Burden of Covid-19 Restrictions in Switzerland:

Evidence form the 2022 LINK Covid Survey

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Abstract

Background

Despite a large number of studies documenting the high mental health burden generated by Covid-19 and accompanying government restrictions, evidence on the total utility and quality of life losses due to the pandemic remains scarce.

Methods

We conducted a nationally representative online survey in Switzerland in February 2022. The survey contained time-trade off questions as well as a discrete choice experiment (DCE) to estimate average utility losses as well as average willingness to pay to avoid specific restrictions. Mean utility weights were computed by population group. Conditional fixed effects models were used to analyze the DCE data. We also compared total quality-adjusted life year (QALY) losses to estimated years of life lost to date at the cantonal and national level.

Findings

Our estimates suggest an average utility loss of 0.6 for severe restrictions, implying a total of 5.6 million QALYs lost for Switzerland. On average, monthly willingness to pay was lowest for masks with a mean WTP of CHF 663 [319, 1007] and highest for schools and daycares (CHF 4123 [3443, 4803]) as well as private parties (CHF 4520 [3811, 5229]).

Interpretation

The quality of life losses due to government restrictions on everyday life in Switzerland are substantial. Future policies should weigh these costs against the health benefits achievable with specific measures.

Funding

No funding was received for this project.

Introduction

The COVID-19 pandemic has affected the global community like few epidemics before; as of April 5th, 2022, more than half a billion cases have been documented, and 6.2 million individuals have died (https://www.worldometers.info/coronavirus/). To prevent even larger health impacts and to ensure the continued functionality of their health systems, governments around the globe have relied on a range of non-pharmaceutical interventions, ranging from mandatory wearing of masks, school closures and home office requirements to complete lockdowns (1). While everyone is well familiar with these measures, and more and more data are becoming available regarding the relative effectiveness of each specific measure, evidence on the impact of these measures on the subjective well-being of the affected population remains scarce.

In a previous work, we estimated average disutilities as well as willingness to pay using data collected from France, India, Italy, the UK and the US through the MTurk online platform (2). Using a sample of online volunteers recruited through the MTurk platform, we showed that average utility losses due to government restrictions in these countries were large. Relative to these five countries, government restrictions in Switzerland were weaker, with strict lockdown measures and school closures only enacted in the first half of 2020. Despite these less restrictive policies, resistance in the country was substantial, with continued protests against government mandates.

In order to quantify the average subjective utility losses in Switzerland, we embedded previously developed survey modules in an ongoing national survey in Switzerland in February 2022 – results of this survey are presented here.

Methods

Study design

This is a cross-sectional study using data collected through a nationally representative online survey. Survey data was complemented by data on Covid-19 restrictions collected through Oxford Covid-19 Government Response Tracker (https://doi.org/10.1038/s41562-021-01079-8) (1). Data on the number of Covid-19 deaths by 10-year age group, sex and canton were downloaded from the Swiss Ministry of Health (BAG) on March 25th, 2022.

Survey Participants

Survey questions were administered through LINK as part of their ongoing national Covid-19 surveys. LINK is a private company specializing in representative surveys (https://www.link.ch/). All surveys were translated to French, German and Italian and completed between February 9th and 15th 2022. Survey weights were generated by LINK to make the sample representative of the Swiss population ages 15-79.

Inclusion / Exclusion criteria

All respondents participating in the national survey were included.

Primary Outcome variables

The primary outcome of interest were the subjective losses due to Covid-19 specific restrictions. We quantified these losses in two ways. First, and following standard QALY procedures (3), we asked subjects to answer a set of standardized time tradeoff questions (TTOs). The questions we asked were:

"First, consider a scenario where **you are required to wear a mask in public at all times, are not allowed to go to restaurants, clubs or the gym, and travel is prohibited**. If you were given the choice of living with these limitations and your normal life:

...would you rather live your normal life for X months (option A) or **12 Months** in this kind of strict lockdown (option B)?"

