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3rd Ad-hoc Statement:

**Coronavirus Pandemic –
Sustainable Ways to Overcome the Crisis**

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Summary and recommendations

The spread of the SARS-CoV-2 virus has had an immense impact on all areas of our society. In light of the resulting widespread uncertainty, science bears a great responsibility – it must analyse all available knowledge and the changing data in order to provide useful recommendations for a course of action within this highly dynamic situation. This statement from the German National Academy of Sciences Leopoldina addresses the psychological, social, legal, educational and economic aspects of the pandemic, leading to the following central recommendations:

Optimise the basis for decision-making: Data surveys which have so far been largely symptom-based have led to a distorted perception of the infection process. It is therefore important to substantially improve the survey of the infection and immunity status of the population, in particular through representative and regional surveys of the infection status and immunity. The data obtained in this way should flow into the ongoing adaptation of dynamic models in real time, and thus enable more reliable short-term forecasts. These can be used to support decisions and make the effectiveness of political measures verifiable. It should be possible to use voluntarily provided GPS data in combination with contact tracing, as is the case, for example, in South Korea. This would increase the precision of models available today, in particular to allow context-dependent, local resolution and thus a differentiated prognosis of the progression of the pandemic.

Enable differentiated risk assessment: The context-based interpretation of available data is important for tackling the coronavirus pandemic on a societal and an individual level. Data on serious illnesses and deaths must be compared to those of other illnesses and must be related to the expected risk of mortality within individual age groups. A realistic representation of the individual risk must be clearly illustrated. This also applies to systemic risks such as overloading the healthcare system as well as negative consequences in economy and society. It is the only way to ensure the cooperation of the population in implementing the necessary measures.

Mitigate the psychological and social impact: For the acceptance and implementation of measures taken, an intrinsic motivation based on self-protection and solidarity is more important than the threat of sanctions. Communicating a realistic timeline and a clear set of measures for a gradual return to normality will increase the controllability and predictability for all persons and groups concerned. This will help minimise the negative mental and physical impact of the stresses currently being experienced. Aid and support must be provided to at-risk groups who are particularly affected by the current restrictions, such as children in difficult familial situations or victims of domestic violence.

Include manifold perspectives in evaluation processes: The measures taken by governments which aim to protect life and health entail restrictions on other legal interests. These must not be ignored in evaluating the proportionality of costs and benefits. Only the inclusion of the unintended side effects makes the entire complexity of weighing up conflicting goods clear. Current political decisions to deal with the crisis must recognise the multidimensionality of the problem and take into account the perspectives of those affected and those at different risk. The underlying deliberation processes must be made transparent and be communicated accordingly. For instance, the preventative segregation of specific groups, such as older people, simply to protect them must be rejected as too paternalistic and patronising.

Gradually reopen the education sector: In the education sector, the crisis has led to a significant decline in day-care services, teaching and learning, as well as to an exacerbation of social inequality. Educational institutions should therefore be reopened as soon as possible. Restrictions in education must be lifted while at the same time keeping the risk of new infections to a minimum. Since younger children are more reliant on in-person care, guidance and support, primary and lower secondary level schools should be the first to gradually reopen. Older students are more capable of using distance learning, whether digital or analogue. We therefore recommend that a return to classroom teaching be postponed to a later date for the higher levels of education. Following different transitional methods and combinations of self-guided learning using digital media and in-person instruction is conceivable. If possible, examinations should take

place. Additional efforts must be made in particular for children with special educational needs in order to reduce disadvantages. As very young children are not self-aware enough to comply with physical distancing and other protective measures, but could still pass on the virus, day-care centres for pre-school children should only be reopened in a very limited capacity.

Gradually bring public life back to normal: Public life can gradually be brought back to normal under the following conditions: a) the rate of new infections must stabilise at a low level, b) the healthcare system will not be overloaded by an increasing number of COVID-19 patients and capacities for other patients are not in any way restricted, c) known protective measures (good hygiene, wearing of mouth and nose protection, physical distancing, increased identification of infected persons) are observed in a disciplined manner. This could allow shops and restaurants to resume business and general commercial and governmental services to reopen to the public. Moreover, business and private travel could be taken up again in compliance with the mentioned protective measures. Wearing mouth and nose protection should become a mandatory additional measure in certain areas such as public transport. Social, cultural and sporting events should begin taking place step by step, subject to the possibility of physical distancing and provided the intensity of contact is low. Infection rates must continue to be monitored.

Ensure stability through economic and financial policy: While the current health policy measures are in force, economic and financial policy must provide short-term help to bridge the difficult situation. Measures include short-time working, liquidity assistance, tax deferrals and subsidies to reduce cases of insolvency. Government participation in businesses should only be used to stabilise enterprises in extreme emergencies. Once the current public health measures have been phased out, expansive fiscal stimuli will continue to be necessary in the medium term. In terms of revenue, this could come in the form of tax relief, in the form of bringing forward the planned partial discontinuation of the solidarity tax surcharge or by abolishing it completely. On the expenditure side, additional funds for public investments are important, for instance in healthcare, digital infrastructure and climate protection. The crisis highly requires European solidarity. Managing the crisis jointly includes for example the provision of liquidity by the European Central Bank (ECB), financial support from the EU budget and the European Investment Bank (EIB) and a credit line from the European Stability Mechanism (ESM) with conditionality focused on the effects of the pandemic.

Set the course for sustainability: Existing global challenges, such as climate and species protection in particular, do not disappear with the coronavirus crisis. Both national and international political measures should observe the principles of ecological and social sustainability, future-compatibility and increased resilience. Measures which were already supported by broad scientific evidence and political and public consensus prior to the coronavirus crisis must not be weakened; rather, they must continue to be implemented with the highest priority, or even strengthened. Economic stimulus packages should be fundamentally compatible with the goals set out in the “European Green Deal”.

