The Impact of Covid19 on the Urban-Rural Happiness Gradient

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People in the developed world tend to be less happy in cities than in rural areas, i.e., "urban-rural happiness gradient." The recent COVID-19 pandemic offers an opportunity to explore how cities were impacted. One of the disadvantages of large cities and dense settlements is the greater spread of infectious diseases compared to rural areas. Thus, in this paper, we examine how the COVID pandemic affected happiness in the largest cities compared to smaller areas using the World Values Survey. What's remarkable is a large differential or effect size pre-post pandemic for cities v smaller areas. Cities became 2 times less happy post-pandemic v pre-pandemic compared to smaller areas. There has been 2x decrease for United Kingdom and the Netherlands. For Uruguay there has been an increase in life satisfaction across both cities and smaller places, but the increase has been 2x smaller for cities v smaller areas. In relative terms, effect size differentials are remarkable—it is rare to see in SWB research 2x or 200% differentials. In absolute terms, effect sizes are large, too. While .2-.5 difference on 1-10 SWB scale is small, one must take into account the massive scale of urbanization–.2-.5 decrease on 1-10 SWB scale applied to millions of people is a massive slump in human wellbeing. Findings are correlational, not causal.

URBAN, RURAL, URBAN-RURAL HAPPINESS GRADIENT, HAPPINESS, SUBJECTIVE WELLBEING

'Here is the great city: here have you nothing to seek and everything to lose.' Nietzsche

Introduction

Covid19 has changed our way of life. Indeed, changes seem persistent to large degree and there seems to be no coming back. One of the key areas affected is urbanism. Pre-pandemic there has been city renewal, rebirth, and indeed triumphalism. Post-pandemic there is urban scepticism, scare, and indeed, in some cases, collapse. Timing is everything. Ed Glaeser wrote a bestselling book 'Triumph of the city' just several years before the collapse of the city. Cities are hollowed out by the covid19 pandemic.

The COVID19 pandemic changed our way of life and highlighted the vulnerability and disparities of society at large. In particular, it exposed the differences between urban and rural areas. The impact of COVID-19 varied significantly depending on where people lived—a person's chance of getting the virus and surviving it was closely associated to their zipcode (**?**). Urban areas were the epicenters of the virus outbreak: the dense population and inevitable close proximity to others, a defining feature of cities, resulted in rapid transmission and a fertile ground for infection. Indeed, studies have long documented that one of the disadvantages of city life is the increased spread of infectious disease[1] (Bettencourt et al. 2010, 2007). The transmission of infectious disease is a social contact process. To be sure, although the scale of COVID19 was unparalleled, all major infectious disease outbreaks in the past, e.g., SARS, Ebola, Flu, occurred in metropolitan areas. Rural areas in contrast, given their lower population density and geographic isolation,

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[1]See for example, "SIR Models for Spread of Disease"

provide a natural social distancing environment that slows the spread of infectious viruses. As such, COVID19 affected cities more than smaller areas (Stier et al. 2021).

In the present study, we take a development perspective using a measure of human development, progress, or flourishing, subjective wellbeing (SWB). Our main research hypothesis is that since cities suffer disproportionately from infectious diseases, city happiness decreased disproportionately during the COVID19 pandemic. We start with a brief overview of how COVID19 impacted different aspects of life in urban versus rural areas. Next we present the underlying theory, the urban-rural happiness gradient theory suggesting that happiness should be observed in the least dense and heterogeneous places, such as rural areas. We end the literature review by pointing to gaps in the literature and pro-urban proclivity pre-pandemic. Our empirical analysis follows and we conclude with a discussion of results and takeaways for policy and practice.