All subjects started with an offer of 12 months of normal life – if they preferred normal life to life with restrictions, they were asked to make a choice between 10 months of normal life vs. 12 months with restrictions, then 8 months, then 6, 4, 3, 2, 1, and 0 to identify the switching point for each respondent.

We also asked a similar set of questions for even stricter restrictions:

"Instead, imagine an even stricter lockdown scenario where **you are required to wear masks in all public spaces, cannot eat, drink, go to clubs or the gym, private parties and events are banned**, **all children must be homeschooled and you are not allowed to travel.** If you had the choice between living in this kind of lockdown and your normal life, would you rather live your normal life for X months (option A) or **12 Months** in this kind of strict lockdown (option B)?"

In order to quantify the respondents' WTP to avoid specific restrictions, we invited all to also participate in a discrete choice experiment (DCE). As part of this DCE, we asked subjects to choose between bundles of living conditions involving restrictions on everyday life as well as pre-specified monthly incomes. Given that we did not want subjects to trade off the benefits of measures against the perceived costs, we chose a framing that forced subjects to think about the restriction by itself in the context of picking a place to live:

"Imagine a world without COVID-19. You must choose to live in one of the following two countries. The countries differ both in the salary you earn and the restrictions that the government has decided on for everyday life. In which of the two countries would you **prefer** to live and work?"

Subjects were then presented with 6 vignettes, each containing an Option A and Option B characterized by random variations of the following income and restriction levels:

Table 1: Attribute Levels

Attribute	Levels
Monthly Net Salary:	CHF 5000/6500/8500
No restaurants, bars and clubs	YES/NO
No sports facilities for you to exercise	YES/NO
Mandatory wearing of masks in public	YES/NO
No schools or day care centers (home schooling only)	YES/NO
Travel abroad only with official permission	YES/NO
No private parties, weddings or concerts allowed	YES/NO

Net salary levels were chose to correspond approximately to the 25^{th}, 50^{th} and 75^{th} percentiles of the current Swiss income distribution. Restriction attributes corresponded to the ones used by the Swiss government throughout the pandemic. Appendix 1 shows 3 out of the 24 vignettes used as well as the average choices made for these vignettes.

Statistical Analysis

We first estimated average utility weights by sex, age group and region for the pooled sample. To avoid biases emerging from extreme preferences (subjects stating they preferred a life with restrictions to a life without restrictions or subjects stating they would prefer 0 years of healthy life to 12 years of life with restrictions) we also estimated average utility weights in a restricted sample of subjects with an interior switching point (outcome range 1-10). To derive relative utility we divided the observed willingness to pay (switching point) by 12.

DCE responses were analyzed using a random utility framework. Marginal effects of each attribute were estimated using conditional logistic regression models. Marginal income effects were used to derive WTP estimates for all other attributes.

Last, we used data on the duration of light and severe Covid-19 restrictions in Switzerland to compute the estimated number of QALYs lost. Data on Covid-19 restrictions was taken from the Oxford Covid-19 Government Response Tracker (1) and divided into periods with severe restrictions (Stringency Index > 70), moderate restrictions (stringency index 50-79) and light restrictions (stringency index 20-49). Daily data on the stringency index in Switzerland are shown in Appendix 2. To quantify QALYs lost, we multiplied the number of days under severe restrictions with the estimated utility weight computed for this scenario through the TTO questions. For intermediate and light restrictions, we assumed intermediate utility weights of 0.6 and 0.8, respectively. As a reference and benchmark, we also computed total Years of Life Lost (YLL) to date by multiplying age- and sex-specific death counts in each canton by the age- and sex-specific residuals life expectancies.

Ethical Considerations

All surveys were completed anonymously online. All respondents provided consent to the use of data for research by ticking a box before the questionnaire starts. Due to the absence of identifiable data, the study was rated as non-human subjects research by the ethics commission (EKNZ Req 2021.00616).

Results

A total of 1299 respondents completed the online survey between February 9th and 15th, 2022 (Table 1). 49.7% of respondents were female, and 76% of respondents indicated to be currently working; 22.9% were below age 30, and 19.6% between ages 60 and 79.