Hold on to a market-based economic order: The economic policies introduced during the crisis must be reversed or adjusted as soon as possible in favour of a sustainable management within the framework of a free market order. This includes that the government withdraws from companies as shareholder in cases where public investment was made due to the crisis, and the reduction of public debt. Conformity with Germany’s balanced-budget provision – the so-called debt brake – must be adhered to in accordance with its current set of regulations. This allows for significantly higher debt to be accrued, particularly in exceptional situations such as this, under the condition that the funds be repaid upon the return to normality.

1. Introduction

The global spread of the coronavirus SARS-CoV-2 and the drastic measures taken to curb its propagation have far-reaching consequences for global society. In light of the psychological, social, economic, civil society and political problems caused by the coronavirus pandemic, curbing its spread must be given the highest priority. Although the pandemic will continue to define economic and societal life for months to come, we must work to develop criteria and policies that go beyond the acute limitation of fundamental rights such as the freedom of movement to ensure a gradual return to normality. Such a gradual relaxation of regulations requires consistently low infection rates to prevent the healthcare system from being overloaded, increasing identification of infected persons and disciplined compliance with protective measures (hygiene, the wearing of mouth and nose protection, physical distancing).

Fundamental civilisational challenges – in particular climate and species protection and transnational cooperation – remain relevant despite the immediate cause for concern induced by the coronavirus crisis, and they must still be addressed. Combating the crisis sustainably requires thinking beyond the acute short-term measures taken and considering the medium- and long-term consequences as soon as possible. This includes explicit consideration of the global dimension of the pandemic and the associated sociocultural factors. Despite all commonalities, the diversity of cultures offers an opportunity for mutual learning, for checking our own reactions and for acquiring a new behavioural repertoire.

In order to find responses to the challenges posed by the current crisis, we must also act within several different time frames. This will ensure that we keep the necessary long-term transformation of our economic and societal activity within our sights without ignoring the urgency of quick and specific decisions. With this in mind, the following principles are key:

1. The protection of every single individual and the facilitation of a dignified standard of living is in the centre of all state action.
2. In addition to protecting health and saving lives, this includes restoring the public's ability to engage in societal, economic, political and cultural activity as quickly as possible, even if this can only be realised step by step. In principle, there is no contradiction between protecting health and the immediate resumption of public life, which has been largely suspended. In fact, the two are mutually dependent.
3. The recommended measures should be developed in accordance with the guiding concepts of sustainability and resilience.

The German National Academy of Sciences Leopoldina has already addressed public health issues in two statements on coping with the pandemic.¹ These recommendations continue to apply. In particular, the current focus on caring for COVID-19 patients must not lead to a shortfall in the care of others. Sufficient capacities in intensive care units and stocks of protective equipment should be held in reserve for new outbreaks of the pandemic. The healthcare system should be analysed and adjusted accordingly. Furthermore, we have to make every effort to expedite the research into effective medications and the development of quickly and widely available vaccines. The German National Academy of Sciences Leopoldina will closely monitor and support this process.

The objective of this third ad hoc statement is to illuminate the psychological, social, legal, educational and economic aspects of the crisis. Furthermore, issues around data- and model-based support for decision-

¹ See the first statement from the Leopoldina published on 21 March 2020 on the health-related and political aspects entitled "Coronavirus Pandemic in Germany: Challenges and Options for Intervention", retrievable at https://www.leopoldina.org/uploads/tx_leopublication/2020_03_24_Leopoldina_ad_hoc_statement_coronavirus_en_final_02.pdf, and the second statement published on 3 April 2020 entitled "Coronavirus Pandemic – Measures Relevant to Health", retrievable at https://www.leopoldina.org/uploads/tx_leopublication/2020_04_08_2ad_hoc_statement_coronavirus_en_final_01.pdf.

making are outlined as an important prerequisite for appropriate political action and for the prioritisation processes which underlie political decisions.

2. Optimising decision-making using data and models

Monitoring the infection and immunity status of the population must be improved substantially

The rapid spread of the SARS-CoV-2 pandemic has led to a series of political measures aiming to slow the spread of infections and limit the immediate damage, all at short notice. These measures, referred to as a “shutdown”, are in some cases based on assumptions which lack an adequate knowledge base due to the dearth of available data, many scientific questions regarding the risks of COVID-19 are yet to be addressed. The time gained by the shutdown must be used to evaluate the actions taken using empirical data, and the costs and benefits of these actions must be evaluated prior to readjustment. The top priorities are providing sufficient care for people who fall ill and gradually returning society to “normality” via appropriate, differentiated measures which take the current epidemiological situation into account. Such measures must continue to slow the spread of infection and minimise the risk to the population as a whole, while reducing the negative effects on society and the economy. We need sufficiently precise knowledge of the population’s infection status and as accurate a quantification of the infection processes as possible in order to be able to model and forecast the epidemiological development as reliably as possible. Because the pandemic is highly dynamic and regionally heterogeneous, the monitoring and forecasting system should ideally be high-resolution with regard to area and time. Continuous, real-time adjustments of the system as new data are gathered would enable quick reaction times. To make this possible, collection of data on the infection and immunity status of the population must be substantially improved. The characteristics and risk levels of particularly vulnerable groups should be assessed, so that they can be advised accordingly.

