COVID-19

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A Case for Social Distancing in Developing Countries

A Response to the Yale Paper on the Costs and Benefits of Social Distancing in Rich and Poor Countries

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ABSTRACT

The following paper is a response to the paper 'The Benefits and Costs of Social Distancing in Rich and Poor Countries' by Zachary Barnett-Howell and Mushfiq Mobarak (April 2020)[1] of Yale, who use a Value of Statistical Lives (VSL) analysis to argue that the epidemiological and economic benefits of saving lives via social distancing in the context of the COVID-19 pandemic are 'much smaller in poorer countries' than in rich countries. This paper argues that Barnet-Howell and Mobarak's paper does not amount to a credible cost-benefit analysis of social distancing in the present context as:

(a) It mischaracterizes the goal of social distancing as a permanent imposition until a vaccine is developed rather than an epidemiological measure aiming to bring the reproduction number below 1 ; (b) It underestimates the mortality risks in developing countries owing to a lack of consideration of lower healthcare capacity, greater incidence of existing infectious diseases, higher levels of air pollution and multi-generational households; (c) It relies on flawed methodology that calculates the value of statistical lives for developing countries in the context of a pandemic from a past, unrepresentative sample of studies consisting of valuations of willingness to pay (WTP) to reduce linear workplace risk - rather than non-linear infectious disease risk - in developed countries; (d) It uses questionable assumptions of an absence or impossibility of any government intervention that could reduce the risk-income trade-off for workers from low-income countries; (e) It fails to assess the costs of potential COVID-19 contagion including the long-term damage to public health, health worker mortality, and supply chains and food production disruption, among others, critical to conduct an objective cost-benefit analysis on the merits of social distancing.

It is argued in response that that social distancing is not a negotiable measure exclusively applicable to rich countries but is demonstrably necessary to avert the potentially catastrophic mortality, morbidity and economic consequences of COVID-19 contagion. Cost-benefit analyses for the pandemic must assess the risks and costs specific to the current context rather than abstract estimates of VSL based on past, linear risks. While social distancing exerts

[1] Barnett-Howell, Zachary and Mobarak, Ahmed Mushfiq. 2020. *The Benefits and Costs of Social Distancing in Rich and Poor Countries*. April 13 2020.

economic costs, evidence shows that mitigating those costs through targeted stimulus measures in developing countries for time-bound periods is both possible and necessary for long-term economic revival. Further, instead of blanket claims about the inapplicability of disease suppression measures in developing countries, economic policy will need to work in tandem with epidemiological and public health indicators like the reproduction number (R), rate of growth of infections, hospital, bed and ICU capacity and testing statistics, while reviewing a range of fiscal and monetary options to assess how economic costs can be averted to minimize loss of both life and livelihoods through appropriate income support, food distribution, health and employment interventions.

JEL Classification: I10, I18, O10
Keywords: Covid-19, Social Distancing, Value of Statistical Lives, VSL, Cost-benefit Analysis, Developing Countries

1. INTRODUCTION

A recent paper on COVID-19 response in developing countries has been the subject of much debate in Pakistan. Written by two economists at Yale, Zachary Barnett-Howell and Mushfiq Mobarak, the paper (not yet peer reviewed) is titled 'The Benefits and Costs of Social Distancing in Rich and Poor Countries' and argues that the welfare gains from social distancing policies like lockdowns are lower in developing[1] countries through a cost-benefit analysis employing the Value of Statistical Lives (VSL) framework. The paper quickly found supporters among opponents of the ongoing lockdown in Pakistan (in both industry and government) and was cited at a press conference by no one less than Pakistan's Planning Minister and Coordinator of the COVID-19 National Command and Operations Centre (NCOC) Asad Umar, who used the reasoning expressed in the paper to rationalise the government's decision to lift social distancing restrictions imposed to control the spread of coronavirus in the country.[2] Since its publication, the paper has become a popular reference among industrialists and the federal government's supporters in the media and social media to support the government's lax COVID-19 suppression policies.