Table 1: Sample characteristics by region

	German-speaking N= 802		French-speaking N= 275		Italian-speaking N= 222		Overall N= 1299	
Characteristic	N	%	N	%	N	%	N	%
Female	395	49.3%	140	50.9%	110	49.5%	645	49.7%
Working	630	78.6%	193	70.2%	167	75.2%	990	76.2%
Age 15-29	178	22.2%	71	25.8%	49	22.1%	298	22.9%
Age 30-44	226	28.2%	79	28.7%	64	28.8%	369	28.4%
Age 45-59	237	29.6%	74	26.9%	67	30.2%	378	29.1%
Age 60+	161	20.1%	51	18.5%	42	18.9%	254	19.6%

Preferences observed in the time-tradeoff questions were relatively extreme. While 233 subjects (17.9 percent) indicated that they consider both types of life equally and would be willing to give 12 months of their normal life for 12 months of restricted life, 626 respondents (48.2 %) indicated that they would rather not have any life (0) than living 12 months with restrictions.

Figure 1: Willingness to pay for restricted life

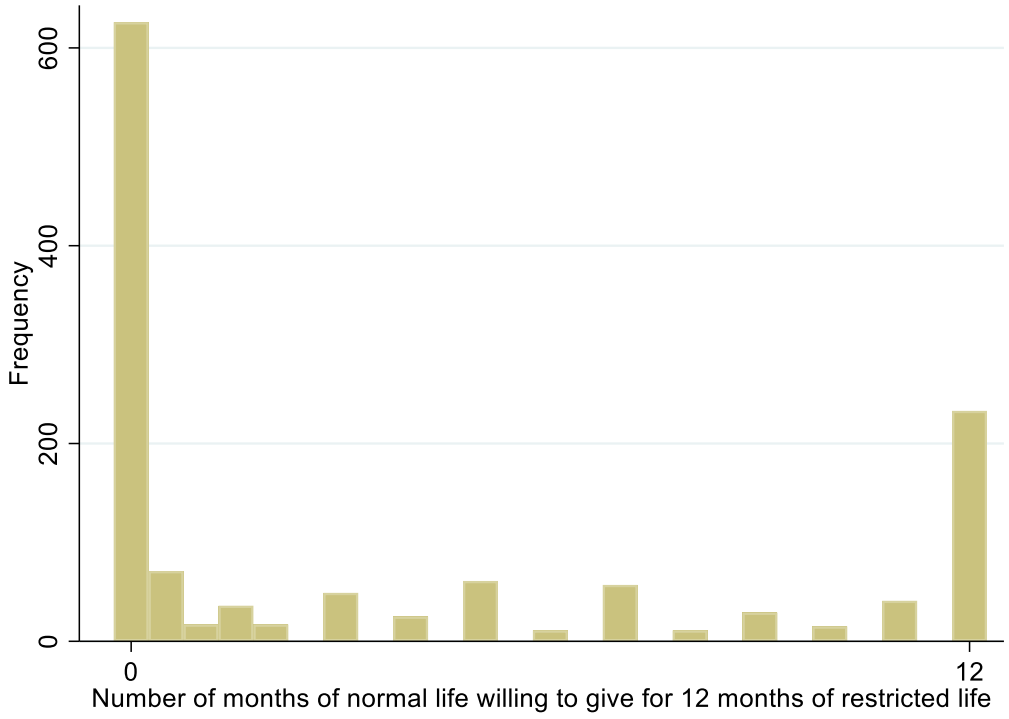
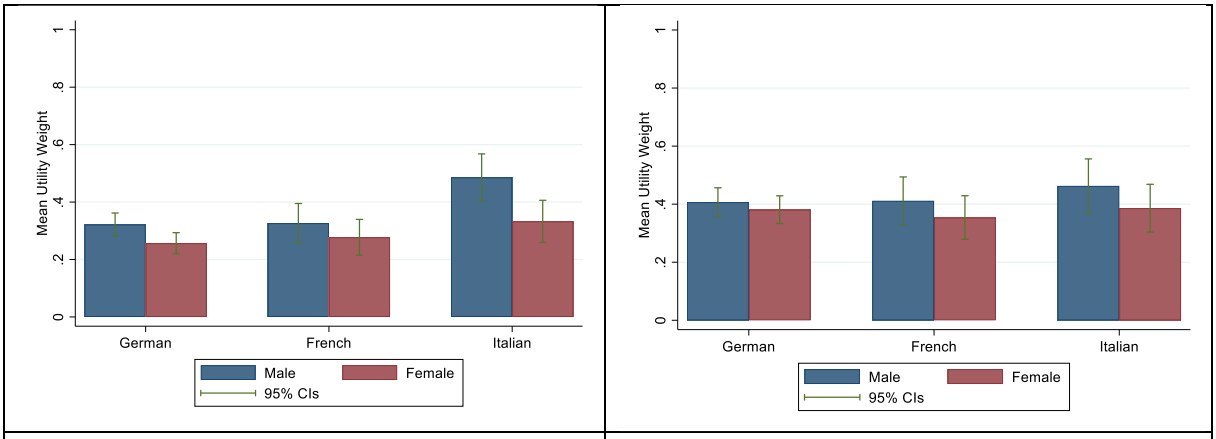