During the average incubation period of 5 to 6 days, COVID-19 carriers are infectious without experiencing symptoms. In fact, a significant proportion of those infected show few or no symptoms for the entire duration of infection. Data surveys which have so far been largely symptom-based have led to a distorted perception of the infection process, making it nearly impossible to reliably assess the efficacy of the measures taken (based on data or models). This is compounded by the lack of sufficient testing capacity for acutely infected persons (PCR test) and those with immunity (validated antibody test) in order to ensure sufficient identification of infected and recovered patients.

An improved knowledge of the situation must be achieved through longitudinal testing of regionally disparate cohorts

To enable targeted implementation of effective differentiated measures, we should strive to establish an undistorted, comprehensive data pool via the longitudinal testing of regionally disparate cohorts with regard to infection and immunity status as well as psychological resilience and willingness to actively cooperate. Tailoring a representative sample, for example in the form of a micro-census, could significantly reduce the data volume required. Representative testing of suitable cohorts can thus help determine the real number of infected, ill, deceased and immune persons. In addition, all suspected cases should be tested in order to systematically place infected persons under quarantine. This requires greater testing capacities, although the current lack of available reagents in particular is leading to delays in testing.

Aside from the knowledge that SARS-CoV-2 is primarily transmitted by airborne droplets, data should be collected on the specific infection processes and environments (families, medical and care professions, retirement and nursing homes, public transport, businesses, schools, etc.). Furthermore, data on the

characterisation and stratification of the risk groups (e.g. data from autopsies) must be made available, evaluated and validated. In assessing disease progressions, the risk factors of newly infected persons (age, pre-existing conditions, lifestyle including smoking, etc.) must be electronically and centrally recorded in a standardised manner upon patient registration.

The procedure for collecting, processing, standardising and integrating data in prognostic models must be substantially expedited

Measures for gradually returning society to “normality” must take into account both the current state of the pandemic and its expected course. Statistical or mechanistic, dynamic computer-based models can enable reliable short-term prognoses (with the associated error margins) founded on valid case numbers and other relevant data sources (mobility, demography, etc.). In this way, potential longer-term scenarios can be collated. For a precise calculation of the impact of political measures and population-wide behavioural changes across an entire region (e.g. per municipality or district), relevant data must be fed into the models in real time. These include epidemiological data as well as population-aggregated data on mobility and networks of contacts. The procedure for collecting, processing, standardising and integrating data in prognostic models must be substantially expedited in order to produce up-to-date prognoses on a regional level.

Traditional reporting and monitoring systems should be supplemented by innovative methods using digital epidemiology

Traditional epidemiological reporting and monitoring systems, which, by their very nature, can only yield incomplete data with a significant time delay, should be supplemented by innovative methods from the field of digital epidemiology. “Digital data donation” approaches offer an innovative use of technology. For example, nationwide surveys via a smartphone app could provide data on the population’s current state of health. Useful data could also be supplied via apps for voluntary reporting of symptoms and information on the course of the illness. Analysis of data recorded by activity trackers and other wearables on the wearer’s resting pulse and sleep rhythms can indicate signs of fever and the emergence of flu-like symptoms. For this approach to be useful, it is crucial to research and review the reliability and validity of these data. Digital data donations must be embedded in participatory projects which invite people to help curb the pandemic and contribute to the common good. People should be able to provide data in an anonymised, safe and protected form to pave the way for improved prognoses. Data trustees could ensure the responsible handling of these data in terms of privacy protection and quality assurance. Data donations should be accompanied by expansive media campaigns to convey their benefit for the common good. Existing and planned projects of this type in the eHealth start-up domain should be identified and coordinated.

In the coming weeks and months, the number of new infections should be kept as low as possible in a controlled manner. Short-term forecast models must be updated with real-time, high-resolution data. The goal is to predict the probable development of the pandemic over the course of 1 to 2 weeks (including specification of inaccuracy intervals) and to compare the expected efficacy of measures prior to their application. The impact of the relaxation of measures can be analysed through a variety of scenarios. Model predictions also offer a set of tools for developing objectifiable criteria for a gradual transition to normality based on the available knowledge. The objective is to identify the recurrent regional clusters in which infection rates increase locally within a short timeframe as early as possible and to establish targeted, regional measures for dissipating them. In regions with low rates of infection and little potential for spreading the virus, restrictive measures could be relaxed, perhaps only for specific groups if appropriate. The expected effect of deploying staff who are known to be immune in critical areas (care services, retirement homes, hospitals) must also be included in the model predictions. Indirect effects on vulnerable groups must also be considered.

On the European level, data protection rules should be examined in the light of the experience gathered in the ongoing pandemic and should be adjusted in the medium term if deemed necessary. The use of

voluntarily provided personal data such as movement profiles (GPS data) in combination with contact tracing should be made possible in the current crisis situation.

3. Improving risk communication and promoting responsible individual behaviour

The relevant authorities must provide unambiguous, contextual information that serves to educate the public

Effective risk communication must achieve two goals: it must represent the risks of infection in a trenchant and realistic manner that encourages the public to comply with necessary measures, while at the same time taking care not to arouse unjustified fears. Achieving both of these goals largely depends on presenting risk statistics which are based on scientifically justified data, which in turn inspires trust in the information communicated. To this end, the relevant authorities must provide unambiguous, contextually framed information that serves to educate the public.

Realistic risk assessment requires supplementing absolute numbers with meaningful comparisons

For the first time in its history, humankind is watching a virus pandemic unfold practically in real time. Each day, graphics depict the rapid growth in infections and the cumulative number of deaths caused by COVID-19. The density of information and the selective presentation of specific absolute numbers increase the perceived threat and make it difficult to identify the actual risks. Differentiating between the number of mild and asymptomatic cases, the number of serious cases requiring hospitalisation, the number of cases requiring intensive care and the number of deaths is crucial for a realistic assessment of the perceived threat.

