Blanket Restrictive Measures in the Czech Republic During the COVID-19 Pandemic – A Trade-Off Concept Application

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Abstract
In early 2020, many widespread restrictive measures were introduced worldwide in response to the COVID-19 pandemic. These measures entailed high socio-economic costs, which have been largely overlooked due to political motivations and the difficulty of their measurement. One of them is the negative impact of widespread restrictive measures on life expectancy due to the limited school attendance and the negative impact of restrictions on the population's health status. In this paper, we use our own structural model based on the trade-off analysis method. The research compares the lost years of life in the situation of the existence of restrictive measures and, on the contrary, the situation of a complete absence of these measures. We use data from the Czech Republic between February 2020 and October 2021. Our article concludes that the number of lost years of life is many times higher when widespread restrictive measures are implemented in all considered scenarios. These findings should be considered when making further decisions on applying widespread restrictive measures in the Czech Republic.

Keywords: COVID-19; Czech Republic; government responses; nationwide restrictive measures; trade-off analysis;

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1. Introduction

For the majority of 2020 and during the first ten months of 2021, the Czech Republic experienced strict restrictive measures that were introduced in response to the global COVID-19 pandemic (Jasova and Kaderabkova, 2022). From 1st March 2021 until the end of May 2021, a resolution of the Government of the Czech Republic led to a period in which the fundamental freedoms, rights and activities of the individual were at their most restricted since the end of the Second World War. The Government of the Czech Republic justified its blanket measures as aimed at: ‘strengthening personal responsibility and prevention while dealing with the COVID-19 occurrence crisis situation’ (Government of the Czech Republic, 2021). For the purposes of this text, we define ‘blanket measures’ as measures valid for the entire population regardless of age, health condition, or other individual characteristics. Their aggregate average impact on selected indicators is modelled in the text. When considering the implementation of blanket restrictive measures,

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the Government of the Czech Republic based its decision-making primarily on modelling approaches that do not consider certain important aspects that influence the quality of human capital, such as unintended public health consequences or the impact on education. In other words, there is a number of other economic and political aspects that are associated with the closure of the economy. The Government of the Czech Republic did not rely on credible and substantiated data studies. A number of decisions was taken on an ad hoc basis and lacked a systematic or coherent framework (Kaderabkova and Jasova, 2021). This, in turn, led to confusion, panic, and an increased level of fear within society. A fundamental mistake can likewise be seen in the fact that the Pandemic Plan of the Czech Republic was not updated or modified, to better reflect the current attributes of COVID-19 even after more than a year of the ongoing pandemic.[1]

The presented research focuses on a selected subset of the socio-economic impacts of restrictive measures, namely the reduction in life expectancy / loss of years of life. The measures introduced also negatively affected the quality of life of the healthy population. Closure of the economy directly decreased total school attendance time which, according to current research (see Fischer *et al.*, 2013; Lundborg *et al.*, 2016; Lleras-Muney, 2005) leads to lower life expectancy. The negative impact was also reflected in the health condition of the population, as instances of mental illness, obesity and other disease increased during the lockdown period. In addition to the restrictive measure costs examined here, it can be stated that the measures also impacted the entire domestic economy. Ultimately, the measures did not significantly benefit the health-compromised either, as they were unable to prevent a high number of deaths, especially in the ‘susceptible’ population (citizens over 65 years of age and further higher risk groups with other diseases).

The aim of the presented research is to conduct a trade-off analysis that compares the costs related to an absence of blanket restrictive measures to the potential costs related to the introduction of blanket restrictive measures during the COVID-19 pandemic. The article evaluates the hypothesis that the given blanket restrictive government measures applied in the Czech Republic during 2020 and the first ten months of 2021 were effective in terms of the number of years of life lost and saved. To verify the chosen hypothesis, a structural model has been developed to analyse the effects of the introduced restrictive measures on the total number of lost years of human life in the medium-term and the long-term horizon. The model compares the potential costs of introducing blanket restrictive measures in terms of lost years of life with the potential costs of the full absence of any such measures. The whole model relies on the assumption of ceteris paribus, that is that all parameters used to estimate the number of years of life lost remain constant. For example, these parameters include the mortality rate, which is greatly dependent on whether hospital bed capacity is exceeded, as well as other factors which could lead to an increased mortality rate, greater intensity and severity of long-term COVID-19 health consequences and to an overall increase in the severity of COVID-19 itself should restrictive measures introduced be relaxed. In turn, all these consequences would lead to a higher number of years of human life lost because of the COVID-19 pandemic itself and to a higher number of years saved by implementing restrictive measures i.e., the introduced measures would likely prove to be more effective. The model works under the assumption of ceteris paribus due to a current lack of data that could serve to evaluate the restrictive measure effects in question as there are significant differences in the intensity of measures introduced.[2] We therefore believe

[1] The current Pandemic Plan of the Czech Republic dates to 2011.

[2] For example, it is not possible to determine the level of hospital bed un/availability and the resulting COVID-19 mortality rate in the absence of blanket restrictive measures because a state of zero blanket restrictive measures no longer existed anywhere by the end of 2021.

that a trade-off analysis where the individual fixed parameters, which we have thus far considered to be constant are varied, to be suitable for future research once a sufficient amount of necessary data becomes available. The study also does not include any individual negative economic effects on the Czech economy, that accompany the introduction of the restrictive measures.

The text of the article is structured as follows. The second section presents an overview of the existing research on the chosen topic. The third section informs about the nature of applied restrictive measures. The fourth section discusses the economic implications of the observed COVID-19 pandemic. The fifth section outlines the constructed model, including its derivation and explanation of the chosen individual variables together with a presentation of the data used and the selected scenarios. The sixth section presents the results of the undertaken research. Finally, section seven concludes.

2. Recent relevant research

The global crisis associated with the spread of the viral disease SARS-CoV-2 causing COVID-19, publicly known as ‘coronavirus’, has significantly affected the lives of billions of people. The origin, spread, course and mutation of the disease have become a daily conversation topic reaching far beyond simply professional communities around the world.

Scientific circles of all disciplines began to refocus their research towards topics related to the COVID-19 pandemic. Numerous articles began to emerge that dealt with strategically important topics, such as the impact of the disease on healthcare systems (Blumenthal *et al.*, 2020), as well as outlying topics, such as the impact of the COVID-19 pandemic on gender inequality (Fortier, 2020).

Hesitant and uncertain government approaches resulted in the gradual emergence of expert articles concentrating on the COVID-19 pandemic and related trade-off analyses. These articles dealt with the decision-making processes related to the design and implementation of restrictive measures in more depth, centering on their progress, fairness, effectiveness, and combined positive and normative perspectives (Norheim *et al.*, 2020). Other articles have compared the trade-offs between restrictive measures and their impacts on the economy. These articles tend to be geographically narrowly focused, such as Lin and Meissner (2020) who examined the effects of the lockdown on the US economy, and Manipis *et al.* (2021), who examined the same impacts on the Australian economy. An example of research into the global impacts of the COVID-19 pandemic on economies can be found in an article by Danielli *et al.* (2021), who provide a comparison of fiscal interventions converted into a percentage of GDP for selected countries (China, Ireland, New Zealand, Hong Kong, Australia, USA, South Korea, Spain, Sweden, Japan, United Kingdom, Germany, and Italy).