Figure 1 notes: Based on the question "*Imagine an even stricter lockdown scenario where you are required to wear masks in all public spaces, cannot eat, drink, go to clubs or the gym, private parties and events are banned, all children must be homeschooled and you are not allowed to travel. Would you rather have x years of your normal life, or 12 months of life with these restrictions?*". Frequencies represent unweighted counts.

When all responses were considered, mean utility weights were lowest among females from the German speaking part of Switzerland, with an estimated utility weight of 0.26 (95% CI [0.29, 0.22] and highest for among males in the Italian-speaking part with an estimated mean utility weight of 0.49 [0.40, 0.57]. When subjects with extreme preferences (willingness to pay = 12 or 0) were excluded, mean utility weights were slightly higher, with lowest utility for females in the French part (0.35 [0.28, 0.43] and highest utility for males in the Italian part (0.46 [0.37, 0.56]).

Figure 3 shows mean utility weights by age group and sex. Mean utility weights were lowest among females 30-44, with a mean utility of 0.24 [0.19, 0.29], and highest among men 60-79 with a mean utility of 0.36 [0.28, 0.44] in the pooled sample (Panel A). When subjects with extreme preferences were excluded, mean utility increased from 0.30 [0.28, 0.32] to 0.39 [0.37, 0.42] (Figure 3, Panel B).

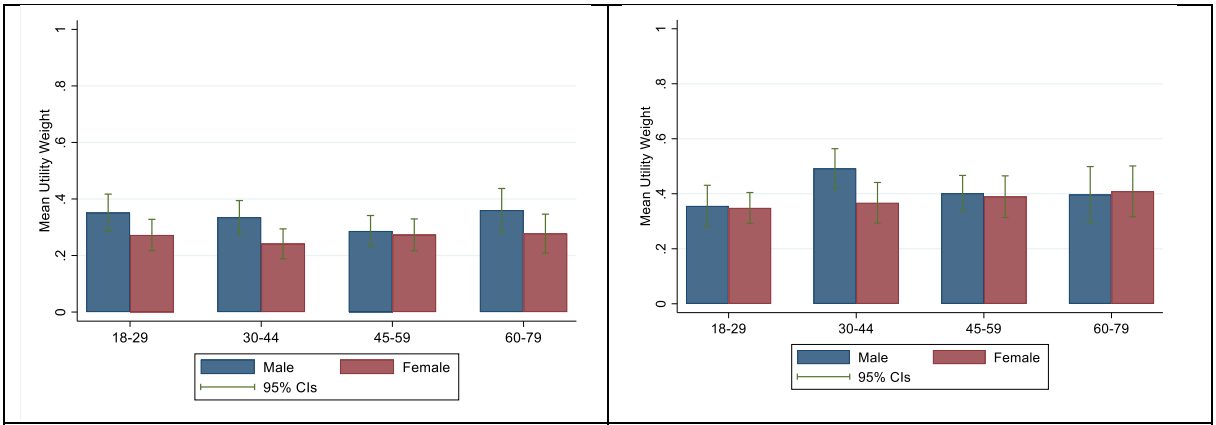
Figure 2: Average utility weights by sex and region