In Germany, the pandemic was identified at a very early stage, with initial cases detected almost exclusively in the healthy, middle-aged population. This may account for the current low mortality rates. Mortality rates which quantify the relationship between the number of COVID-19 deaths and the number of new infections, must be calculated on the basis of the total number of infections and the total population rather than just the number of registered cases. In terms of the individual risk of dying from COVID-19, more attention must be paid to the multicausality and the complexity of causes of deaths. The number of COVID-19 deaths must be compared to the number of deaths from other diseases in an equivalent age group over a comparable period of time.

Yet even when individual risk is relatively low, the societal risk posed by the unchecked spread of COVID-19 and the associated possibility that the healthcare system could become overburdened remains considerable. The systemic risk, which must be distinguished clearly from the individual risk, is the primary reason that society must take protective measures. This is illustrated by the significant growth in the number of cases and the associated epidemiological models (see German National Academy of Sciences Leopoldina's second ad hoc statement "Coronavirus Pandemic – Measures Relevant to Health"). A differentiated approach to risk assessment makes clear that excessive individual anxiety and panic are unfounded. At the same time, the reasons for temporarily restricting freedoms become evident to the population, since such measures are the only way to slow the spread of infection and ultimately contain the coronavirus.

Additional factors must be taken into account when considering inpatient capacity and the number of intensive care beds available for treating COVID-19 patients. Among these is the fact that measures to address COVID-19 could endanger patients with other illnesses if these measures affect their ability to access the healthcare system or if their fear of contracting coronavirus disease leads them to avoid seeking medical treatment (e.g. people suffering from mental illness, patients due for surgery, stroke and heart

attack patients, people requiring personal care). General societal risks, such as increases in domestic violence and mental illness due to existential hardship, must also be considered.

This discussion promotes a differentiated view of the complexity of risk assessments: Apart from the problems incurred by quoting absolute numbers, it becomes clear that various, equally relevant, levels of risk exist simultaneously and must be taken into account. Since different levels of risk accentuate different cost-benefit factors, ethical principles must be applied, too.

Appeals to personal responsibility must take priority over sanctions

At the moment, there appears to be continued broad public acceptance of the policy measures taken in response to the coronavirus pandemic. While some instruments such as closing restaurants and banning events are relatively easy to implement and monitor, the effectiveness of other measures such as hygiene recommendations and limitations on free movement are largely dependent on the public's willingness to comply. However, broad public acceptance of these measures can be expected to erode the longer the measures continue, as their positive effects become less evident and the reasons for them become less convincing.

Compliance is generally best when rules are clear, unambiguous and plausible. Individuals are especially likely to comply when motivation is intrinsic, in other words, when they believe that compliance is in their best interest or benefits the welfare of others. In contrast, the threat of sanctions is less effective. In light of this, it is especially important that policy measures implemented to combat the coronavirus pandemic are clearly formulated and well-founded, and that they appeal to self-interest, public welfare, and a sense of responsibility to others. It is crucial that communication also addresses vulnerable groups (including, in particular, older people living alone, refugees, migrants without knowledge of German, the homeless) and takes their specific communication needs into account.

In the initial phase of the crisis, the experience of a common threat has led to a swift rise in social solidarity. This includes an increase in spontaneous – i.e. non-institutionalised – civic engagement with little formal organisation, such as concrete support for others (e.g. helping neighbours) and actions in the public interest (e.g. making donations) or other ways. Society is standing together and setting aside egotism and individual interests. This raises the hope that some aspects of this solidarity may carry into the future, thereby strengthening the voluntary focus on the common good by society and industry over the long term.

Civic life must gradually be allowed to return

The current measures to slow the spread of infection are also severely weakening civil society. While a vital civil society keeps democracy alive and strengthens the focus on the common good, it requires civic engagement and must take place in the public sphere. The existing restrictions represent a profound disruption, as public life has largely ground to a halt. The activities of organisations – from sport and cultural clubs to support and charity associations to basic political and religious organisations – have mostly been suspended. Broad areas of organised civic life currently exist solely as digital networks in a diminished form. With regard to the future of civil society, too, there is therefore every reason to gradually ease the current restrictions as soon as possible.

4. Mitigating the psychological and social impact of the crisis

A crisis of the magnitude of the current COVID-19 pandemic will inevitably have an enormous psychological and social impact on individuals, groups, and societies as a whole. Stress research findings can help to

address the problems already being experienced, such as anxiety and uncertainty, social isolation (including home quarantine and changes to daily routine), or depression.

Encouraging individuals to take a proactive approach

The extent to which stressful events lead to illness depends largely on whether or not an individual experiences these events as predictable and controllable. It is their subjective (i.e. “perceived”) assessment of the situation that matters here. Anything that people can actively do themselves increases their sense of control. This is why regulations and recommendations should grant the population as much agency as possible, preferably through actions people can take on their own or together (“What you can do”). Furthermore, predictability must be increased by means of clearly presented information. It must be ensured that there is low-threshold, barrier-free access to expert services such as hotlines and websites for addressing infection risk, anxiety, depression, domestic violence, etc. Funding offers for such services and for the scientific assessment of their effectiveness must be stepped up as soon as possible.

Clear communication does not just increase predictability and compliance, but also improves risk management (see Chapter 3). Living with risks is part of everyday life, even if we usually do not consider this. People cope with risks much better when they are appropriately informed. The sense of threat grows when people perceive risks to be unknown, exceptional, and unintended. Therefore, support must be provided that subjective assessments of risks remain realistic: Transparent and easy-to-understand information aims at familiarisation; providing historical context by referencing the origins and progression of known infectious diseases reduces the perceived exceptional nature of the pandemic. Unpopular measures to reduce objective risks (as e.g. physical distancing) are more likely to be accepted when people are motivated to take on personal responsibility.