The model introduced in this article presents a new and original comparison. It suggests a trade-off analysis of the number of potentially lost years of life due to the absence of blanket restrictive measures contrasted to the number of years of life lost in the long-term due to the many negative effects that derive from the restrictive measures.

3. Overview of applied restrictive measures in the Czech Republic during 2020 and 2021

Already before the discovery of the COVID-19 in the Czech Republic in early February 2020, restrictive measures against the spread of the disease were introduced in the form of a ban on direct air links with China and in early March also with Italy and South Korea. At the beginning of March 2020, all primary, secondary and higher education institutions were closed, followed by the declaration of the first state of emergency in the territory of the Czech Republic. All emergency measures were first adopted by the Government of the Czech Republic within the framework of the declared state of emergency, and later measures started to be issued by the Ministry of Health of the Czech Republic under the Act on the Protection of Public Health.

In the first half of March 2020, when COVID-19 appeared in the Czech Republic, the Czech Government adopted the first large-scale and comprehensive package of measures to prevent the spread of the disease. This package included the following measures:

- prohibition of free movement of persons,
- prohibition of movement and staying outside the residence without respiratory protection,
- equipment such as respirator, mask, scarf or other means to prevent the spread of droplets,
- closure of selected shops and stores,
- severe restrictions on catering and accommodation services,
- severe restrictions on the operation of inpatient care facilities and social services,
- severe restrictions on the operation of spa care,
- the establishment of rules for the admission of patients to social facilities,
- ban on all sports, cultural, religious and artistic events with an attendance of over 100 people, which was later extended to all events regardless of the number of people.

The measures then escalated almost until the second half of May 2020, when the measures began to be gradually relaxed. In the meantime, the duration of the restricted free movement of persons and other measures was extended. Retail sales and the sale of services were even banned altogether. During April 2020, patient visits to health and social service facilities were banned, the operation of providers of respite care services was restricted, and beds were set aside for social service clients. In early May 2020, there was also a ban on entry into the Czech Republic, making it impossible to cross the border inwards (Ministry of Industry and Trade of the Czech Republic, 2020).

We consider all the above measures to be the most crucial ones in terms of their importance that the Government of the Czech Republic has taken to prevent the spread of the COVID-19 epidemic. These measures have been tightened or loosened in 2020 and 2021 depending on the evolution of the epidemic itself, which can be simplistically described through four main waves. The first wave peaked in October/November 2020, the second in December/January 2021, the third in February 2021 and the fourth, the strongest in terms of daily increase in the number of infected, in November 2021. As hospital overcrowding is one of the most important risks of a coronavirus epidemic, it should be emphasised at this point that the first three waves of the epidemic appeared to be the riskiest from this perspective, as they had the highest proportion between the number of hospital admissions and the daily increment of infected persons (Ministry of Health of the Czech Republic, 2022). According to the analysis of the Ministry of Labour and Social Affairs of the Czech Republic (2021), the restrictions were most intense in April and November 2020 and between January and April 2021. Conversely, the restrictions were most relaxed between June and September 2020.

Some of the measures were modified in various ways over time. For example, health and social services workers were exempted from the ban on the free movement of persons. The prohibition of school attendance was extended over time to other educational or leisure activities. In selected outlets, the hours within which seniors could shop were defined (Ministry of Industry and Trade of the Czech Republic, 2020).

4. Economic and political implication of the COVID-19 pandemic and of the introduced restrictive measures

From an economic point of view, the COVID-19 pandemic can be described as a negative exogenous shock that has significantly affected the economies of most countries in the world. There is no clear consensus across the economic community on the question of whether the COVID-19 pandemic was a supply or demand shock. However, most economists agree that the pandemic bears the hallmarks of both supply and demand shocks. The pandemic itself is primarily a supply shock as it affects manufacturers and their ability to produce goods and services. The state's response to the pandemic, i.e., the introduction of restrictive measures, brings about a demand shock as it not only limits household access to goods and services but also reduces the incentive to consume due to negative expectations (Brinca *et al.*, 2020).

Uncertainty arose in the economy, expectations were mostly negative, and the government was unable to offer a rational strategy to overcome the pandemic. Companies reduced production and postponed investment, households postponed consumption and increased their marginal propensity to save. From an aggregate macroeconomic point of view, the COVID-19 pandemic represents a negative exogenous shock that has affected not only small open economies, such as that of the Czech Republic, but also large open economies. One of the key determinants of Czech economic development during the observed COVID-19 pandemic is the development of aggregate demand. The real unemployment rate is one of the most important macroeconomic indicators observed in the domestic economy. In the spring of 2020, decision-makers launched ‘antivirus’ programs motivated by fear of a sharp rise in unemployment. According to the Ministry of Labour and Social Affairs, the aim of this step was to help companies protect jobs and thus keep unemployment low.

As a short-term measure, introducing these packages was a rational act by the government as the implementation of restrictive health measures would result in a sharp decrease in demand for the services limited by these restrictions. The decline in demand for these services would lead to a decline in demand for labour in the affected sectors as the demand for labour is derived directly from the demand for the affected services that this labour provides. Without the protective measures the fall in demand would lead to dismissals at the affected companies and to a significant salary reduction for employees, according to neoclassical labour market theory. From the theoretical perspective of the Phillips curve that illustrates the short-term trade-off between the rate of inflation and the unemployment rate, it can be supposed that holding the unemployment rate artificially low in this way will result in a subsequent inflation rate rise. This theoretical perspective is currently supported by macroeconomic indicators that reveal developments in real unemployment rate and price level growth.

Due to the pandemic, the most valuable form of capital – human capital – has also been undeniably damaged. It has been significantly depreciated by the COVID-19 infection itself and the short-term and long-term consequences it has for affected patients. The offered study does not underestimate these circumstances and reflects this in the choice of parameters investigated by the structural model. The aim of the study is not to downplay the significant negative impacts of COVID-19 itself. The aim is to evaluate whether the blanket restrictive measures introduced alleviate the depreciation of human capital and increase its quality, or whether the overall societal impact will exacerbate this deprecation. Besides protecting human health, the introduction of restrictive measures also brings negative side effects such as a decline in education quality, increases in the frequency of mental disorders, decreases in disposable household income and other consequences that lead to a reduced standard of living for the whole society. These factors may also lead to a decrease in the average life expectancy of the population. All these potential negative side effects impact the quality of human capital. A comprehensive evaluation of the abovementioned effects will only become possible after a longer period of time has passed, but we believe that some evaluation should be performed now – at a shorter interval since the outbreak of the pandemic – due to the gravity of the examined issues and, in particular, with regard to the significant costs associated with blanket restrictive measures.[3] The presented analysis can contribute to improving the quality of decision-making regarding the introduction of restrictive or other economic-policy measures.