Panel A: Full Sample | **Panel B: Excluding subjects with extreme preferences**

Notes: Figure 2 shows estimated average utility weights by language region and sex in the full sample (Panel A) as well as the restricted sample excluding extreme preferences. All utility weights are normalized to range between 0 and 1, with 0 corresponding to zero utility and 1 corresponding to the utility of a fully healthy life.

Figure 3: Average utility weights by age group and gender



Panel A: Full Sample | **Panel B: Excluding subjects with extreme preferences**

Notes: Figure 2 shows estimated average utility weights by age group and sex in the full sample (Panel A) as well as the restricted sample excluding extreme preferences. All utility weights are normalized to range between 0 and 1, with 0 corresponding to zero utility and 1 corresponding to the utility of a fully healthy life.

Table 2 summarizes the main results of the DCE. A total of 7794 decisions were recorded and analyzed. All attributes were highly predictive of subjects' choices made. Marginal effects of

a CHF 1000 increase in monthly net salary were highest among males and in the Italian speaking part of Switzerland, and lowest among females and in the German-speaking part. Except for masks, the relative weight given to all restrictions exceeded the weight given to a 1k salary increase for all subgroups.

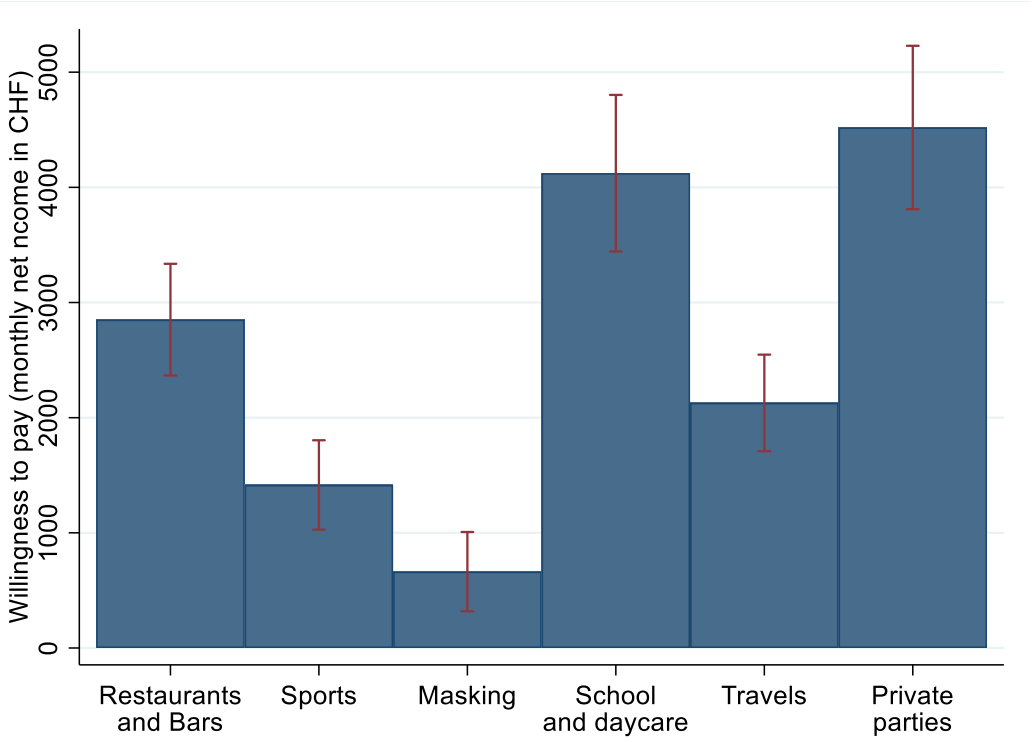
Table 2: Discrete Choice Experiment: Marginal effects of traits by subsample