Urban-Rural Happiness Gradient

In an earlier study, Berry and Okulicz-Kozaryn (2009) investigated global differences in satisfaction with urban life. In developed countries, rural residence increased happiness at double the rate that big-city residence boosted malaise, a pattern most pronounced in societies with an Anglo-Saxon heritage. Easterlin et al. (2011) found that in more advanced developed countries, rural areas approach or exceed urban areas in life satisfaction, while in developing countries the low levels of economic development result in gaps favoring urban areas over rural areas when it comes to income, education and life satisfaction. Easterlin's call for further investigation on the urban-rural differences has since led to many studies exploring the urban-rural happiness gradient around the world. This body of research has indicated that generally, rural residents tend to report higher levels of happiness compared to their urban counterparts. There are notable exceptions (e.g., Millenials in the US) for example.

In another more recent paper Easterlin and O'Connor (2023) points out that only few studies examine the effect of COVID19 on SWB. Easterlin and O'Connor (2023) does an overal analysis for Europe, but misses urban-rural differential. Thus, this is the first study on the topic.

Health is one of the strongest predictors of SWB, if not the very strongest–decent health is clearly quite necessary for SWB, and in general, health is expected to be strongly linked with SWB.

Again, cities are hotbeds of infectious disease–infections are promoted by proximity and close contact between humans, and by definitions cities offer the most fertile ground for infectious disease spread.

There are detailed data for the US, and other countries likely followed a similar pattern.

It is especially large central metropolitan areas that are mostly affected as compared to fringe metros and medium cities. https://www.cdc.gov/nchs/products/databriefs/db447.htm

The urban covid19 disadvantage was at the beginning of the pandemic with incidence almost 2x and mortality almost 3x in urban v rural areas. Then rates converge, and towards the end of the pandemic cities recover and rural areas have higher rates https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8061094 (tab1)

The graph illustates the trajectory well: https://www.cdc.gov/mmwr/volumes/69/wr/mm6946a6.htm It needs to be remembered the rates are per 100,000 population. If it was per area, say sq km, ie how much disease there is in an area, the urban disadvantage would have been astronomical. For instance in NYC population density is about 11k/sq km, whereas in Montana it is about 3/sq km, about 3600x difference.

1 Data

We use the World Values Survey cumulative file from 1981-2022, 7-wave file. We proceed as follows with the sample selection: the rate of COVID19 infection increased substantially later in 2020, peaked in 2021, and still had a considerable effect in 2022. Hence,

we look at data in 2021 and 2022. Data in 2021 is only available for developing countries, and are rather small with small cities in countries like: Armenia, Kenya, Maldives, Morocco, and Venezuela. Hence, we focused on existing data for 2022: Czechia, Libya, Netherlands, Northern Ireland, Slovakia, United Kingdom, and Uruguay. Next, we checked sample sizes by year and urbanicity (X049) for each country. We excluded: Czechia—it had no city with a population larger than 500k before 2022; Libya—there were only 7 respondents in cities larger than 500k before 2022; Northern Ireland—the total sample size is 447 and there's data only for one wave; Slovakia—only 61 respondents in cities with a population larger than 500k pre-2022. Which leaves us with United Kingdom (GBR), Netherlands (NLD), and Uruguay (URY) for our detailed analysis.

2 Results

The results are set in figure **??**. Each panel shows results for a separate country: United Kingdom (GBR), the Netherlands (NLD), and Uruguay (URY). Y axis is life satisfaction. X-axis is urban-rural gradient–degrees of urbanicity or urbanness. Blue bars show pre-pandemic (2005) averages, and green bars show pandemic/post-pandemic averages (2022).

