countries.

Figure 2: Lockdown stringency reduced spatial mobility (Q2 2020)



Source: Lockdown stringency, Oxford Blavatnik Index, https://covidtracker.bsg.ox.ac.uk.

Figure 3: Greater mobility led to higher rates of new infection



Source: Paul von Chamier, NYU Center on International Cooperation, 2021; Based on satellite tracking data from Google Mobility Report, +/- one standard deviation band marked in Figure 2.

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Much research has been devoted to understanding the factors that influence citizens' compliance with containment measures. Early findings tend to confirm that socio-economic factors constrain citizens' ability to comply with stringent containment measures and suggest that poverty and inequality may also reduce support for such measures. Recent work by NYU CIC looks at some of the main channels through which inequality affects societies' responses to the pandemic. In this respect, effective social protection and income support have not only benefited the individuals who received them, but they may also have strengthened societies' ability to withstand the pandemic by facilitating increased compliance with and support for stringent government measures. Public attitudes and cultural factors also matter, in addition to socio-economic factors. A study by Ruben Durante, Luigi Guiso and Giorgio Gulino shows for instance that areas with higher levels of civic capital saw greater voluntary reductions in mobility and greater compliance with containment measures both in Italy and in Germany.

The collection of precise behavioral data has helped governments turn these insights into actionable policies. In Ireland for example, the Department of the Taoiseach has collaborated with the Economic and Social Research Institute to develop the Social Activity Measure (SAM)—an anonymous online survey launched in February 2021 designed to record the public's response to COVID-19 over time. Interestingly, early results from SAM showed that among the population that had a large number of discretionary social contacts, a significant share falsely believe they are complying with the rules or doing better than others. Data of this kind can improve policy decisions by better identifying problems (in this case misperceptions on compliance and gaps in information on public health rules), targeting communication effectively, and justify restrictive measures by helping citizens understand how they affect behavior and why they are needed.

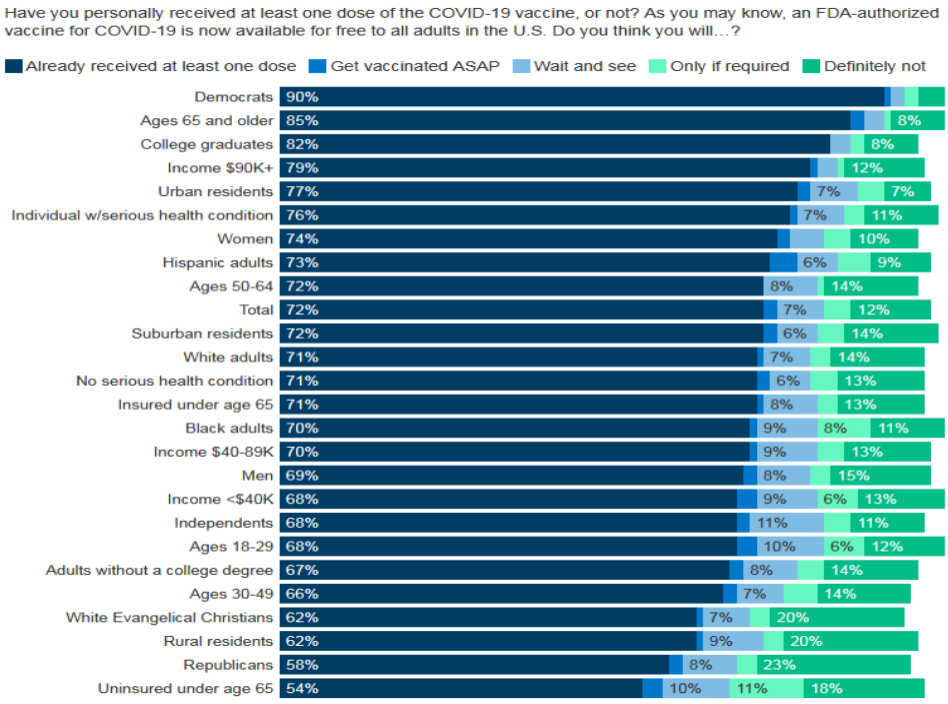
Second challenge: Ensuring effective take up of vaccines to achieve herd immunity

Where campaigns have been successful, vaccination is helping usher in a return to normal. Barely over a year after the outbreak of COVID-19, a range of safe and effective vaccines were already available. To deliver these vaccines on the global scale needed to defeat the pandemic, highly complex production and logistical challenges must be overcome. In many parts of the world, this is not yet the case and vaccine scarcity continue to be a problem. By mid-October 2021, the COVAX Facility had shipped 371 million vaccine doses out, still far from the 1.8 billion planned for distribution by early 2022 in 129 low- and middle-income countries and territories. However, even in the rich countries that have been most successful in rolling out their vaccination campaigns, progress has not been even. One reason is that willingness to be vaccinated has

varied across groups and, in several countries, a non-negligible share of the population has remained opposed to vaccination.