There is plentiful evidence for antidepressant effects and other health benefits of psychological factors as giving meaning to life, taking action to help others, social support, self-efficacy, and resilience. These factors can be boosted even in the short term through suitable psychological measures. People are generally more strongly influenced by examples than by statistical evidence. It is therefore important to cite specific examples, to explicitly commend the high levels of cooperation shown by the public so far, and to highlight what further measures will be needed.

Families need support from care, counselling and assistance services

The measures currently being applied mean that families and other forms of partnership and cohabitation play a central role. They are often the only remaining space for crucial aspects of daily life, face-to-face communication, socialising, childrearing, education and entertainment, as well as stress relief and conflict resolution. Meanwhile, public social institutions and many workplaces are largely or entirely inaccessible as sites for social interaction. In this situation, households take on additional tasks ranging from childcare and schooling to procuring food to organising leisure time, or are responsible for these tasks for longer periods of time. These additional responsibilities primarily fall to women. Particular challenges are faced by blended families which must remain able to share or alternate childcare. Households’ ability to manage these roles will vary depending on their financial means, cultural background, completeness and internal organisation. The longer the shutdown lasts, the more often they will reach breaking point, which is reflected in the increase in domestic violence and demand for professional counselling. However, this immense strain is largely invisible from the outside. This means that hotlines and counselling services are increasingly important in the short term. Consideration should also be given to measures such as those taken in France, where contact points have been established in supermarkets and pharmacies for people affected by domestic violence and other family crises.

With regard to the psychological effects and severe stress caused by the pandemic, it is imperative to take socioeconomic factors and lack of social integration into account. Particular risk groups include single-

parent families, migrants without language skills, older people living alone, the unemployed, and people who are living with mental illness or require care services. Poorer and less educated parts of society tend to lack material, psychological and social resources.

5. Ensuring transparency in deliberation and decision-making processes

Curtailments of fundamental rights must constantly be weighed against the protection which they are intended to achieve.

The measures taken by the German federal, state and local governments to combat the coronavirus pandemic have led to severe curtailments and suspensions of fundamental rights on a level previously not considered possible. Some of these affect the entire population, others individual (economic) sectors or groups within society. In light of the severity of these restrictions, the state has a duty not only to limit the duration of the measures, but also to constantly review whether it is possible to consider more lenient measures.

The government measures taken to date restrict a number of fundamental rights. These include not just the general freedom of movement, but also freedom of assembly and of religion, as well as the fundamental economic rights of freedom of occupation and property. As Germany, unlike other countries, is not in an official state of emergency, these measures must meet the constitutional requirements. As a result, the question of whether restrictions to fundamental rights comply with the principle of proportionality remains a key consideration in the current situation. Curtailments of fundamental rights must not only have a legitimate objective – which is unquestionably the case in the current circumstances, where the aim is to protect public health and save lives. The measures taken must also be appropriate, necessary and proportionate for achieving the desired outcome. The fact that the objective is unquestionably correct does not automatically mean that the means used to achieve it are permissible.

While there can likewise be no doubt that the measures taken are in principle appropriate for achieving the intended objective, in particular for flattening the curve of infection, it does not automatically follow that they are necessary. The question is whether more lenient but equally effective measures are possible. The current political response is based on sweeping measures, which were introduced for understandable reasons given the pressing need to act. The severity and duration of the restrictions of fundamental rights mean that it is now necessary to consider alternatives and potentially ease some of these restrictions, without losing sight of the objective of protecting health. Constitutional law imposes a duty to constantly monitor and review the situation with a view to possibly easing the restrictions.

The extent and scope of the curtailments of fundamental rights must be proportionate to the purpose and objective of the measures

It is crucial to ensure that the severity of the curtailments of fundamental rights is proportional to the importance of the public interests addressed by the measures. The extent and scope of the curtailments of fundamental rights must be proportionate to the purpose and objective of the measures. However, the unintended secondary effects of these curtailments must also be taken into account. The drastic measures introduced to curb the pandemic not only result in severe curtailments of the fundamental rights of all those affected, but also have other harmful repercussions. For instance, the preventative segregation of specific population groups, such as older people, simply to protect them must be rejected as too paternalistic.

Risk assessment must account for different objectives and consequences

The measures which aim to protect public health and save lives in the context of the pandemic are detrimental in other ways to the very same legal interests. These must not be ignored in assessments of the proportionality of the measures and sacrificed to the overriding imperative of controlling the epidemic; rather, they must be included in comprehensive decision-making. It is important to broaden the perspective in order to do justice to the multi-dimensional nature of the situation. One could describe this as the necessity of a multi-dimensional risk assessment to replace the single-minded focus on the sole objective of curbing the pandemic. Only once the unintentional secondary effects are taken into consideration does the complexity of the task of weighing conflicting interests become clear in its entirety. The indirect nature of these undesirable effects means that some may be much more difficult than others to attribute to a specific cause. These differences must be taken into account in assessments of the different priorities and levels of urgency for state decisions. The difficult task of weighting the individual aspects to be included in the overall deliberations lies primarily with the responsible state institutions. In this exceedingly complex task, they have a wide scope of action – although not without limits.