TODO have here fig with fewer cats as in presentation

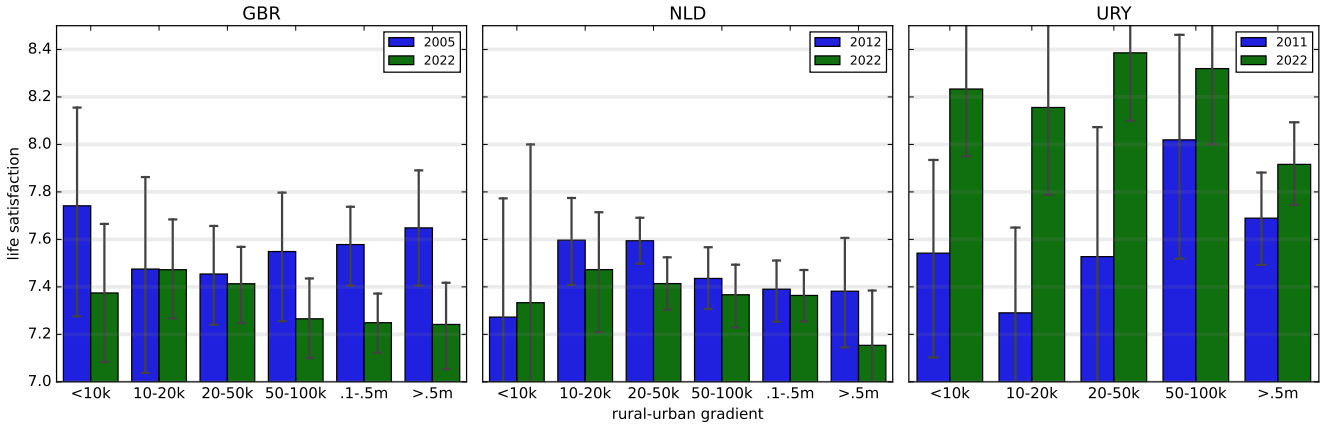

Figure 1: Life satisfaction ($1 = unhappy$ to $10 = happy$) means with 95% CI against rural urban gradient categories. $GBR =$ United Kingdom, $NLD =$ Netherlands, $URY =$ Uruguay. Note: URY is missing .1-.5m cat due to small cell sizes.

In Great Britain, pre-pandemic, the happiest places were the smallest ($< -10k$), while during the pandemic, both the smallest and largest places were most affected and saw significant reduction in subjective well being. It is unexpected to see this reduction in the smallest places, and the result could be due to some country specific factors.

In the Netherlands, there's not much change in subjective well being in smaller places pre and post the pandemic, except for the largest cities where there's a significant drop in SWB as expected. There was also a smaller drop in 10-20, and especially 20-50 categories.

Uruguay, a developing country, shows a different story: SWB increased across urbanicity, including the largest areas (>500k), but that's also where the smallest increase occurred, as expected. Many of the CI are wide, and it is not clear which differences are significant.

Next, we test the differences with regression. First, since the focus is on cities v smaller areas (rural and towns), for simplicity, we collapsed categories up to .5m into one as rural and towns, and contrast this category with cities (larger than .5m).

There's also two technical reasons for this approach. It is a simpler exposition to have urban dichotomy as opposed to a full gradient, given that we also have two other breakdowns: pre-post COVID and by country. The cell sizes run small with too many breakdowns for this relatively small dataset. When more data becomes available, future research should test the full urban-rural gradient.

Our hypothesis is that while the pandemic decreased subjective wellbeing in general, we expect to see an even greater SWB decrease in cities. We are focused on the pre-post pandemic differences in SWB levels in big city versus smaller areas.

Bivariate regression results are set in table 1. We first separate our analyses by country and then within each country by rural and towns ($< .5m$) v cities ($> .5m$). We regress life satisfaction on a year dummy for 2022 with the base case being the latest pre-pandemic wave as shown in fig **??**.

	GBR		NLD		URY	
	$< .5m$	$> .5m$	$< .5m$	$> .5m$	$< .5m$	$> .5m$
2022	-0.21**	-0.41**	-0.12**	-0.23	0.75***	0.23+
constant	7.54***	7.65***	7.50***	7.38***	7.54***	7.69***
N	3111	521	3572	373	1154	836
+ 0.10 * 0.05 ** 0.01 *** 0.001; robust std err						

Table 1: OLS regressions of life satisfaction.

Effect sizes on the year 2022 dummy bar length differences from fig **??**. For GBR the difference pre-post pandemic is about .2 for rural areas and towns ($< .5m$), and the difference for cities ($> .5m$) is about .4, and so forth for NLD and URY. A remarkable finding in our analysis is the roughly 2 times difference for GBR and NLD, and 3 times difference for URY—this is a very strong differential. When comparing cities ($> .5m$) versus smaller areas ($< .5m$), cities became 2 to 3 times less happy post-pandemic compared to pre-pandemic levels.