5. Theoretical model

5.1. The principle of the theoretical model

'Trade-off' (something for something) analysis is the foundational element of the model. The presented analysis is primarily important from the national economic decision-making perspective. The question of whether blanket restrictive measures are worth introducing must be answered. Restrictive measures not only affect people's lives, but they also hinder the economic performance and economic subjects that are forced to significantly reduce or even cease their activities because of state paternalism.

Expert studies examining trade-off analyses usually compare potentially saved lives with economic costs in monetary form. However, this is highly problematic to calculate or estimate. The model we have constructed compares parameters expressed in identical units, namely in the number of years of life saved. We compare two parameters; firstly, the potential number years of life lost due to an absence of blanket restrictive measures designed to prevent the transmission of COVID-19 (the cost of an absence of restrictive blanket measures) and secondly, the number of years of life that are lost in the long-term due to the implementation of blanket restrictive measures (the potential costs of introducing blanket restrictive measures).

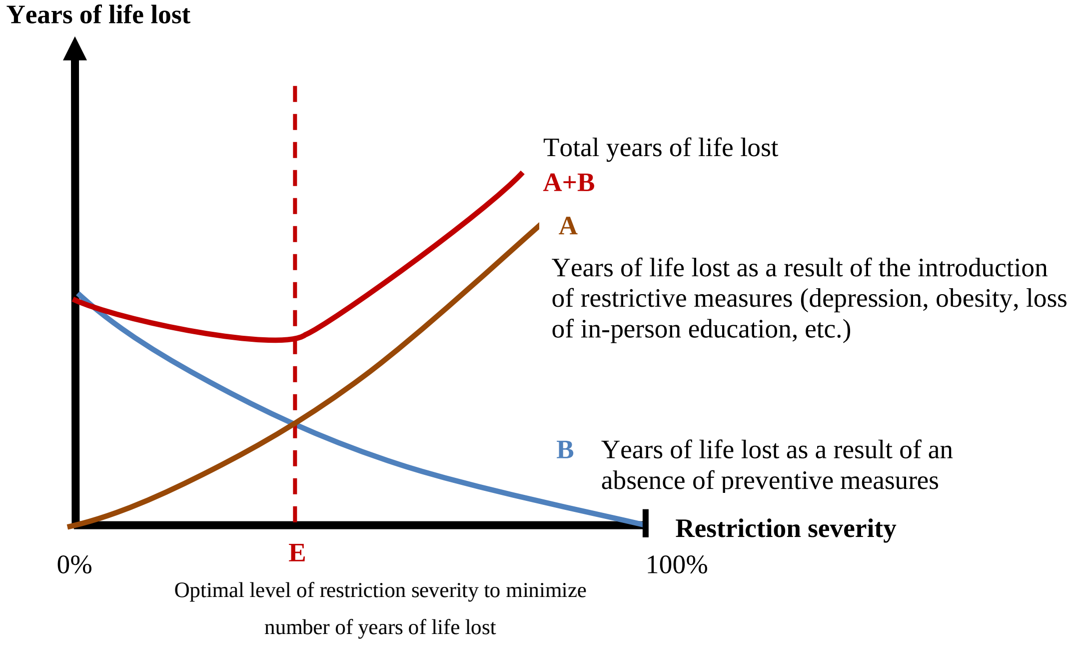
[3] From late October 2021, much earlier than expected, reports appear of overcrowded children's hospital wards due to a higher prevalence of common respiratory illness. It can be assumed that children's immunity has weakened as a direct result of the restrictive measures (see Svecova, 2021). From June 2021, reports also begun to appear of overcrowded pediatric psychiatry wards due to a large increase in anxiety disorders, depression, self-harm and child suicide, etc., linked to the previous lockdown (see Czech Television, 2021).

The model compares the costs described above. It should be emphasized that costs are incurred in both cases, i.e., if blanket restrictive blanket measures are introduced and if they are absent. It is their magnitudes that differ. When estimating the number of years of life lost through the implemented measures, the reduced quality of life resulting from a significant reduction of social contact is not considered. While this decrease in the quality of life can be considered an important factor, we make no attempt to estimate it here, due to the complexity of its quantification.

Our basic assumption is that one year of life of the average senior citizen is of equal value to one year of life of a relatively young citizen. It could, however, be argued that one year of life of young individuals, who tend not to have significant health indispositions in comparison to seniors, is more valuable than one year towards the end of life. From this perspective, we are therefore overestimating the positive impact of blanket restrictive measures.

Loss of life optimization is illustrated in **Figure 1** where the blue line represents all possible combinations of restrictions severity and the total years of life lost due to an absence of restrictive measures. This curve has a negative incline, as the number of years of life lost due to the absence of restrictive measures decreases with the increasing severity of these measures. The green line represents the total years of life lost due to restrictive measure introduction, e.g., due to the emergence of depression, obesity, loss of in-person education, etc. This curve has a positive slope, as the number of years of life lost due to the introduction of restrictive measures increases together with the severity of these measures (for more details, see Section 5.3.) As the red line is the sum of the blue and green lines, it therefore represents the total number of years of life lost due to the COVID-19 pandemic. The optimal severity of restrictive measures minimizes the total number of years of life lost. The minimum number of years of life lost is graphically depicted as point E, where the value of the red curve is at its minimum. Should decision-makers try to minimize only the number of years of life lost due to COVID-19 (blue line), then the total number of years of life lost takes on enormous proportions.

Figure 1. Theoretical representation of total number of years of life lost minimization



Source: own illustration

In the model, all exogenous variables related to the course of the COVID-19 pandemic in the Czech Republic, the number of infected persons, the number of seriously ill persons, or the number of people who succumbed to COVID-19,[4] are based on data from the Ministry of Health of the Czech Republic as of 20 July 2022. All of these exogenous variables are inserted into the theoretical model with the purpose of calculating key endogenous values.

The potential costs of the absence of restrictive measures are derived as follows. In the absence of restrictive measures, it is assumed that the entire population will be infected. Even with the introduction of tough restrictive measures, not all lives will be saved. The potential costs of blanket restrictive measures are expressed in terms of the number of years of life lost by people who do not die due to the measures being implemented and the years of life lost by the population who will suffer the long-term consequences of COVID-19.

The potential costs of introducing restrictive measures represents the number of years of life lost due to the two main reasons considered. Firstly, a decrease in the quality of teaching and the provision of education, which reduces the average life expectancy of the population. Secondly, a decrease in average life expectancy due to the higher prevalence of mental disorders, reduced physical activity and fewer social contacts (for more see Section 5.3). We do not take other causes into account in the model. As an example, if a young person's life expectancy is reduced by three years, that person may not die immediately but shortening the life expectancy of a senior citizen by the same number of years can lead to the instant death of that person. As a result, both persons die three years earlier (their life expectancy is shortened) but only one of them appears in the current death statistics.