Sample	All	German	French	Italian	Female	Male
	(1)	(2)	(3)	(4)	(5)	(6)
Net monthly salary 1000s CHF	0.196*** [0.168, 0.223]	0.181*** [0.148, 0.214]	0.227*** [0.172, 0.282]	0.271*** [0.204, 0.337]	0.118*** [0.0810, 0.155	0.269*** [0.229, 0.308]
No restaurants, bars and clubs	-0.557*** [-0.625,0.490]	-0.559*** [-0.642, 0.477]	-0.587*** [-0.725, 0.449]	-0.475*** [-0.641, 0.308]	-0.510*** [-0.605, 0.415]	-0.603*** [-0.702, 0.505]
No sports facilities for you to exercise	-0.277*** [-0.343, 0.210]	-0.317*** [-0.399, 0.235]	-0.169** .303, 0.0356]	-0.114 260 - 0.0317]	-0.268*** [-0.364, 0.172]	-0.283*** [-0.377, 0.189]
Mandatory wearing of masks in public	-0.130*** [-0.193, 0.0662]	-0.150*** -0.230, 0.0706]	-0.0592).179 - 0.0607]	-0.0425 154 - 0.0693]	-0.110** .200, 0.0191]	-0.149*** 0.239, 0.0587]
No schools or day care centers (home schooling only)	-0.806*** [-0.883, 0.729]	-0.824*** 0.917, 0.732]	-0.730*** .895, 0.564]	-0.880*** .065, 0.694]	-0.906*** .021, 0.792]	-0.723*** -0.828, 0.617]
Travel abroad only with state approval	-0.416*** [-0.482, 0.350]	-0.483*** 0.566, 0.401]	-0.211*** 337, 0.0860]	-0.407*** .543, 0.270]	-0.459*** .562, 0.356]	-0.386*** -0.473, 0.298]
No private parties, weddings or concerts allowed	-0.884*** [-0.961, 0.806]	-0.869*** 0.962, 0.776]	-1.010*** .177, 0.843]	-0.550*** .719, 0.381]	-0.959*** .076, 0.842]	-0.828*** -0.932, 0.724]
N (decisions)	7794	4812	1650	1332	3870	3924

Notes: All coefficients based on conditional logistic regression model with decision fixed effects. Coefficients represent logit differences; 95% confidence intervals in parentheses. Standard errors are clustered at the individual level (six responses by subject). All regressions are weighted to achieve nationally representative sample ages 15-79. *** p<0.01, ** p<0.05, * p<0.1

Figure 4 summarizes implicit average valuation of each restriction. On average, monthly willingness to pay was lowest for masks with a mean WTP of CHF 663 [319, 1007] and highest for schools and daycares (CHF 4123 [3443, 4803]) as well as private parties (CHF 4520 [3811, 5229]).

Figure 4: Implicit willingness to pay for avoiding restrictions



Notes: Estimates based on non-linear combination of point estimates reported in Table 2. Blue bars represent mean valuation, red lines 95% confidence intervals.

Table 3 shows estimated life years lost by sex and canton. A total of 5903 female and 6920 male deaths were reported as of February 28, 2022. Based on the latest age and sex-specific life expectancies, these deaths imply a total of 95,551 life years lost. Over the same period, 41 days of strict restrictions (stringency index > 70), 392 days of moderate restrictions (index 50-70) and 295 days of mild restrictions (20-49) were recorded. Appendix 2 shows the full time series of the stringency index. Applying the more conservative utility weight of 0.39 to the severe restrictions implies a total of 586,000 quality-adjusted life years lost for the first hard lockdown in 2020 – which lasted 41 days - alone. The estimated utility losses for intermediate and light restrictions were 3.7 and 1.4 million quality-adjusted life years respectively.