Conflicting goals must be identified and weighed during decision-making

Decisions are marked by uncertainty, dilemmatic preconditions and, not least, conflicting goals in many different ways. They are inherently uncertain simply because they are always made against the background of alternative options. They often involve dilemmas in the sense that their consequences entail unintended secondary effects such as those mentioned above. In addition, depending on the decision-making design and the underlying assumptions, the objectives pursued may compete with or even contradict one another. In the current COVID-19 crisis, all three of the aforementioned elements are visible. This was true of the decision to introduce the current shutdown, and it is all the more true of strategies to gradually ease these measures. In this connection, at least two separate levels of weighing alternative decisions or formulating action targets must in principle be differentiated from one another.

In epistemological terms, conflicting goals do not arise merely from different interests or orientations within a society, but rather reflect the structure of a functionally differentiated society with differing problem-solving instruments and rationales for action. Economic action is different from medical action, political action from scientific action, legal action from religious action. It is precisely the differentiation of these rationales that makes modern society capable of action in these different areas. At the same time, it makes centralised political coordination of this action more difficult.

This structure is virtually mirrored in the field of scientific expertise and advice, which generally remains closely tied to the specific perspective of each individual discipline. The urgent question which is thus raised with regard to the consequences of the COVID-19 crisis in particular is not primarily that of how to access the best expertise in the various disciplines, but how decision-makers can manage the necessarily differing knowledge bases and what deliberation and decision-making processes enable consistent decisions.

At the same time, consideration must be given to the normative level of deliberation and decision-making, which can also conflict with other levels of justification. In the present situation, an ethical outlook calls for emphasis on the principles of justice and solidarity, which are fundamental to our society, in deliberations weighing the different conflicts of interest.

Justice means that the social and economic costs of the pandemic, and of the measures to cope with it, must not be allowed to solely impact certain individuals or groups, but must be distributed as evenly as possible. Solidarity is expressed in the shared readiness to (help) bear burdens on behalf of others. Promoting justice and solidarity helps individuals to identify more strongly with the common good and motivates them to participate in joint action. This is essential in order to jointly overcome such a crisis. In

this regard, too, the question arises of how different normative expectations, aims and principles can be reconciled with one another to form a common basis for decision-making.

The epistemological and normative levels, for their part, require a diversity of perspectives, particularly in the present situation, where conflicting goals and the contradiction between the primary and secondary effects of a given course of action play an especially significant role. One way of doing justice to this diversity on the normative level is to take into account the perspectives of disparately affected and vulnerable groups. Some social groups are particularly vulnerable, in part because they have less power or fewer resources allowing them to engage in public discourse and influence it in their own interest.

On the epistemological level, it is important to be mindful of the limits of one's own perspective in terms of one's particular discipline. This primarily entails acknowledging that each discipline only accounts for the logic of the specific area of society (the law, economy, family, health, etc.) that it studies. The consequence of all this is that political decisions, especially those which need to be taken in the face of this crisis, must recognise the multidimensionality of the problem at hand and make the deliberation processes transparent and communicate them accordingly.

6. Gradually reopening parts of the education sector

All educational institutions have been closed during the crisis due to their high contact density and the associated risk of infection. Some teaching and learning processes have been suspended, some have been transferred to families and households to a greater extent, and some are continuing remotely using digital and analogue tools.

Home learning is less effective than school-based learning for many children. The shutdown has removed three essential functions of schools: a) learning-centred daily routine, b) socialising with peers and teachers, which supports learning and serves as practice for social participation, and c) professional feedback on learning progress. The crisis is thus leading to an overall decline in childcare, teaching and learning. It must also be feared that the crisis will exacerbate the already stark social inequality prevailing in Germany in terms of access to childcare and teaching and in terms of learning outcomes and educational success.

Educational institutions should reopen gradually, differentiated by year group. Examinations must be allowed to proceed at every level of education

Educational institutions should be reopened as soon as possible, although gradually and differentiated by year group. The circumstances of each individual educational institution must be taken into account. For a considerable period of time, all measures will have to be implemented in compliance with the regulations concerning hygiene, physical distancing, mouth and nose protection, testing, and rigorous application of quarantining. There will be a longer transition period in which limited forms of childcare and teaching will have to be accepted, with gradual expansions, in order to reduce the still significant risk of infection. The following recommendations concern this transition period.

Primary school children require the most support and guidance, and their parents are more heavily dependent on schools for childcare. This also applies to children in preschools and day-care centres. The process of gradual normalisation must begin with significantly reduced group sizes to facilitate physical distancing. It is recommended to focus on core subjects (in primary school, German and mathematics) and to divide each class into smaller groups for teaching in staggered time slots. These groups must remain the same in order to reduce the risk of infection. A group size of up to 15 pupils would be possible provided that large enough classrooms are available. Parents must be able to rely on schools to reopen in line with

these recommendations. Break times for the individual groups must be staggered. Schoolyards must not be allowed to become sites of infection.

Primary schools should initially be opened for children in the final year of their primary education so that they can be prepared for the transition to secondary school. The year groups below should then be readmitted one after another. Emergency childcare services for the youngest year groups can be gradually reduced accordingly.

In preschools and day-care centres, the same logic should be applied and normal operation should be resumed with reduced group sizes (max. 5 children per room) for children about to transition to primary school (5- to 6-year-olds). Every effort should be made – including in the summer holidays – to prepare these children for the transition to primary school as thoroughly as possible. As very young children do not comply with physical distancing and other protective measures, but are still capable of passing on the virus, day-care centres should continue to provide emergency care for younger age groups until the summer holidays. After-school childcare services should also remain limited to emergency care. Working parents will therefore continue to require both financial support and an extremely flexible approach to working hours and locations.