5.2. The structural model and its derivation

The model is based on the calculation of estimated mortality *d*, shown in equation 1. The calculation works with the exogenous value of the final expected number of people who will die from COVID-19 if all inhabitants of the Czech Republic become infected, *D*.

This value is derived from the expected mortality rate of COVID-19 and the total number of deaths increases as the mortality rate increases[5]. Variable *N* represents the total population of the Czech Republic.

$$d = \frac{D}{N} \tag{1}$$

Equation 2 describes the calculation of the estimated mortality rate for residents over 85 years of age (o):

$$o = g_9 \times \frac{D}{E}\ , \tag{2}$$

where the variable g_9 denotes the share of deceased persons from the 85+ age group in the total number of deceased persons, *D* represents the total number of deaths should all inhabitants of the Czech Republic become infected, and the variable *E* captures the total number of persons over 85 years of age.

The model also incorporates the exogenous value of the number of lives that can be saved as a result of the introduction of restrictive measures *(S)*. The higher the effectiveness of the measures applied, the higher the number of lives will be saved as a result.

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[4] Including their frequency by individual age categories in the Czech population.

[5] Illustrative example: A mortality rate of 0.5% corresponds to 53,000 deceased persons, while a mortality rate of 0.8% corresponds to 86,000 deceased persons within the relevant dataset.

Equation 3 describes the first possible calculation of measure effectiveness (e):

$$e = \frac{D - L - (D - L - S)}{D} = \frac{S}{D} \,, \tag{3}$$

where variable *D* represents the total number of deceased persons should all inhabitants of the Czech Republic become infected. The variable *L* shows the number of deaths to date and the variable *S* represents the number of lives saved by result of the introduction of restrictive measures.

Equation 4 describes the calculation of the estimated additional increase in deceased persons should restrictive measures be introduced (*W*):

$$W = D - S - L \,, \tag{4}$$

where variable *D* represents the total number of deceased persons should all inhabitants in the Czech Republic become infected, the variable *S* represents the total number of lives saved by the introduction of restrictive measures, and the variable *L* captures the number of deaths to date.

Equation 5 further describes the calculation of the estimated total number of deceased persons should restrictive measures be introduced (*B*):

$$B = W + L \,, \tag{5}$$

where the variable *W* denotes the additional increment of deceased persons should measures be introduced and *L* represents the number of deaths to date.[6]

Equation 6 captures the calculation of the cumulative number of people infected with COVID-19 (*H*):

$$H = \frac{1}{d} \times L \,, \tag{6}$$

where the variable *d* denotes the estimated mortality and *L* represents the number of persons who have died so far.

Equation 7 describes the calculation of the estimate of the number of uninfected persons (*A*):

$$A = \frac{1}{d} \times (S + W) \,, \tag{7}$$

where the variable *d* denotes the estimated mortality, *S* represents the number of lives saved due to the introduction of restrictive measures, and *W* is the additional increase in deaths should measures be introduced.

The number of uninfected persons (*A*) can also be estimated through the calculation shown in equation 8:

$$A = N - H \,, \tag{8}$$

where the variable *N* represents the total population of the Czech Republic and *H* represents an estimate of the cumulative number of people infected with COVID-19.

Equation 9 describes the calculation of the estimated number of people who will not become infected as a result of the introduction of restrictive measures (*K*):

[6] The model relies on data from 31 October 2021.

$$K = S * \frac{1}{d} \;, \tag{9}$$

where variable S captures the number of lives saved as a result of the introduction of restrictive measures and d represents the estimated COVID-19 mortality rate.

Equation 10 describes the calculation of the estimated average loss of years of life in case of death from COVID-19 (Q):

$$Q = T_1 \times q_1 + T_2 \times q_2 + \; \dots + T_9 \times q_9 \;, \tag{10}$$

where the variable T represents the average loss of years of life in the event of death for the given age group and q represents the share of deaths from a given age group of the total number of deaths. The figures in the index (1-9) represent the individual age groups, see Table 1 below.

Table 1. Czech Republic age group designation and distribution.

Number – designation	Age category	Age category population	Age category population share
1	0-14 years	1,710,202	15.99%
2	15-24 years	961,062	8.99%
3	25-35 years	1,374,019	12.85%
4	35-44 years	1,686,444	15.77%
5	45-54 years	1,525,514	14.27%
6	55-64 years	1,305,068	12.20%
7	65-74 years	1,281,901	11.99%
8	75-84 years	205,892	6.01%
9	85+ years	205,892	1.93%

Source: Czech Statistical Office (2022)

The model also includes the proportion of years of remaining life lost due to long-term health consequences caused by contracting COVID-19 (*p*). This proportion indicates the ratio of lost years of life for people who become infected but do not die versus life expectancy with long-term health consequences of COVID-19. The number of people who will suffer these long-term health consequences resulting from COVID-19 is given by a multiple of the mortality rate of the age group. This value is chosen exogenously and increases with COVID-19 severity.

The model also includes the exogenous value of years of life lost per student due to the loss of one year of full-time in-person education *(α)*. This value is added to the model in accordance with the studies completed by Fischer *et al.* (2013), Lundborg *et al.* (2016), Lleras-Muney (2005) and Woolf *et al.* (2007). The parameter is intentionally underestimated to preserve the conservative character of the model.

Another exogenous value included in the model is the number of years of life lost per person due to obesity, depression and other mental or physical complications resulting from the introduction of restrictive measures *(β)*. This value indicates the average number of years by which the lives of all survivors are reduced due to unhealthy lifestyles and a reduction in social contacts that result from the introduction of blanket restrictive measures. This exogenous parameter is chosen based on a study by Moser *et al.* (2020), which was developed in connection with the COVID-19 pandemic.

Also incorporated in the model, are exogenous variables expressing life expectancy for individual population age groups *(R)*. These parameters are included on the basis of a study by Roser *et al.* (2013) that was prepared for the United Kingdom but with a modification that takes the demographic differences of the Czech Republic into account.[7]

Equation 11 describes the calculation of average loss of life estimation in case of death from COVID-19 (*Q)* for each population age group, where *i* expresses the index for each age group (see equation 9):

$$Q_i = R_i - B_i \ , \tag{11}$$

where the variable *Ri* captures the estimated life expectancy for each age group and *Bi* represents the average age within that age group.

Equation 12 describes the calculation of the estimated proportion of deceased persons from a given age group *as well as* from the total number of persons in the individual age groups (*C*):

$$C_i = \frac{L_i}{N_i} \ , \tag{12}$$

where the variable L_i represents the current number of deaths for each age group and *Ni* captures the population of a given age group. Number of deaths by individual age group data was gathered from the statistics of the Ministry of Health of the Czech Republic (2022).