Table 3: Estimates life years lost due to Covid-19 as well as estimated QALY loss due to Covid-19 related government restrictions

	Estimated Life Year Lost due to Covid-19			Estimated QALY Loss			
				Restrictions (in days)			
Canton	Females	Males	Total	Severe 41	Medium 392	Light 295	Total 728
AG	3,135	4,663	7,797	46,471	291,350	109,628	447,449
AI	38	74	112	1,106	6,936	2,610	10,652
AR	192	373	565	3,785	23,728	8,928	36,441
BE	4,687	5,735	10,422	70,917	444,615	16,7298	682,830
BL	760	972	1,732	19,743	123,778	46,575	190,096
BS	928	1,010	1,938	13,345	83,669	31,483	128,498
FR	1,562	2,228	3,790	21,838	136,916	51,518	210,273
GE	2,678	3,778	6,456	34,225	214,571	80,738	329,534
GL	285	481	766	2,768	17,357	6,531	26,656
GR	771	1,403	2,174	13,593	85,221	32,067	130,881
JU	260	353	613	5,031	31,540	11,868	48,438
LU	1,548	1,836	3,384	28,063	175,941	66,202	270,207
NE	1,149	1,571	2,720	12,118	75,973	28,587	116,677
NW	117	141	258	2,962	18,568	6,987	28,517
OW	151	205	357	2,593	16,256	6,117	24,966
SG	3,047	3,917	6,964	34,788	218,101	82,066	334,955
SH	325	504	829	5,618	35,222	13,253	54,094
SO	980	1,472	2,452	18,719	117,361	44,160	180,241
SZ	833	1,331	2,164	10,906	68,376	25,728	105,010
TG	2,145	2,739	4,885	18,944	118,769	44,690	182,403
TI	2,709	4,337	7046	24,211	151,792	57,116	233,119
UR	288	303	591	2,496	15,651	5,889	24,037
VD	3,548	4,430	7,978	54,758	343,304	12,9177	527,239
VS	2,279	3,491	5770	23,568	147,759	55,598	226,925
ZG	398	494	893	8,691	54,488	20,502	83,681
ZH	5515	7,381	12,896	104,218	653,391	245,855	1,003,464
Switzerland	**40,327**	**55,223**	**95,551**	**585,476**	**3,670,635**	**1,381,170**	**5,637,281**

Discussion

This paper reports the results of the first nationally representative estimates of the quality of life losses generated by restrictions imposed authorities in Switzerland between March 2020 and February 2022. The results presented suggest that the individual and aggregate quality of life losses are rather massive. An average utility weight of 0.39 emerging from the TTO question analysis suggest that on average respondents value 12 months of life under severe restrictions only about as much as 4.7 months of their normal life. This implies that even short

periods of strict lockdowns – such as the first period in the spring of 2020 – result in a rather massive loss of quality-adjusted life years. Applying similar, but smaller disutility of moderate and light restrictions implies that Switzerland has lost a total of 5.6 million quality-adjusted life years, which is almost 60 times the actual number of life years lost to date. Even though restrictions were of course essential for keeping the number of deaths at the relatively low level finally observed, it is worth highlighting that the estimated number of QALYs lost reported here likely exceeds the maximum possible impact of Covid-19 in terms of life years lost by a fair margin. Under a rather pessimistic assumption that the pandemic would have resulted in the deaths of 1% of the total population the total number of life years lost would have been around 650,000 assuming the current Swiss age distribution.

The rather large disutility of government restrictions taken is also clearly visible in respondents' implicit willingness to pay to avoid specific restrictions on their life. On average respondents indicated to be willing to give up a bit more than CHF 600 per month for not having to wear masks, and more than CHF 4000 per month for not being allowed to have private parties or for not having to teach children at their homes.