For education pathways involving centralised final examinations at the end of the lower secondary level, schools should initially reopen for year groups who are about to graduate. For all other year groups, a staggered approach with a reduced number of teaching hours and a focus on the core subjects (German, mathematics, foreign languages) is recommended. One additional class period per day can be provided to mark and comment on work completed by the pupils. This period can also be used to assign new work for the pupils to complete at home. This homework must not necessarily be restricted to the core subjects, but can include content from other subjects.

As older students are more able to benefit from distance learning, a return to customary face-to-face teaching can be postponed for longer for the upper levels of the educational system. For upper secondary levels, greater reliance on self-guided studying using digital and analogue media will be possible. Teachers will be responsible for providing study material and giving feedback on performance.

Universities and other higher education institutions should generally complete the summer semester via online/home learning. It will be possible to implement smooth transitions and combine remote and classroom teaching. This will require modified study units which can be taught online.

In general, examinations should remain possible at all levels of education.

Furthermore, when educational institutions reopen, they should address the interruption to usual teaching and day-care, the resulting disruption to children's socialisation with their peers, and the overall crisis as experienced by the children.

Digital teaching material must be expanded and made easily accessible

High-quality teaching tools for self-guided study and distance learning at all educational levels must be expanded and made available nationwide as a result of the crisis. Furthermore, compensatory measures should be provided, for example in the upcoming summer holidays, in order to minimise the detrimental effects on pupils' attainment of the education standards for their year group, the transition to primary/secondary school, and the completion of examinations. These measures are particularly important for lower-performing pupils and can help to mitigate social inequality.

However, it must also be recognised that the crisis has accelerated the drive to digitalise education, which will lead to improvements in institutions' portfolio of digital tools and in teachers' and pupils' digital skills as well as to more rapid development of strategies and programmes for utilising digital methods and media in

teaching and in the education sector as whole. More detailed experience of the significant advantages and the limitations of digitalisation in the education system is being gained. This should help to develop a more accurate idea of its possibilities – which can subsequently be consolidated by means of scientific research. The crisis highlights how important it is to develop digital options for substituting and/or supplementing classroom teaching. The use of modern teaching methods and tools must be enhanced following the crisis.

7. Overcoming the crisis with sustainable economic measures

The measures taken by the German Federal Government as an immediate response to the crisis with the aim of preventing infection from spreading, in particular the restrictions on individuals' freedom of movement, the stricter border controls, the closure of shops, restaurants, hotels, etc., the cancellation of leisure events, and similar components of the shutdown, are undoubtedly necessary regardless of any debate over the specifics of their implementation. At the same time, health policy makers reacted purposefully and are making efforts to reinforce intensive care capacity, increase testing capacity and provide protective equipment, for example.

The economic shock caused by the coronavirus pandemic is reflected in both macroeconomic supply and demand; however, it is in no small part the result of these health policy strategies. Supply is affected by the disruption of supply chains and a reduction in demand for work. Demand and therefore sales have slumped for products in general but particularly in the sectors most heavily affected by the shutdown, such as retail, hospitality, transport, leisure, tourism and events.

The state has responded with corrective economic policies on an unprecedented scale. But the longer the shutdown lasts, the more difficult it will be to avoid serious economic consequences. The likelihood of widespread bankruptcy and higher unemployment will rise accordingly. Broad swathes of society are facing financial losses and seeing their retirement savings in particular dwindle. Many independent self-employed workers and small family businesses have lost some or all of their revenue. Many of those affected have minimal savings. The only assistance offered to these people by the German welfare state consists in the basic social security provisions. In general terms, the significant role that social inequalities play in people's experiences of the coronavirus pandemic must not be overlooked. The risks of contact and infection and, in particular, the psychological and economic effects of the crisis are distributed highly unequally across society.

From the national level to European solidarity and international cooperation

A crisis is always a time for the executive to act. Executive power is growing around the world. While this may currently seem unavoidable, it is essential to do everything possible to uphold the democratic culture of debate, multi-party competition and the crucial role of parliaments despite the restrictions on public life. Addressing the crisis requires decisions, often rapid ones, at a national level, resulting in a centralisation of power. At the same time, the advantages of Germany's system of cooperative federalism are clearly demonstrated. It allows for the necessary differentiation based on regional perspectives, promotes productive competition to find the best solutions, and generally leads to the necessary common ground by means of compromises. However, the current situation shows that a cautious increase of federal powers in times of crises would be desirable, not least to avoid discrepancies across jurisdictions which would be difficult to justify to the public and therefore decrease acceptance of the measures taken.

This crisis is also a time for nation-states to act. They remain as effective as ever; that much is clear. Thus far, it appears that only nation-states have the legitimacy, resources and capacity for action required to implement such far-reaching interventions. But this requires additional steps. The extent to which

nationalism, self-promotion and protectionism – and even the revival of old stereotypical concepts of the enemy – are reappearing is worrying. Firstly, it is indisputable that the present crisis represents an international challenge which can ultimately only be overcome through international cooperation. Secondly, encouraging European integration remains a national political goal and is well understood to be in Germany's best interest. The current crisis is throwing the disunity of the European countries into stark relief. At the same time, however, its exceptional nature offers unique political opportunities to revive the spirit of European solidarity. The German Federal Government should seize this opportunity and display greater solidarity with its European partners than it did in the initial phase of the crisis, including by providing assistance to other countries and taking additional steps to tackle the crisis jointly. At the same time, as a major exporting country, Germany will suffer the consequences if our most important trading partners sustain lasting economic damage. Even in purely economic terms, there is therefore a common interest in collaborative action. If this does not happen, the European Union is threatened with further disintegration.