This response paper reviews the reasoning and evidence presented in Barnett-Howell and Mobarak (2020) to assess whether it constitutes a reasonable attempt at cost-benefit analysis and whether its assumptions, methodological framework and reasoning stands up to scrutiny. This is done through a review of both existing epidemiological and public health literature on COVID-19 and other infectious disease outbreaks, as well as an examination of literature on VSL in the context of cost-benefit analysis on environmental, workplace safety and public health policy. As part of the review, the author also consulted with experts in the field of VSL analysis, including environmental and resource economist Dr. Alan Krupnick of Resources For the Future (RFF), who was interviewed on the Yale paper's use of VSL.

This paper finds that the Barnett-Howell and Mobarak paper does not constitute a credible cost-benefit analysis of social distancing for a number of reasons: it disregards empirical evidence on the application of distancing and mischaracterises it as a measure for European/North American contexts, ignoring the multiple successful instances of its application in non-Western and developing contexts; it misrepresents social distancing enforcement as a permanent measure to buy time for a vaccine rather than reducing the reproduction number of the disease to enable its containment; it underestimates the mortality risk in developing countries by not accounting for deaths from weaker overwhelmed healthcare capacity, higher infectious disease incidence, higher air pollution and multi-generational households; it inappropriately applies the VSL framework (the utility of which is itself questionable in the context of a pandemic), extrapolating values for developing countries using non-representative estimates of VSL from a past study

[1]Barnett-Howell, Zachary and Mobarak, Ahmed Mushfiq. 2020. *The Benefits and Costs of Social Distancing in Rich and Poor Countries*. (2020).

[2]Asad Umar, *Easing lockdown completely would overburden healthcare system*, (May 2020).

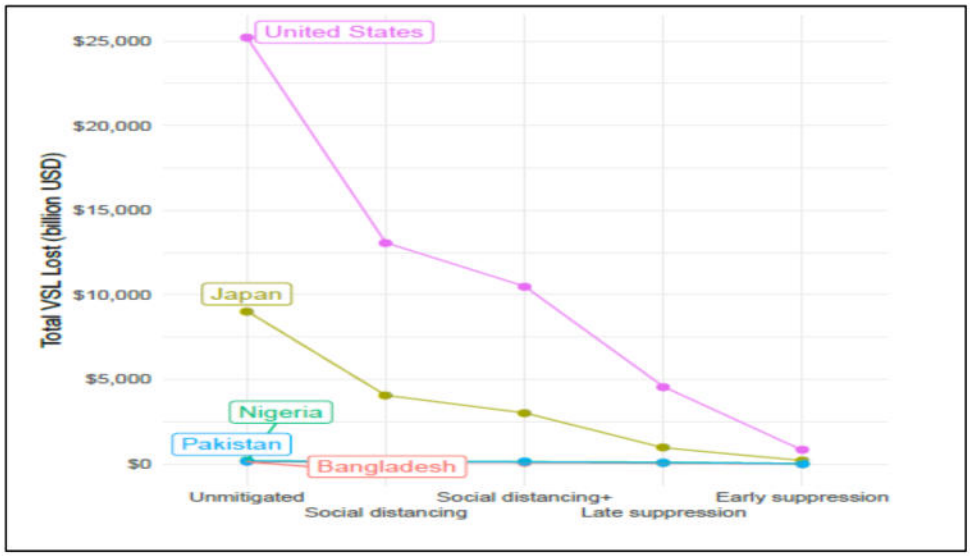
consisting mostly of study samples from developed countries; it assumes a complete absence of government interventions that could mitigate the risk-income trade-off for workers; and greatly underestimates the costs of unmitigated contagion in the absence of disease suppression measures, including long-term health impacts and supply chain disruptions that are likely because of the 'fait-tail' nature of pandemics.