Equation 13 describes the calculation of the estimated proportion of deceased persons from a given age group *i* to the total number of deceased persons (*gi*):

$$g_i = \frac{L_i}{\sum_{i=1}^{9} L_i} \ , \tag{13}$$

where the variable Li captures the current number of deaths for each age group and $\sum_{i=1}^{9} L_i$ represents the total cumulative number of deaths to date for all age groups combined.

Equation 14 describes the calculation of the estimated number of lives saved as a result of the introduction of restrictive measures for individual age groups (*Si*):

$$S_i = S \times g_i \ , \tag{14}$$

where the variable *S* represents the number of lives saved as a result of the introduction of restrictive measures and g_i captures the proportion of deceased persons for each age group in the total number of deceased persons.

Equation 15 describes the calculation of estimated mortality for each age group should the entire population be infected (*di*):

$$d_i = \frac{g_i \times D}{N_i} \ , \tag{15}$$

where the variable g_i denotes the share of deceased persons for the individual age groups in the total number of deceased persons, *D* captures the total number of deceased persons in the event that all inhabitants in the Czech Republic become infected and *Ni* represents the number of inhabitants from the given age group.

[7] Life expectancy for individual age groups is moved by the difference between the life expectancy in the UK and the Czech Republic. Based on real statistical data, average life expectancy in the Czech Republic will be reduced by 2.07 years.

Equation 16 describes the calculation of the estimated number of years of life saved for each age group, *also* due to the introduction of restrictive measures (F_i):

$$F_i = S_i \times Q_i \ , \quad (16)$$

where the variable *Si* represents the number of lives saved for the given age groups due to the introduction of restrictive measures and *Qi* denotes the average loss of years of life in the event of death from COVID-19 for each age group.

Estimating the number of people who become infected but do not die from COVID-19 is also necessary. These are people who suffer from the long-term health consequences of this disease.

The estimate of the number people infected who may suffer from long-term consequences of COVID-19 is based on a recent study by the Office for National Statistics (2021) ('ONS'). According to the ONS, approximately 5% of infected people exhibit health problems 8 weeks after COVID-19 recovery, approximately 3% have problems 12 weeks after recovery, and approximately 1.5% have problems after 16 weeks or more. In our research, we emphasize the importance of not underestimating the severity of COVID-19. In this context, the nature of the model used is very conservative, especially given the potential and as yet unknown impacts of COVID-19. These negative effects may only occur or become apparent in the longer term. The model therefore also relies on very conservative values in this area.

The model therefore also includes health complications that the infected display only after 8 weeks from the onset of the disease among the long-term health consequences. It is for this reason that the model assumes a value of a whole 5% (based on ONS data) and not lower. With this step, we are trying to overestimate the positive health protective impact of the introduced restrictive measures to the highest possible value.

Equation 17 shows the value of the coefficient m – the percentage of people with long-term symptoms. As discussed in a previous paragraph, the value for parameter *m* was chosen to be 5% based on ONS data (2021).

$$m = 0.05 \quad (17)$$

Equation 18 describes the mortality rate for each age group (σ_i) in the event that the entire population is infected and 5% of the total population (10,693,226) succumbs to COVID-19.

$$\sigma_i = \frac{g_i \times D}{N_i} \quad (18)$$

where D represents the total number of deceased persons in the event that all inhabitants in the Czech Republic become infected and *Ni* denotes the number of inhabitants from the given age group. The model is based on the assumption that the long-term health consequences of COVID-19 will be distributed among the individual age categories in the Czech Republic in the same relative (dis)proportion as the mortality rate of this disease is distributed among them. In other words, the higher the age of COVID-19 patients, the higher the likelihood that these patients will face long-term health consequences. Simulation of the distribution of the relative rate of long-term health consequences among the individual age categories of Czech population is done according to the relative distribution of the COVID-19 mortality rate in these age categories.

Equation 19 describes the calculation of the estimated number of people in each age group (E_i) who will not be infected with COVID-19 as a result of the introduction of restrictive measures:

$$E_i = \frac{N_i}{N} \times K \ , \tag{19}$$

where the variable *Ni* denotes the number of inhabitants from the given age group, *N* captures the total number of inhabitants of the Czech Republic and *K* represents the number of people who do not become infected as a result of the introduction of restrictive measures.

Equation 20 describes the calculation of the estimated number of years of life lost due to COVID-19-related damage for each age group (J_i):

$$J_i = m \times p \times Q_i \times E_i \ , \tag{20}$$

where the coefficient m represents the percentage of people with long-term symptoms of COVID-19, *p* denotes the proportion of years lost from the remaining life expectancy as a result of the long-term health consequences of COVID-19, Q_i captures the average years of life lost in case of death for each age group, and *Ei* represents the number of people who will not experience COVID-19 as a result of the introduction of restrictive measures.

Equation 21 describes the calculation of the estimated total number of years of life saved as a result of the introduction of restrictive measures (*F*):

$$F = \sum_{i=1}^{9} F_i \ , \tag{21}$$

where the variable *Fi* represents the years of live saved for each age group calculated in equation 15.

Equation 22 describes the calculation of the estimated number of years of life saved of persons (*J*) who do not become infected as a result of the introduction of restrictive measures and will not suffer any long-term health consequences:

$$J = \sum_{i=1}^{9} J_i \ , \tag{22}$$

where the variable *Ji* denotes the number of years of life lost due to COVID-19 related health damage for each age group *i*.

Equation 23 describes the calculation of the estimated total number of years of life saved as a result of the introduction of blanket restrictive measures and quarantine (*X):*

$$X = F + J \ , \tag{23}$$

where variable *F* denotes the number of years of life saved as a result of the introduction of restrictive measures (these are lives saved) and *J* denotes the number of years of life saved years of persons who will not become infected and will not display any long-term health consequences as a result of the introduction of restrictive measures.

Equation 24 describes the calculation of the estimated number of years of life lost due to health damage[8] related to the introduction of restrictive measures and quarantine (*U*):

$$U = (N - D) \times \beta \ , \tag{24}$$

[8] These include, for example, damage to health as a result of lockdowns (onset of depression, obesity and other psychosomatic problems arising from the restriction of physical activity and social contact).

where the variable N captures the total number of inhabitants of the Czech Republic, D denotes the total number of deceased persons in the event that all inhabitants in the Czech Republic become infected and β indicates the number of lost years of life, e.g., due to the onset of depression or obesity resulting from the introduction of restrictive measures for one person.

Equation No. 25 describes the calculation of the estimated number of lost years of life due to the loss of one year of full-time in-person education (V):

$$V = \alpha \times P \ , \qquad (25)$$

where the variable α denotes the number of years of life lost due to the loss of one year of full-time education for one student and P captures the total number of students in the Czech Republic.

Equation 26 describes the total number of years of life lost due to the introduction of restrictive measures (Y):

$$Y = U + V \ , \qquad (26)$$

where the variable U captures the number of years of life lost due to health damage related to introduced restrictive measures and quarantine and V represents the number of years of life lost due to the loss of one year of full-time in-person education.