The present crisis has also exacerbated the often general criticism of globalisation. Major reliance on global markets and the transnationalisation of supply chains have doubtlessly increased our vulnerability in a global crisis. The interconnectedness of our world, not just in economic terms, should prompt us to consider ways of making our external relations easier to control, in terms of the economy in particular. The pandemic has highlighted the existence of deeply globalised interrelations which need to be better coordinated through concerted multilateral efforts bringing together nation-states and continents.

[Finding sustainable solutions to the crisis on a national and European level](#)

A great deal depends on successfully combining the desired medical outcomes – curbing the pandemic, protecting public health and saving lives – with a gradual resumption of economic and social activity. The high direct and indirect costs of the shutdown described here mean that even very large investments in fighting the pandemic and protecting public health, such as widespread testing and high staffing levels in the healthcare system, are worthwhile and deserve support.

As restrictions are gradually loosened, the number of infections must not be allowed to increase rapidly once more. The mortality rate depends in particular on the performance of the healthcare system and the peak loads it is able to absorb. Finding the right approach is therefore a balancing act. The Leopoldina set out a number of concrete measures in its two previous statements. The most effective of these measures include the wearing of mouth and nose protection, widespread testing, the use of mobile phone data and the isolation of infected individuals, as well as the development of treatments; all of these together should stabilise the system until an effective vaccine is found.

In light of the significant long-term impact that the coronavirus crisis will have, and above all in light of the climate and biodiversity crisis, which poses at least as great a threat, we cannot simply return to the previous status quo. We must learn lessons for the future from our experience of the coronavirus pandemic and its causes. The general increase in population, urbanisation and global mobility, and the destruction of ecosystems and decrease in their resilience due to changes in land use as well as climate change, are major factors in the emergence of epidemics and pandemics.

State measures to stimulate economic activity after the pandemic abates should therefore prioritise principles of sustainability. If the investments made and programmes launched now are designed to be sustainable, the parties involved will be free to implement the necessary changes in a way that suits the circumstances in each local area at the relevant moment in time, to encourage the desperately needed openness towards technological innovation in areas such as the energy transition, and to close local and global material cycles, etc. If we miss this opportunity, the scale of the current economic programmes would make it extremely difficult to implement an even more drastic change in policy direction when needed later on. Decision-makers thus have an extraordinary responsibility to seize this historic

opportunity. They must ensure a transparent discussion of the costs involved, including the enormous external costs of damage to the climate and environment and, not least, the resulting impact on human health.

In concrete terms, there will first of all be a need for economic stimuli which ensure that the inevitable recession forecast for this year will not be too deep and that economic growth will resume. However, these stimuli must be guided more firmly than before by considerations of sustainability, not least because this offers vast potential for economic growth. Doing so will require decisive action in the field of economic policy. It is highly likely that additional economic measures will be needed, beyond those already taken and despite the automatic stabilisers taking effect within the system (lower tax revenues, labour market policies). In terms of revenue, these additional measures will include tax policy instruments such as introducing loss carry-backs and making loss carry-forwards easier for businesses (abolishing minimum taxation), temporarily moving to declining-balance depreciation, and bringing forward the planned partial discontinuation of the solidarity tax surcharge. The complete abolition of the solidarity tax surcharge should be considered. With regard to spending, the most obvious approaches include state investment and the reduction of subsidies that are harmful to the climate and environment. Particular consideration should be given to structural policy objectives, for example regarding public service and the protection of common goods, especially in the areas of health, climate and ecosystems.

Ensuring stability through economic and financial policy

National economic and financial policy:

Short-term: Economic policy must primarily provide aid to bridge this period of economic turbulence while health policy measures are still in place. This includes short-time working in order to avoid mass unemployment and the attendant negative consequences, liquidity assistance, tax deferrals and grants to reduce cases of insolvency. State contributions should only be used to stabilise enterprises in extreme emergencies and should not involve additional industrial policy goals; depending on the case, they should be structured more in the form of silent participations.

Medium-term: Once the current public health measures have been phased out, expansive fiscal stimuli will continue to be necessary. In terms of revenue, this could come in the form of tax relief, in the form of bringing forward the planned partial discontinuation of the solidarity tax surcharge or by abolishing it completely. With regard to spending, alongside the existing stabilisers such as unemployment insurance, additional resources for public investments are important, for instance in healthcare, digital infrastructure and climate protection.

European economic and financial policy:

The crisis requires the highest degree of solidarity within Europe. Managing the crisis at the level of the European Union includes the provision of liquidity by the European Central Bank (ECB), financial support from the EU budget and programmes by the European Investment Bank (EIB) and a credit line from the European Stability Mechanism (ESM) with conditionality focused on the effects of the pandemic. A strong and united Europe is indispensable for Germany as a major exporting country.

Setting the course for sustainability

All policies other than emergency measures to save businesses must be guided by the principle of sustainability at the national and international level. The following measures, which rest on broad scientific evidence and a broad societal consensus, must therefore continue to be implemented with the high priority. Developing a climate-friendly economy and ensuring a systematic transition of the mobility and agriculture sector will act as a major stimulus for innovation and growth. Specific measures include immediately introducing a carbon price for CO₂ emissions from fossil fuels, passing and implementing the

national hydrogen strategy as soon as possible, and reforming electricity market regulations. The objective must remain a strong “European Green Deal”.

Adhering to a market-based economic order

The economic policies introduced during the crisis must be reversed or modified as soon as possible in order to transition to sustainable economic activity within the framework of free market operation. This includes that the government withdraws from companies as shareholder in cases where public investment was made due to the crisis, and the reduction of public debt. Conformity with Germany’s balanced-budget provision – the so-called debt brake – must be maintained in accordance with its current set of regulations. This allows for a significantly higher debt to be accrued, particularly in exceptional situations such as this, under the condition that the funds be repaid upon the return to normality.

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