2. THE "SMALLER" BENEFITS OF SAVING LIVES IN POOR COUNTRIES

The central argument made in the Yale paper is that the epidemiological and economic benefits of social distancing are 'much smaller in poorer countries'. The authors say this is because of: 1) the larger proportion of the population that is elderly in developed countries, leading to higher mortality there as compared to younger populations in developing countries. This claim is based on the mortality estimates of the Imperial College London COVID-19 epidemiological model from various mitigation and suppression scenarios; and 2) the "greater economic benefits" of saving a larger number of lives in developed countries as compared to developing countries;

The second claim is made on the basis of an analytical framework known as the "Value of Statistical Lives" (VSL), a tool for cost-benefit analysis based on individuals 'willingness to pay' (WTP) to avoid risk of injury or death. The VSL framework has been used particularly since the 1980s onwards, particularly in the United States and Europe, to evaluate the efficiency of government policies, such as environmental regulations, that aim to reduce public risk. While it has many supporters in the field of economics for its utility in understanding the comparative costs of policies, the framework has come under criticism for its commodification of risk and has often generated controversy for the manner in which it monetises mortality, including in the acrimonious policy debate around climate change mitigation in the Intergovernmental Panel on Climate Change (more on this in section 6).

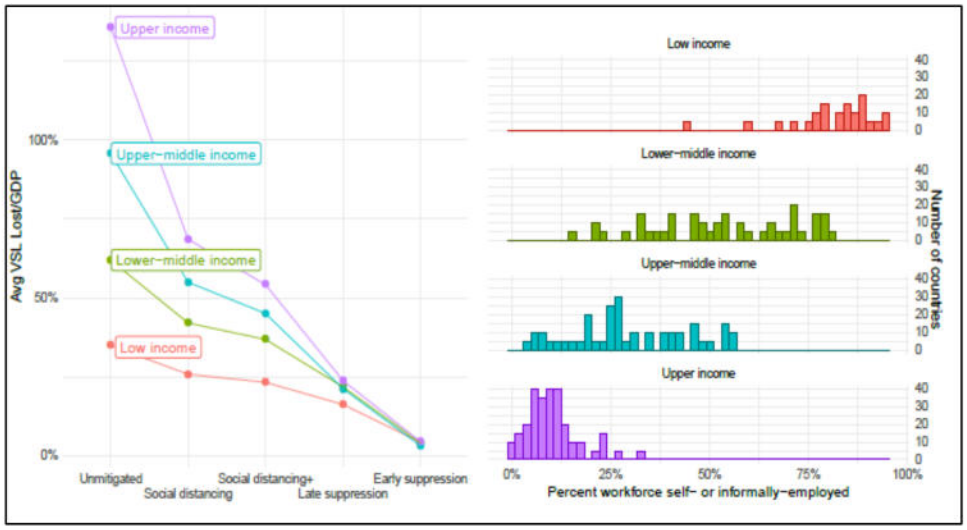
Fig. 1. Total VSL Lost for Each Country



Source: Barnett-Howell and Mobarak 2020.

The authors argue that, as people in developing countries are "less willing to make economic sacrifices to reduce their risk of death or disease", this results in a lower VSL in those countries (both in absolute terms and in comparison to GDP), implying that the economic value of saving lives in those countries is comparatively lower than in developed countries. The authors make this argument by mapping country level VSL estimates from rich and poor countries (from a 2017 paper) on to mortality predictions from the Imperial College London COVID-19 epidemiological model in the same countries to estimate the "dollar value of total losses from deaths" under each intervention for different countries.

Fig. 2. Estimated Value of COVID-19 Intervention by Income Group



Source: Barnett-Howell and Mobarak 2020.

Through their analysis, the authors find that the "economic value" generated by saving lives through effective social distancing policies is estimated to be "240 times larger for the United States, or 70 times larger for Germany, compared to the value created in Pakistan or Nigeria". In proportion to GDP, the value of benefits of lives saved estimated for each country translates to "a savings of 59 percent of GDP for the USA, 85 percent of GDP for Germany", but "only" 14 percent of GDP for Bangladesh or 19 percent for India. In comparison to U.S. losses, the paper says, the "dollar costs of uncontrolled COVID-19" in poor countries like Pakistan (which Imperial College estimates would lead to 691,000 Pakistani deaths) "look minuscule".