The analysis presented here has several limitations. First, and most importantly, both the TTO and DCE choices were hypothetical, and it is clearly possible that subjects overstate their true willingness to give up life time or to pay for having certain freedoms. Second, it is also possible that some subjects did not fully understand some of the questions; this may be particularly relevant for the TTOs, where a surprisingly large proportion of subjects either indicated to prefer restrictions to normal life, or stated that they would rather not have any life at all rather than life with restrictions. Even when these respondents were excluded, disutility from living with restrictions seems very large, even when compared to the previous international study (2). It is of course also possible that the Swiss population feels more strongly constrained by government restrictions, which would certainly be consistent with the generally more lenient Swiss policies relative to neighboring countries. It also seems plausible that responses could change with different framing: our TTO questions focused on a 12 months horizon, and it possible – even if not obvious – that more higher utility weights would emerge with longer term or end-of-life questions. Similarly, our DCE focused on a neutral setting, where subjects had to trade off life with restrictions against salary in the absence of Covid-19. While this framing was intentionally chosen to prevent subjects from trading off potential disease benefits against the disutility from these measures, answers could be

different if shorter-term and disease-specific measures would be considered. Our model also did not incorporate differences in restrictions across cantons – these deviations from national policies were on average fairly minor and likely would not change any of the main results here.

Despite these limitations, the main message emerging from this study is relatively clear: government restrictions to contain the spread of infectious diseases cause major losses in the quality of life of the entire population. In the Swiss context, these losses appear particularly large for the prohibition of private meetings and get-togethers as well as for the closure of schools and daycare, and relatively minor for the wearing of masks in public. These private costs associated with each strategy should be weighed against potential disease transmission benefits in future policy decisions.

References

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2. Fink G, Tediosi F, Felder S. Burden of Covid-19 restrictions: National, regional and global estimates. eClinicalMedicine. 2022;45.
3. Whitehead SJ, Ali S. Health outcomes in economic evaluation: the QALY and utilities. British Medical Bulletin. 2010;96(1):5-21.

Data availability

All data can be downloaded at

https://wwz.unibas.ch/de/personen/stefan-felder/

or requested by email from guenther.fink@swisstph.ch.

Code availability

All code necessary to reproduce this analysis is available at
https://wwz.unibas.ch/de/personen/stefan-felder/

And can also requested by email from guenther.fink@swisstph.ch.

Appendix 1: DCE Examples

Vignette 1

Land A	Land B
Monatliches Nettogehalt: 5000 CHF Keine Restaurants, Bars und Clubs Keine Sporteinrichtungen für Sie zum Trainieren Obligatorisches Tragen von Masken in der Öffentlichkeit	Monatliches Nettogehalt: 8500 CHF Auslandsreisen sind nur mit staatlicher Genehmigung erlaubt Keine Schulen oder Kindertagesstätten (nur Hausunterricht) Keine Sporteinrichtungen für Sie zum Trainieren Keine privaten Feste, Hochzeiten oder Konzerte erlaubt

Decision pattern observed: 64% choose option A, 36% option B.

Vignette 3

Land A	Land B
Monatliches Nettogehalt: 8500 CHF Keine Restaurants, Bars und Clubs Keine Sporteinrichtungen für Sie zum Trainieren Obligatorisches Tragen von Masken in der Öffentlichkeit	Monatliches Nettogehalt: 6500 CHF Auslandsreisen sind nur mit staatlicher Genehmigung erlaubt Keine Schulen oder Kindertagesstätten (nur Hausunterricht) Keine Sporteinrichtungen für Sie zum Trainieren Obligatorisches Tragen von Masken in der Öffentlichkeit Keine privaten Feste, Hochzeiten oder Konzerte erlaubt

Decision pattern observed: 91.7%% choose option A, 8.3 % option B.

Vignette 24

Land A	Land B
Monatliches Nettogehalt: 6500 CHF Auslandsreisen sind nur mit staatlicher Genehmigung erlaubt Keine Restaurants, Bars und Clubs Keine Schulen oder Kindertagesstätten (nur Hausunterricht) Keine Sporteinrichtungen für Sie zum Trainieren	Monatliches Nettogehalt: 8500 CHF Auslandsreisen sind nur mit staatlicher Genehmigung erlaubt Obligatorisches Tragen von Masken in der Öffentlichkeit

Decision pattern observed: 11.7%% choose option A, 88.3 % option B.

Appendix 2: Oxford Stringency Index Switzerland