Still one of the coefficients for NLD is not significant, and only weakly significant for URY, and there is left out variable bias. Differences in SWB levels should be even bigger when controlling for SWB predictors as the urban rural happiness gradient often emerges only after controlling for SWB predictors (Okulicz-Kozaryn and Valente 2021). Hence, we elaborate our models with a set of SWB predictors in table 2.

	GBR		NLD		URY	
	$< .5m$	$> .5m$	$< .5m$	$> .5m$	$< .5m$	$> .5m$
2022	-0.18*	-0.39+	-0.20***	-0.45**	0.42***	0.21
income	0.09***	0.01	0.06***	0.14***	0.07*	0.13***
age	-0.03*	-0.08**	-0.02+	-0.06+	0.00	-0.06**
age2	0.00**	0.00**	0.00**	0.00*	-0.00	0.00**
male	-0.18**	-0.13	-0.11*	-0.27+	0.06	0.19
married or living together as married	0.53***	0.74***	0.44***	0.23	0.46**	0.06
divorced/separated/widowed	0.07	0.15	-0.11	-0.14	-0.37+	-0.19
autonomy	-0.11*	-0.07	-0.11**	-0.01	-0.06	0.06
freedom	0.44***	0.42***	0.35***	0.43***	0.43***	0.36***
trust	0.12+	0.42**	0.43***	0.28+	-0.05	0.10
postmaterialist	-0.05	-0.18	-0.11*	0.14	-0.02	0.15
god important	0.01	0.05*	0.02*	-0.01	0.05**	0.06**
constant	4.08***	5.95***	4.59***	4.80***	3.47***	4.58***
N	1985	309	2283	237	736	579
+ 0.10 * 0.05 ** 0.01 *** 0.001; robust std err						

Table 2: OLS regressions of life satisfaction.

The elaborated models in table 2 confirm our earlier results. We find that there's again roughly a 2 times difference for GBR and NLD, while for URY the differential is reduced from about 3 times to roughly 2 times as well.

Finally, as a robustness check we add "health" as a control variable in table 4. It is important to underscore that there's a confounding effect between pre-post COVID and health by definition. And there will also be confounding effects between urbanicity and health since COVID is more prevalent in cities as previously discussed. Hence, these regressions are less useful in determining pre-post COVID urban-rural differentials. Taking into account health, the results on the over time SWB difference are smaller and less significant, as expected. Remarkably though, we find that the urbanicity differentials even though less statistically significant, are still about 2 times larger for GBR and URY and even stronger for NLD. Perhaps the high infections rate of COVID in cities in addition to bad health caused other problems such as misanthrophy and overall malaise. Future research is needed.

	GBR		NLD		URY	
	$< .5m$	$> .5m$	$< .5m$	$> .5m$	$< .5m$	$> .5m$
2022	-0.12	-0.26	-0.06	-0.24+	0.44***	0.23
health	0.48***	0.67***	0.62***	0.77***	0.56***	0.32**
income	0.05**	-0.01	0.04***	0.08**	0.05	0.12***
age	-0.02*	-0.07*	-0.01	-0.03	0.01	-0.05*
age2	0.00**	0.00**	0.00**	0.00+	-0.00	0.00*
male	-0.16*	-0.15	-0.09+	-0.23+	-0.01	0.14
married or living together as married	0.49***	0.60**	0.38***	0.21	0.41**	0.04
divorced/separated/widowed	0.05	0.20	-0.15	-0.27	-0.36+	-0.16
autonomy	-0.12**	-0.09	-0.10**	0.07	-0.09	0.04
freedom	0.38***	0.29***	0.29***	0.31***	0.40***	0.35***
trust	0.07	0.28*	0.34***	0.21	-0.07	0.01
postmaterialist	-0.05	-0.26+	-0.09*	0.06	0.01	0.12
god important	0.01	0.02	0.02+	0.00	0.05**	0.06**
constant	2.72***	4.29***	2.46***	2.01*	1.31+	3.31***
N	1985	309	2279	236	736	578

+ 0.10 * 0.05 ** 0.01 *** 0.001; robust std err

Table 3: OLS regressions of life satisfaction.