Equation 27 describes the calculation of the estimated ratio of potential costs of the introduced restrictive measures and quarantine in relation to their benefits in terms of years of human life saved (z):

$$z = \frac{Y}{X} \ , \qquad (27)$$

where the variable Y denotes the total number of years of life lost due to the introduction of restrictive measures and X denotes the total number of years of life saved as a result of the introduction of restrictive measures and quarantine.

5.3. The data used and its credibility

Several parameters are included in the model. These individual parameters and their set values are introduced as three separate scenarios, in the interest of simplification and transparency of presentation. These scenarios are described in the subsequent section. For simplicity we omit false positivity in testing (investigated in detail by Karel *et al.*, 2022).

The following parameters are to estimate the cost of the absence of blanket restrictive measures. Firstly, the average number of years of life lost, i.e., the reduction of average life expectancy due to death from COVID-19. This parameter is derived from the empirically verifiable relative distribution of deaths in the Czech Republic by individual age group as of 20th July 2022 (see **Table 2**.). Actual data shows that the proportion of deaths in individual age categories remained practically constant during the observed period, therefore this parameter is fixed.

Table 2. Distribution of deaths with COVID-19 symptoms by age category as of 31st December 2020 and as of 20th July 2022.

Age category	Age category population	Number of deaths with COVID-19 symptoms (as of 31.12.2020)	Deaths with COVID-19 symptoms in proportion to the total number of deaths (as of 31.12.2020)	Number of deaths with COVID-19 symptoms (as of 20.07. 2022)	Deaths with COVID-19 symptoms in proportion to the total number of deaths (as of 20.07. 2022)
0-14	1,710,202	0	0.000%	9	0.022%
15-24	961,062	3	0.018%	10	0.025%
25-35	1,374,019	32	0.194%	82	0.203%
35-44	1,686,444	89	0.540%	279	0.691%
45-54	1,525,514	251	1.522%	912	2.259%
55-64	1,305,068	965	5.851%	3,001	7.435%
65-74	1,281,901	3,772	22.870%	10,326	25.582%
75-84	643,124	6,306	38.234%	14,927	36.980%
85+	205,892	5,075	30.771%	10,819	26.803%
Total	**10,693,226**	**16,493**	**100%**	**40,365**	**100%**

Note: 'susceptible population' in relation to age category means the number of deaths of people over 65 years of age, which comprises 91.875% (as of 31st December 2020) and 89.365% (as of 20th July 2022) of the total number of deaths with COVID-19 symptoms.
Source: Ministry of Health of the Czech Republic (2022), own calculation.

The next parameter is the number of years of remaining life expectancy lost. The assumption is made that people infected with COVID-19 will subsequently die at a younger age due to the long-term health consequences of the disease. The said parameter indicates the reduction in life expectancy of people who were infected but did not die as a percentage. According to the previously cited research conducted in the United Kingdom, up to five percent of those infected suffer from long-term health consequences (ONS, 2021). Evidently, the current research has not been able to provide an applicable value for this parameter, as it is still too early to assess the loss of remaining life expectancy. Possibly, it will take several years to obtain the "true" parameter. However, the absence of an exact value of this parameter does not prevent us from making a reasonable estimate and developing a meaningful discussion about the impact of COVID-19 measures. As with our entire study, we are trying not to underestimate the effects of COVID-19. So, the assumption is made that people who experience long-term health consequences resulting from COVID-19 will see a reduction in life expectancy of 30% in comparison to the original expected remaining years of life by individual age group.[9] Arguably, we chose coefficient value which emphasis the benefits of blanket restrictive measures and diminishes the costs of the blanket restrictive measures. For comparison we present the

[9] A person who was three years away from expected death now has only two years left to live because of COVID-19. The calculation considers only those in the relevant age group who have experienced COVID-19 and have long-term health consequences.

estimated value of remaining life expectancy loss due to a serious viral illness AIDS. Data from numerous studies in European and US realities indicate that for a 21-year-old person, the expected loss of life due to AIDS has decreased from 22 years at the beginning of the century to 9 years or less recently. In our calculation this would imply a value of this coefficient ranging from 38.5% to 17.5%. For our coefficient estimate to be proven wrong, the long-term effects of COVID-19 must be equal to or rather greater than AIDS (The Antiretroviral Therapy Cohort Collaboration, 2017; Marcus *et al.*, 2020). As this coefficient (30%) is considered to be an overestimate of the real state, the presented model overestimates the total number of years of life lost in the absence of restrictive measures and therefore overestimates the positive impact of blanket quarantine measures. By and by, the severity of COVID-19 effects is not underestimated but, on the contrary, overestimated. Default assumptions suggest that the total years of life lost to long-term consequences of COVID-19 are greater than those lost due to death from the disease. Critics of the model may argue that the real threat of COVID-19 lies not in the number of short-term deaths, but in these long-term health consequences, which we have addressed.

Due to the complexity of the researched area, we encountered a certain limiting factor in the Czech literature. We are not aware of any studies conducted on the Czech population that could be used for obtaining the relevant data. Therefore, we are preferably using studies from the other European countries and the USA. Furthermore, we assume that the data are relatively unbiased for the Czech population because the nature of the data implies great cross-national stability. To avoid the risks associated with possible overestimation of data estimates, we always use estimates of lower values and round them down to lower values.

We use the following parameters to determine the potential costs of introducing blanket restrictive measures. The first parameter is determined by the relationship between the level of education and life expectancy. Several scientific studies have shown that there is a relatively strong link between the two.[10] Nonetheless some authors, such as Fischer *et al.* (2013), point out that there may not necessarily be a causal link between the two and that certain scientific studies may not give this enough consideration.[11] For this reason, precise identification strategies must be selected when estimating the causal influence of education on life expectancy. The authors analysed the effect of a one-year increase in compulsory school attendance in Sweden in 1936 and concluded that there was an average increase in life expectancy of 0.8 years.[12] Lundborg *et al.* (2016), researched data related to 50,000 Swedish twins born between 1886 and 1958 to conclude that, when compared to low education levels (less than ten years of school attendance), a higher level of education (at least 13 years of school attendance) is associated with an approximately three years longer life expectancy for 60-year-old. The given coefficient would therefore correspond to a parameter slightly lower than one. Lleras-Muney (2005) examined changes in the parameters of compulsory schooling in the US between 1915 and 1939 and concluded that the effect may be even greater than expected. The results showed that an additional year of education was linked to an average increase in life expectancy of 1.7 years for a 35-year-old. Given that the above-mentioned authors all considered a complete absence of teaching, a very conservative and probably underestimated impact was assumed in the model - that a year of education increases life expectancy by 0.4 years. The authors above estimated the causal effect on life expectancy of complete absence of school attendance for one whole school year. In the Czech Republic, standard teaching ceased for 282 days, which is more

[10] See Lundborg *et al.* (2016), Clark and Royer (2013) and Lleras-Muney (2005).
[11] An issue of correlation and causality.
[12] An increase in compulsory school attendance from six to seven years.

than one school year (approximately 196 days). The model therefore considers a reduced coefficient, given that teaching was not completely abolished, but significantly reduced. The importance of the effect of school attendance on life expectancy is also emphasized in the research of Woolf *et al.* (2007), which concludes that the elimination of education inequality would save more lives than advances in medicine thus far.