On the basis of this comparison, along with a normative assumption of lower compliance rates with social distancing guidelines because of "weaker enforcement capacity" in developing countries and the risks to livelihoods that economic shutdowns pose on the most vulnerable members of low-income societies, the authors claim that it "remains unclear whether the value of mitigation and suppression policies in poor countries outweighs the economic costs". (Despite this highly consequential claim, however, the economic costs of those suppression policies are not quantified or listed anywhere in the paper so as to facilitate an objective comparison).

Instead of enforcing social distancing, the authors urge researchers to explore the benefits of "alternative policies" including "harm-reduction measures that allow people in low income countries to minimise their risk from COVID-19 while preserving their ability to put food on the table". These alternative policies proposed include mask wearing, targeted social isolation of the elderly, improving access to clean water and sanitation and information campaigns.

In the following sections, it will be demonstrated how the arguments and assumptions made in the paper have both a questionable evidentiary basis and deeply flawed reasoning based on its misunderstanding of the purpose of social distancing, underestimation of the health and economic risks of COVID-19 contagion, the misapplication of VSL analysis, and lack of consideration of interventions to mitigate livelihoods and hunger risks.

3. FRAMING SOCIAL DISTANCING AS A "WESTERN" POLICY

Let us start with the framing of the analysis. From the onset, it is unclear why the comparison between benefits and costs in rich and poor countries is being made in the first place. The authors do not explain the merits of undertaking comparative analysis of the costs and benefits of social distancing between rich and poor countries – instead of, say, country-specific cost-benefit analysis of social distancing.

From the title - "should low-income countries impose the same social distancing guidelines as Europe and North America to halt the spread of COVID-19?" – the implication seems to be that social distancing measures are a European/North American policy being imported to low-income contexts. This is incorrect on both a historical and contemporary level.

Historically, social distancing has been applied as a measure to control infectious disease since before the medieval era, to contain plagues and epidemics across the world, including for 20th century pandemics like the Spanish flu.[3] In the context of the COVID-19 pandemic, social distancing was first enacted in Wuhan, the Chinese city where the virus emerged and since then, it has been applied in dozens of countries in every continent, many of which have managed to successfully contain the virus.

It is not even the case, as the authors seem to imply, that European or North American countries have had greater success in applying social distancing policies. Most of them have struggled to contain infections and deaths and, at the time of writing, account for over 3.5 million of 5.5 million cases around the world. Demographics are a part of the reason for their high death toll but there are several other factors at play, including slowness to act, repeated denials about the seriousness of the threat from political leadership, and non-compliance with social distancing guidelines by populations in developed countries.[4]

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[3] Jamison, D. T., H. Gelband, S. Horton, P. Jha, R. Laxminarayan, C. N. Mock, and R. Nugent, editors. 2018. Disease Control Priorities: Improving Health and Reducing Poverty. Disease Control Priorities (third edition), Volume 9. Washington, DC: World Bank. doi:10.1596/978-1-4648-0527-1.

[4] There are some notable exceptions in the Western world, including New Zealand, Australia and, to some extent, Germany.

From the available evidence on COVID-19 responses around the world thus far, it seems clear that the more successful instances of social distancing and disease suppression policies– in terms of COVID-19 containment and low loss of life – are to be found in Asia. This includes well-off countries like China, South Korea and Taiwan but also far less wealthy ones like Vietnam, Thailand, Cambodia, Malaysia, Sri Lanka and even Nepal.[5] Most of these countries, while far poorer than North America and Western Europe, have enacted social distancing with far greater effectiveness at containing both cases and deaths. Countries like Vietnam and Cambodia, as well as sub-national entities like the Indian state of Kerala, with GDP's per capita that are a fraction of most Western economies, have thus far managed to contain the pandemic with barely any deaths and no reported instances of mortality via poverty or starvation, as the Yale authors suggest is near-inevitable if social distancing is applied in developing countries.