Finally, we pool data for the three countries together. It is useful to formally test the differences with interactions in table **??**.

	a1	a2	a3	a4	a5
post pandemic	-0.20**	-0.13+	-0.10	-0.02	-0.18*
city lg500k	0.05	0.19*	0.20*	0.11	0.07
post pandemic × city lg500k	-0.26*	-0.26*	-0.26*	-0.21+	-0.15
United Kingdom	-0.04	0.03	0.08	-0.01	-0.04
Uruguay	0.82***	0.92***	0.95***	0.68***	0.43***
2005	0.00	0.00	0.00	0.00	0.00
2011	-0.82***	-0.72***	-0.54***	-0.47***	-0.44***
2012	-0.10	0.15+	0.11	0.02	0.05
2022	0.00	0.00	0.00	0.00	0.00
income		0.14***	0.13***	0.08***	0.08***
age		-0.05***	-0.04***	-0.03***	-0.03***
age2		0.00***	0.00***	0.00***	0.00***
male		-0.16***	-0.17***	-0.16***	-0.11**
married or living together as married		0.46***	0.46***	0.39***	0.44***
divorced/separated/widowed		0.01	0.01	-0.03	-0.07
god important			0.03***	0.03***	0.02***
trust			0.38***	0.25***	0.26***
postmaterialist			-0.04	-0.05+	-0.04
autonomy			-0.10***	-0.10***	-0.09***
health				0.71***	
freedom					0.40***
constant	7.58***	7.42***	7.14***	4.40***	4.47***
N	9196	7746	6038	6032	5970

+ 0.10 * 0.05 ** 0.01 *** 0.001; robust std err

Table 4: OLS regressions of life satisfaction.

We start with a basic model where we regress life satisfaction on a dummy for the largest cities, and post-pandemic wave dummy where "post pandemic" $= 1$ if $year = 2022$. We also include country dummies, as we now pull all the data together. Finally, we also include year dummies in addition to pre-post dummy since data were collected in different countries in different years.

In column a1, as expected we see that post pandemic SWB went down by -.2, and especially so for cities by an additional -.26. When adding basic controls in a2, we find that the main variable of interest testing our hypothesis, post$*$city, stays about the same at -.26. We include an extended list of controls in a3, and again the coefficient is -.26. It is only after adding "health" in model a4 that it the coefficient slightly drops to -.21. Finally, the addition of freedom in model a5 cuts the effect most substantially to -.15 and loses statistical significance. Future research should further explore why controlling for "freedom" removes the effect.[2]

3 Conclusion and Discussion

The COVID19 pandemic adversely impacted SWB around the world, but specially in large cities and metropolitan areas. Before the COVID19 pandemic, city happiness was on the rise relative to rural areas (**?**). As rural areas have been left behind (Hanson 2015), the rural happiness advantage has decreased. A rural Californian explains (Fuller, 2017, p. 2):

[2]The original WVS code for the freedom variable is A173: "Some people feel they have completely free choice and control over their lives, while other people feel that what they do has no real effect on what happens to them. Please use this scale where 1 means 'none at all' and 10 means 'a great deal' to indicate how much freedom of choice and control you feel you have over the way your life turns out." A rationale to look at freedom is that it confounds with city; ie city has more freedom than rural at least in some senses. The idea goes back at least to Ferdinand Toennies "Gemeinschaft und Gesellschaft"–city air is free–e.g., nonstandard/nonconformist types such as LGBTQ are more free in a city.

> "In the rural parts of the state we drive more miles, we drive older cars, our economy is an agriculture- and resource-based economy that relies on tractors. You can't move an 80,000-pound load in an electric truck. They've devastated ag jobs, timber jobs, mining jobs with their environmental regulations, so, yes, we have a harder time sustaining the economy, and therefore there's more people that are in a poorer situation."