For instance, in the United States, data from the Kaiser Family Foundation COVID-19 Vaccine Monitor show that willingness to be vaccinated has increased significantly. By the end of September 2021, 72% of the US population had received at least one dose of vaccine. Despite this, the share of the population who stated they would "*definitely not*" be vaccinated or would only do so "*if required to*" has remained significant over the period at 16% in September 2021, compared to 24% in December 2020 when the campaign started. Similarly, while a majority across all demographic groups has now been vaccinated, large differences in vaccine uptake persist along lines including partisanship, education level, age, and health insurance status (see Figure 4 below).

Figure 4: Willingness to be vaccinated still varies significantly across US demographic groups



Source: Hamel, Liz et al., "Kaiser Family Foundation COVID-19 Vaccine Monitor," *Kaiser Family Foundation*, September 28, 2021. https://www.kff.org/coronavirus-covid-19/poll-finding/kff-covid-19-vaccine-monitor-september-2021.

At a global level, the contrast between insufficient supply of vaccines on the one hand and potentially insufficient demand on the other highlights the importance and need for vaccine solidarity between countries. The decisions by the US to back the temporary suspension of international property rights on COVID-19 vaccines and urge all WTO countries to follow suit are highly

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significant in this respect, moving the global consensus towards an approach to vaccine access as a "common good." So far, the COVAX Facility has fallen short of its objective to ensure a fair and effective distribution of vaccines worldwide. Advance purchase agreements for vaccines have favored affluent countries, allowing them to secure 150–500 percent of their predicted needs, while many citizens of low- and middle-income countries will remain unvaccinated until 2023.

For this reason, societies in low- and middle-income countries are losing trust both in the multilateral system and in their own governments which cannot provide an adequate supply of vaccines. Within high-income countries where vaccine supply is secured, remaining gaps between supply and demand highlight the importance of ensuring effective uptake of vaccines, including among the more reticent parts of the population, in order to reach the levels of vaccination required for herd immunity. Lessons can be drawn from the experience of countries that have been successful in rolling out their vaccine campaigns and overcoming vaccine hesitancy, as highlighted for instance by The Economist.

More broadly, understanding the reasons for vaccine hesitancy can help governments facilitate behavioral change by developing better-adapted messaging strategies, outreach, and policies to overcome distrust. Vaccine hesitancy was already on the radar as a serious threat to global health even before COVID-19 struck. Over the past decade, its effects have contributed to falling immunization rates in many different regions of the world and to the resurgence of vaccine-preventable diseases, including measles and pertussis. Existing tools have been developed to monitor public attitudes towards vaccines. They provide valuable insights for vaccination campaigns against COVID-19. One such tool, the Vaccine Confidence Index survey (VCI), has been used to measure individuals' perceptions of the safety, importance, and effectiveness of vaccines and how they have evolved since 2015, both at global and national level.[3]

Results from a large-scale study using the VCI to map vaccine confidence across 149 countries between 2015 and 2019 show for instance that convincing people of the importance of being vaccinated against particular diseases tended to have the largest effect on confidence and uptake. Recent analysis by the OECD confirms this, highlighting the key role that openness and community engagement have played in fostering trust in COVID-19 vaccination campaigns and in reducing vaccine hesitancy, alongside other personal factors (fear of

[3] These perceptions have been shown to be key factors influencing people's decisions on vaccines, alongside ease of access, trust in the health system, religious beliefs, and other socio-economic and demographic factors.

COVID-19 increased as death rates peaked) and "critical mass" effects (confidence in the safety of vaccines grew as more people got vaccinated).

Insights from social and behavioral science can also shed light on how to address online misinformation on COVID-19. Part of the debate has centered on the relative effectiveness of two different approaches. These approaches consist of either (i) in strengthening efforts to counter anti-vaccine arguments, or (ii) in "de-platforming" them through the imposition of legal penalties for misinformation or through stricter content monitoring by social media companies. An important lesson to remember here is that providing information is often not enough to change behavior. Efforts to counter anti-vaccine arguments should seek instead to build on a better understanding of the perceptions and beliefs that underpin anti-vaccine views, as well as the broader factors that contribute to the spread and potency of conspiracy theories, such as low levels of well-being. Networks also play a crucial role in the spread of online misinformation on vaccines. Understanding the role played by networks and mapping them can help identify different populations and communities involved and tailor outreach, messaging, and policy responses accordingly.