The second parameter capturing the possible costs of introducing blanket restrictive measures is the number of years of life lost (e.g., in relation to: loneliness, anxiety, depression, restriction of movement, obesity, neglect of preventive medical care, etc.). The impact of blanket quarantine measures on the shortening of life expectancy is very difficult to estimate. Despite this, Moser *et al.* (2020) conducted an expert study of COVID-19 pandemic implications based on Swiss data in the context of the COVID-19 pandemic. Their estimates suggest that strict quarantine measures lasting for three months reduced life expectancy by an average of 0.205 years. The authors considered the negative effects of stemming from blanket quarantine on suicide rates, divorce rates, domestic violence, depression, alcoholism and on frequency of social contact. Moser *et al.* (2020) worked with the parameters and findings from scientific studies focusing on the negative psychological effects caused by restrictive measures in developed countries around the world. They then included the assumption of blanket quarantine measures (stay at home and restriction of movement) for three months in their model. The authors state that their study was based on Swiss data from the first half of 2020. The households selected to illustrate the impact of the introduced restrictive measures on the mental state of the population depict a representative sample of society. The work of Moser *et al.* (2020) is one of a limited number of scientific studies that address the impact of the introduction of restrictive anti-coronavirus measures on the mental state of the population at an aggregate level. At the time, closures of schools, restaurants and shops were ongoing, social gatherings were banned (initially limited to 100 people then gradually limited to five) and state borders were partially closed. If we apply the estimates from Moser et al.'s study to the whole year and simply multiply the coefficient by four, we arrive at a figure of 0.82. Nonetheless, this estimate is quite conservative because our model captures a significantly longer period. Blanket restrictive measures in the Czech Republic lasted for nearly one whole year (with the exception of a few weeks in the summer of 2020).

Also included is a parameter that indicates how many deaths could be expected if all inhabitants of the Czech Republic were to become infected with COVID-19. As a simplification, the coefficient assumes that, in the absence of any restrictive measures, the entire population will be infected. We are aware that there may also be reinfections after a certain period. However, it is unlikely that all residents would be infected, and this would therefore not occur even in the complete absence of restrictive measures. In the constructed model, this parameter therefore again overestimates the real impacts of COVID-19. In addition, the fact that not all the deaths reported are clearly directly and primarily attributable to COVID-19 must also be considered[13]. Based on this, it is likely that the mortality assumptions (the number of deaths from COVID-19, i.e. not the number of deaths reported with symptoms of disease) are overestimated, and therefore the actual impacts of the disease are also overestimated.

Other relevant parameters form a basis for the model to endogenously express mortality, which is given by the ratio of the total number of deaths to the total number of persons

[13] On 24 January 2021, the then Minister of Health, Jan Blatný, stated: "We know that about 30 percent of the deaths we report are undoubtably associated with coronavirus. We report everyone, even someone who dies in a car accident and has COVID-19, as a person who died of it."

infected. The model assumes that, in the absence of measures, all inhabitants of the Czech Republic will become infected, so in this case the mortality rate is defined as the total number of deceased persons in the total population of the Czech Republic. According to a meta-analysis including over 60 scientific articles that was conducted by Ioannidis (2020), the mortality rate ranges between 0.5% and 0.7%. The mortality rate for residents over 85 years of age is expressed by the number of deaths of the total number of infected in this most vulnerable age group of the population.

The final key parameter is the effectiveness of protective measures, which is defined as the proportion of years of life saved due to the introduction of restrictive measures in comparison to the maximum potential number of years of life lost due to these measures not being introduced and the subsequent infection of the entire population. Saving all infected people is impossible, even if the harshest possible restrictions are imposed. The effectiveness rate of the measures therefore cannot approach 100% and deaths will occur even if highly effective measures are introduced.

5.4. Scenarios modelled and summary of coefficients used

In the model, we aim to describe the real turn of events in the Czech Republic through 2020 and during the first ten months of 2021. Opinions about these events widely differ among the professional and general public. To capture a wide range of these views, we consider three possible scenarios that capture a broad set of potential situations and demonstrate the validity of the presented results (see **Table 3**). The scenarios considered vary according by level of COVID-19 mortality and by restrictive measure effectiveness.

Scenario 1 relies on the lower estimated mortality range by Ioannidis (2020) combined with low effectiveness of any measures undertaken. Scenario 2 assumes the upper estimated mortality range combined with an increased effectiveness of measures. Scenarios 1 and 2 are relatively close and, in our opinion, represent the most probable development of the situation. Scenario 3 was deliberately constructed to model highly successful restrictive measures. It represents extreme opinions and the attitudes of blanket restrictive government measure supporters. This scenario simulates the absolute collapse of the health system, with the death rate rising well above 2%,[14] while assuming the high blanket measure effectiveness. In this scenario, restrictive measures are the only tool for delaying the absolute collapse of the health system.

The maximum number of deaths is determined on the basis of the mortality estimate presented in the Ioannidis research. The coefficient of the number of people saved as a result of introducing restrictive measures has been selected in direct proportion to the maximum number of deaths so as to simulate differing protective measure effectiveness. The coefficient of percentual life span reduction is set at 30% when compared to the original remaining years of life. This coefficient remains constant across the scenario and its chosen level reflects an effort to avoid underestimating the impact of long-term COVID-19 consequences. Years of life lost to the lack of in-person teaching and the decline in the level of education are derived from research by Fischer *et al.* (2013). Since that study explores a complete loss of teaching, we deliberately selected a significantly lower value of this parameter for the model.[15] The parameter capturing lost years of life due to restrictive measures has been selected on the basis of a study by Mosera *et al.* (2020). The authors estimate that restrictive measures of three-months duration estimate reduce life

[14] Such a level of lethality is even higher than when using the epidemiological case-to-fatality ratio (CFR).
[15] There was even public debate about the possible reset of an entire school year.

expectancy by 0.205 years. This figure was also deliberately underestimated, but it was subsequently multiplied by the medium-term outlook for blanket restrictive measure validity in the Czech Republic of one and a half years. Nevertheless, restrictive measures have been in place for over 15 months as of mid-2021. Some of these measures may well be expected to last for weeks or even months to come. This means that the potential costs of blanket measures may therefore be significantly higher.