Ironically, the COVID19 pandemic made the economic advantage and prosperity of cities quickly wither away. The pandemic created significant economic turmoil particularly in large urban centers: as businesses and industries shut down, millions lost their jobs, and thousands fled to the suburbs or smaller places, hoping to avoid human interaction and protect themselves against the virus. Places like New York City, that were vibrant and full of life, became dull and empty. Still, as of 2024, much of commercial real estate in urban cores is empty.

Urban and rural areas experienced and coped with the pandemic very differently. Urban areas became the center of coronavirus outbreaks around the world, and many cities saw their healthcare systems become quickly overwhelmed given the magnitude of the virus–makeshift hospitals and makeshift morgues were set up in cities like New York City.

There's always a strong correlation between subjective well being and health. Health is the key predictor of happiness (TODO CITE STUDIES). The virus not only made people severely ill, but it prevented people who had any other health emergencies or issues from being properly taken care of (e.g., cancer, heart disease, diabetes). This was particularly an issue in large metropolitan areas. The number of people who's health was directly or indirectly affect by COVID is significantly larger then the reported statistics of COVID infection. Thus, it no surprise that our findings show such a significant and relatively large drop in happiness levels in cities as compared to smaller places.

Understanding the discrepancies is important because policymakers can implement policies targeted to create a more healthy and livable environment for urban and rural residents based on the different challenges they experience to foster happiness. The spread of infectious disease in cities is unavoidable and will likely happen again in the future. Learning from the challenges brought by COVID19 might result in lifesaving, health and happiness promoting measures.

Again, only initial phase of infection per capita is greater in cities, then urban rural rates converge and in last stage are higher in rural as cities got hit first and recover first. But there is arguably a strong psychological effect, urban scare, that will also last well after pandemic for the foreseeable future. Likewise, urban quality of life v rural quality of life even given the same per capita infection is very different–one can easily go about daily life and even enjoy most rural activities in rural areas, while the opposite is true in cities–city way of life during the pandemic is unbearable.

The massive difference in population density of urban v rural needs to be highlighted. Again, NYC population density is about 11k/sq km, whereas in Montana it is about 3/sq km, about 3600x difference. Even if infection rate were similar across urban-rural, the difference in infection rate per sq km is massive. And this is one key factor behind urban scare–the sheer number of infections in one's proximity is astronomical.

Many thought that COVID19 may be largely gone and cities safe to return to. One of the authors of this study was reckless enough to go to a large city, New York City, and surely enough just got infected with COVID19 this summer (2023) when we were revising this paper. President Trump has called COVID19 "Chinese Virus," but indeed a more descriptive term could be "City virus." We advise the readers to keep away from large cities–you will be safer from infectious disease and happier.

Future Research

As more data becomes available, it will be instructive to closely examine countries that were most affected by COVID19. Italy and the U.S., for example, will probably show much greater negative effects on SWB than what we found in GBR, NLD and URY. Although COVID19 infection rates are significantly lower now, and another massive pandemic could be decades ahead, we'll likely experience

COVID19 lingering effects for many years to come. This could arguably include urban scare, prevalence of misanthropolis (a metropolis full of distrust and dislike of humankind) (Okulicz-Kozaryn and Valente 2022), and possibly an urban crisis. It would be useful to study the long term effect on urban-rural gradient and whether COVID19 has widen more permanently the urban-rural happiness gap that had been closing (Okulicz-Kozaryn and Valente 2018).

Again, this is the first study on the topic. We are interested in general/overall patterns to start the debate. Future research can focus on a more direct link between inections, hospitalizations, and deaths and SWB by linking public health data with SWB data for specific locations.

Likewise there is huge difference in infection rates across countries (e.g., Italy, the US, China), and across places within countries. Such differences could be explore in a natural experiment framework where massively infected area can be matched with a similar area but with low infection rate.

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