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Third challenge: Adapting social policy to the effects of COVID-19

The COVID-19 pandemic has severely tested social protection systems. Governments have acted fast and often decisively to support people against threats to their health, livelihood, and well-being. They have done so by expanding existing social programs and introducing additional emergency measures, while relying on a range of social policy instruments including unemployment insurance, short-term work programs, and sickness and paid leave schemes. Social protection systems have not only expanded, but they have also adapted. Governments have experimented with new programs aimed at closing gaps in the safety net by extending social protection and income support to populations that were not traditionally well covered, such as temporary, part-time, self-employed, and informal workers—what are often referred to as "non-standard workers".

Early evidence suggests that social protection has been effective in shielding people from the economic impact of the crisis. For instance, analysis of seven EU countries based on European Central Bank survey data estimates that COVID-19 unemployment benefits may have helped reduce the number of financially vulnerable households by up to 80% during the pandemic, once the costs of food, utilities, rent, and mortgages are factored in. Analysis based on high-frequency measures also seems to confirm this, as highlighted for example in a study of Spain using anonymized data from bank records. Looking forward, the social policy responses to the crisis will also have significant implications for

the recovery. COVID-19 has highlighted gaps in existing safety nets, including in rich countries with well-developed welfare states, and spurred governments into action. In doing so, it opens opportunities to modernize social protection systems and better adapt them to a rapidly changing situation on the labor market. In addition to extending social protection coverage for non-standard workers, the difficulties encountered by working parents—and especially mothers—during lockdowns have led the US to announce plans for greater investment in affordable childcare as part of its Build Back Better agenda.

Similarly, sickness and disability schemes may need to be adapted to the adverse long-term effects of COVID-19 on physical and mental health. At the same time, it creates challenges that governments will need to bear in mind. As the recovery gathers pace and support measures start to unwind, the question of how to finance social spending will loom larger and decisions will need to be taken regarding the areas to prioritize. Furthermore, governments will also have to take account of people's changing expectations and demands for social protection.

Data have a role to play in addressing these challenges. Behavioral data can help governments set priorities in the recovery and better calibrate programs by identifying, measuring, and keeping track of the key perceptions, attitudes, and preferences that influence demand for and reception of social policies. In the more immediate term, they shed valuable light on the extent to which the COVID-19 pandemic has affected people's perceptions of socio-economic risks, attitudes towards government intervention and policy preferences.

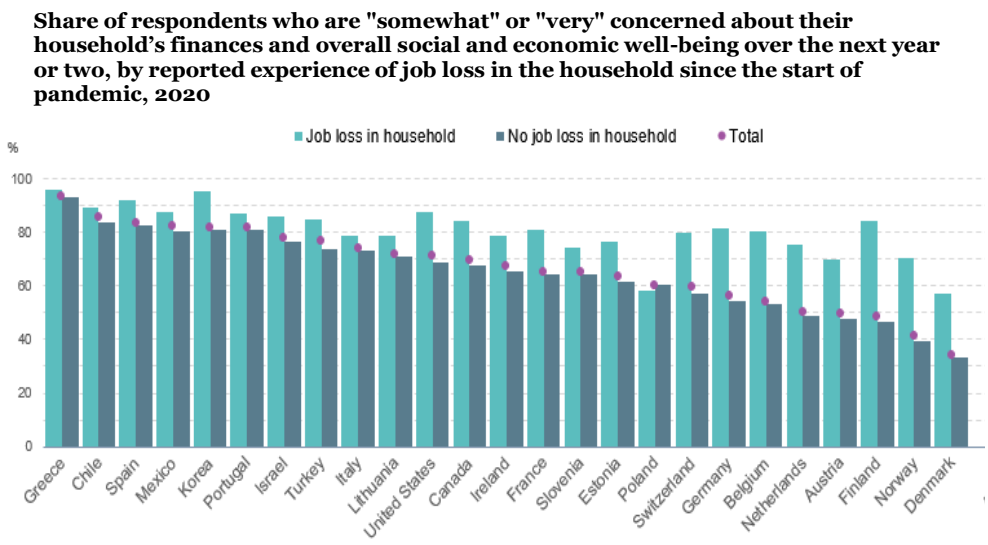
OECD evidence based on new tools, such as the Compare Your Income web-tool[4] and the Risks that Matter survey,[5] suggests that the effect of COVID-19 on public perceptions, attitudes and preferences have been significant. The consequences for social policy may be far-reaching. Early findings from the 2020 *Risks that Matter* survey show that the pandemic has given rise to significant levels of actual economic insecurity and has magnified concerns about economic insecurity in the immediate future. Across twenty-five OECD countries, 31% of respondents reported encountering financial difficulties since the start of the pandemic, a share which rises to 68% for households that experienced job loss. At the same time, 67% of all respondents expressed concern about their household's financial or economic well-being in the next