The mortality rate is directly proportional to the total number of deaths should the entire population of the Czech Republic become infected. The average number of years of life lost is derived from the remaining life expectancy of persons in the individual age groups and the relative proportion of COVID-19 deaths in these age groups as of 20 July 2022 (Ministry of Health of the Czech Republic, 2022). The model relies on the assumption that people who succumbed to COVID-19 had health complications corresponding to the average state of health within their age groups and were therefore likely to achieve an average life expectancy. People with above average health complications are more likely to die earlier and therefore have a lower life expectancy. This fact again reflects the effort to not underestimate the impact of COVID-19.

The effectiveness of restrictive measures is the subject of controversy among experts (see Haug *et al.* (2020). Scenarios 1 and 3 represent extreme case scenarios of protective measure effectiveness and it is for reason that extreme values of this parameter – very ineffective measures and practically perfectly effective measures – have been selected. In scenario 2, a value of 26.67% was set. In our opinion this represents a reasonable compromise between the two extremes. In scenario 2, this level of efficiency would lead to an additional 14,635 deaths. This means that a protective measure effectiveness of 26.67% still has relatively significant consequences. The number of deaths occurring despite the measures in place, represent the difference between the maximum number of deaths and the number of lives saved as a result of the introduction of restrictive measures.

Table 3. Model scenarios considered

	Scenario # 1	**Scenario # 2**	**Scenario # 3**
Maximum number of deaths	55,000	75,000	220,000
Number of lives saved due to the introduction of restrictive measures	5 000	20,000	170,000
Percentage of life expectancy reduction due to COVID-19 related health complications	30%	30%	30%
Lost years of life due to loss of in-person education	0.40	0.40	0.40
Lost years of life due to restrictive measures	0.82	0.82	0.82
Mortality	0.51%	0.70%	2.06%
Average number of life lost years due to COVID-19 deaths	8.29	8.29	8.29

Note: Values have been rounded to two decimal places
Source: own estimation based on data presented in the Section 5.3.

6. Results

Our research has led us to the conclusion that in all the scenarios considered, the potential costs of introducing blanket restrictive measures are significantly higher in terms of years of human life saved than in their absence. Our results demonstrate that introducing blanket restrictive measures is not worthwhile.

Table 4 shows that the overall unsuitability of blanket restrictive measures increases with their decreasing effectiveness and with decreasing estimated mortality linked to COVID-19 effects.[16] Even in the extreme case of scenario 3, the potential costs of blanket restrictive measures are more than 3 times greater than their benefits. Scenarios 1 and 2 have parameters selected close together in order reflect the most probable development of the events in the Czech Republic. In these scenarios, the potential costs of blanket restrictive measures amount to tens of multiples of their potential returns. In scenario 1, this multiple exceeds fifty.

Table 4. Model results by scenario

	Scenario # 1	Scenario # 2	Scenario # 3
Total number of years of life lost with blanket restrictive measures in place	9,545,566	9,529,166	9,410,266
Total number of years of life lost in the absence of blanket restrictive measures	162,381	520,622	2,434,183
Ratio of the possible costs of the measure to the benefits of the measure in the form of loss of human life	58.78	18.31	3.87

Note: Data has been rounded to two decimal places.
Source: own data

The presented model does not consider the effects of vaccination introduction against the COVID-19 disease, which was initiated in the Czech Republic in late 2020/early 2021. However, such a parameter would arguably make the benefits of lockdowns even lower because more people would be protected against the adverse long-term effects of the COVID-19 disease - according to the generally accepted opinion. Therefore, this assumption does not invalidate the validity of the research. Furthermore, the research on the effects of vaccination introduction is still in place and will take several years. The size of the respective parameter is unknown.

7. Conclusions

In this research, the authors have carried out a trade-off analysis of the blanket restrictive measures that were introduced in the Czech Republic in 2020 and maintained through the first ten months of 2021. These measures have negatively affected the lives of many people. The submitted model in no way attempts to downplay the severity of COVID-19 and the health risks it poses. The results derived in all selected scenarios from the constructed structural model indicate the ineffectiveness of the blanket restrictive measures introduced by the Government of the Czech Republic when we take into account the number of years of life lost due to these same measures.

The hypothesis that the blanket restrictive government measures introduced in the Czech Republic during 2020 and the first ten months of 2021 were effective regarding saved and lost years of life has been challenged. As stated in the introduction, our calculations of the estimated number of years of life saved or lost, carried out under the assumption of ceteris paribus, can be improved by variability in some of the fixed parameters. Since sufficient relevant data is not available for further investigation at the time of writing, this could

[16] The total number of COVID-19 deaths includes people who did not primarily die from the disease. For this reason, the numbers of reported deaths are distorted, probably significantly so.

become a future research focus. It will only become possible to confirm or refute the hypothesis with conclusive certainty when enough relevant data becomes available.

Various scenarios were examined to demonstrate the robustness of the results obtained. Model parameters that overestimate the severity of COVID-19 effects were deliberately chosen. It is also necessary to consider the fact that the total number of deaths with symptoms of COVID-19 includes people who did not primarily die from this disease. For this reason, the number of deaths reported is overestimated, probably in a statistically significant way. Also not taken into account are the massive economic losses that began to manifest already in 2020 in the form of the deepest economic recession since the establishment of the independent Czech Republic. This means that the potential costs of restrictive measures have been underestimated in the model. It can therefore be argued that, in terms of years of life or the number of human lives saved, targeted measures are clearly a more appropriate solution than blanket, frequently changing and often illogical regulations. Individually targeted measures[17] that recognize the public health situation in particular regions, the age demographic, health conditions of individual inhabitants or other relevant specifics would probably mitigate, or even completely avoid, the negative effects of blanket restrictive measures on public mental and physical health. Targeted, local and situation-specific measures would also reduce the degree of educational process degradation, together with the associated negative impact on the health of younger Czech population age groups.

These research outputs show that, when deciding on the introduction of blanket restrictive measures, other indicators than those monitored by the Government of the Czech Republic must be considered. Every economic policy decision should be made with regards to its long-term social impact. The potential ramifications of the results of this model for public budgets and the social system of the Czech Republic are wide ranging. From increased health sector costs, through effects on health and social insurance to pension system impacts.

We would like to stress that any external interference in the spontaneous nature of the development of society can bring serious and unpredictable problems associated with system instability and the disturbance of the equilibrium between the individual entities operating in the economy. Ultimately, this could lead to the destruction of market mechanisms. A deep economic imbalance was already evident in the second half of 2021, when the rate of inflation growth began to accelerate (Zubikova and Smolak, 2022). The emergence of partial imbalances, manifesting as shortages in individual goods and services markets[18] or imbalance on the housing market (discussed in detail by Hromada and Cermakova, 2021) are another consequence of blanket restrictive measures.

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[17] For example, these include measures aimed at the susceptible population (over 65 years of age and other at-risk persons).

[18] Our own internal research shows supply chain failures across multiple industries – automotive industry (individual components are missing; chips, electronics, plastic parts), basic building materials are missing (brick, lime, cement, wood, metals), lack of printing and wrapping paper, bicycles, hygiene products, packaging and leisure goods (guitars, electric pianos and other musical instruments).

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