[4]Compare Your Income is an online interactive web-tool that allows users to test whether their perceptions of income inequality are in line with the actual situation in their country and express their views on how income should be distributed. The web-tool is available in 8 languages, fully confidential and anonymized, and has attracted over 2 million users since its launch in 2015. It can be accessed at: www.compareyourincome.org
[5]Risks that Matter is a cross-national survey that assesses people's perceptions of social and economic risks and of the effectiveness of government responses. It aims to map the way in which these perceptions are evolving and help adapt social policy in a way that better reflects people's concerns.

"Other data innovations pioneered during the pandemic can help make social protection systems more inclusive and effective."

two years, regardless of whether they had experienced job loss during the pandemic or not (see Figure 5 below).[6]

Figure 5: Most people are worried about their financial situation in the next two years



Source: "Risks that Matter 2020: The long reach of COVID-19," OECD, April 28, 2021, https://www.oecd.org/coronavirus/policy-responses/risks-that-matter-2020-the-long-reach-of-covid-19-44932654.

A broad consensus seems to be forming in favor of greater social protection. For instance, 68% of all respondents to the 2020 *Risks that Matter* survey are calling for governments to do more to ensure the economic security of households, with little or no difference between those who experienced job loss during the pandemic and those who didn't. Similarly, over the period of the pandemic, users of the *Compare Your Income* web-tool have identified health, education, poverty alleviation, and employment as the main areas of social spending they would like to see prioritized or expanded.[7] Here again, there seems to be widespread bipartisan consensus around the importance of health and education, as only a small share of the users who agree that there is scope to reduce social spending would select these areas for budgetary cuts. NYU CIC has recently conducted surveys on perceptions in a number of high-, middle-, and low-income countries, in collaboration with its partners from the Pathfinders multi-stakeholder coalition.

[6] The 2020 round of Risks that Matter was conducted in 25 OECD countries over the September-October 2020 period and was designed to capture people's experiences during the pandemic, as well as attitudes towards the future of work and inequality. It is worth noting that the results were collected before the peak of the 2nd wave of COVID-19 and that people's perceptions and attitudes may have been further impacted by the experience of the 2nd and 3rd waves of the pandemic.

[7] In 2020, *Compare Your Income* introduced a new module exploring people's perceptions of tax fairness and the areas they would prioritise for public spending. This new module provides real-time data on how people's perceptions and preferences are evolving in response to the COVID-19 pandemic, with the aim of informing policy decisions. Results presented here are based on entries collected over the period May 2020 to May 2021.

Other data innovations pioneered during the pandemic can help make social protection systems more inclusive and effective. For instance, the development of Unified Social Protection Databases (USPDs), which cross-reference different types of information, has allowed governments to respond to the COVID-19 pandemic by rapidly expanding social programs and safety nets. Notable examples include the Ehsaas Emergency Cash Program (EEC) in Pakistan and the use of existing social registries by a number of Latin American countries to extend coverage or issue benefits to informal workers. High-frequency data has the potential to further improve USPDs by better identifying vulnerable groups and households and by keeping better track of sudden income shocks.

Novel sources of local-level data, such as electricity usage, cell phone usage, and satellite-measured geographic mobility can complement traditional data, thereby lowering the risk of "exclusion error" and increasing safety nets' capacity to shield people from adverse shocks and build resilience.

The increasing importance of data and the promising avenues this opens for improving policy further underline the need to address data divides between high-income and middle- and low-income countries. According to the World Bank, between 1977 and 2012, high-income countries, collected data on poverty every two years on average, 3.5 times as frequently as low-income ones. This gap extends to novel types of data, including high-frequency data. Investing in closing the data gap should become a developmental priority, in line with SDG 17.18.

To conclude, the idea of integrating behavioral data into social policy is not new, but it has gained new impetus in the battle against COVID-19. Policymakers have had no choice but to focus on the "human side" of the pandemic, as many of their key objectives—including compliance with lockdowns and vaccine uptake—have been highly dependent on people's individual and collective responses. Furthermore, as argued here, COVID-19 has accelerated the deployment of new tools for measuring public perceptions and attitudes and their application to policy. Governments should use the opportunities provided by these new approaches and data to inform public decision-making and develop "people-centered" policies that better reflect the perceptions, attitudes and lived experience of citizens.[8]

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[8] The UK Office of National Statistics' recent initiative on inclusive data provides an example of this.