From the evidence available before us currently – it seems that national wealth or income has little to do with the utility or effectiveness of social distancing policies in containing the pandemic. Other factors like quickness to enact suppression measures, decision-making grounded in science over politics, higher levels of state-citizen trust and compliance (more common in East Asian countries), well-funded and universal healthcare systems, effective and consistent communication and robust social protection mechanisms seem to be more important determinants of policy success.

4. MISUNDERSTANDING THE PURPOSE OF SOCIAL DISTANCING

The authors of the study also seem to understand strict social distancing measures like lockdowns as an indefinite imposition. They state that "the goal of flattening the curve through strict social distancing is to buy time until a vaccine can be developed". This, they argue, will likely be far too long and economically costly a period to maintain strict suppression or lockdown measures.

However, this is a fundamental misunderstanding of the epidemiological purpose of social distancing. Strict suppression measures for social distancing are not supposed to be a permanent measure that lasts until vaccine development. From the perspective of epidemiology, the basic goal of social distancing measures is to reduce the reproduction number (R), which is "the average number of secondary infected individuals generated from one primary infected individual".[6]

In a basic model of social distancing, where a proportion "*f*" of the population engages in social distancing to decrease their interpersonal contacts to a fraction "*a*" of their normal contacts, the effective reproduction number *R* is given by:

$$R = [\ 1 - (1 - a^2)\ f\ ]\ R0$$

[5] For a list of countries that have successfully managed to contain the outbreak within their borders, visit https://www.endcoronavirus.org/countries

[6] Becker, Niels (2015). Modeling to Inform Infectious Disease Control. CRC Press. p. 104. ISBN 978-1-49873107-2.

In this model of social distancing, if R can be kept below 1 for a sufficiently long period (via testing, quarantine and contact tracing), the number of infected begin to decrease and containment is achieved.[7] [8]

It is important to bear in mind what the above equation implies: **bringing down R does not necessarily require every member of the population to practice social distancing**. A recent Australian study found that reduction in workplace attendance by 50 percent and in community-wide contact by just 30 percent alone was associated with a reduction in the COVID-19 infection rate from 66 percent to below 10 percent as well as a significant reduction in the reproduction number.[9] Hence, even seemingly small reductions by a minority of the population has a statistically significant effect in delaying the exponential growth and spread of the disease.

Hence, two notions forwarded by the Yale paper – that social distancing as a policy is inapplicable to poor countries in general and that practicing it necessarily involves direct trade-offs with livelihoods – are misleading. While it may certainly be difficult for a significant section of the population to practice it while retaining livelihoods, even if the minority whose work allows them to do so practice it, it can still have a significant effect. Further, reduction in community contact – much of which is non-economic – is also a significant contributor to social distancing goals and reducing infection rates and can be practiced by most, if not all, of the population. Social distancing and other non-pharmaceutical interventions (NPIs) are meant, simply, to bring infections down to a manageable level to allow for containment of outbreaks. This also helps reduce pressure on the health system and buys time to build healthcare capacity and enhance testing, treatments and surveillance capacity for reopening. Evidence has now emerged for how they have helped contain outbreaks across the world by bringing down the R; in the case of China, a recent study found that a city lockdown, centralised quarantines and other social distancing measures resulted in a decline of R from an average of 3-4 to below 1 within weeks (See Figure 4).[10] The goals of NPIs and social distancing measures have also been achieved in several other countries, enabling them to reopen their economies without a debilitating outbreak (See Figure 3).

The authors' also misstate the temporal utility of lockdowns in developing countries when they state that, "as the healthcare systems in poor countries have few hospital beds and ventilators per capita, and are predicted to be unable to absorb a rapid influx of COVID-19 patients, this means that flattening the curve of the disease to fall within the capacity of the healthcare system may not be feasible, no matter the extent of the lockdown or mitigation efforts employed."

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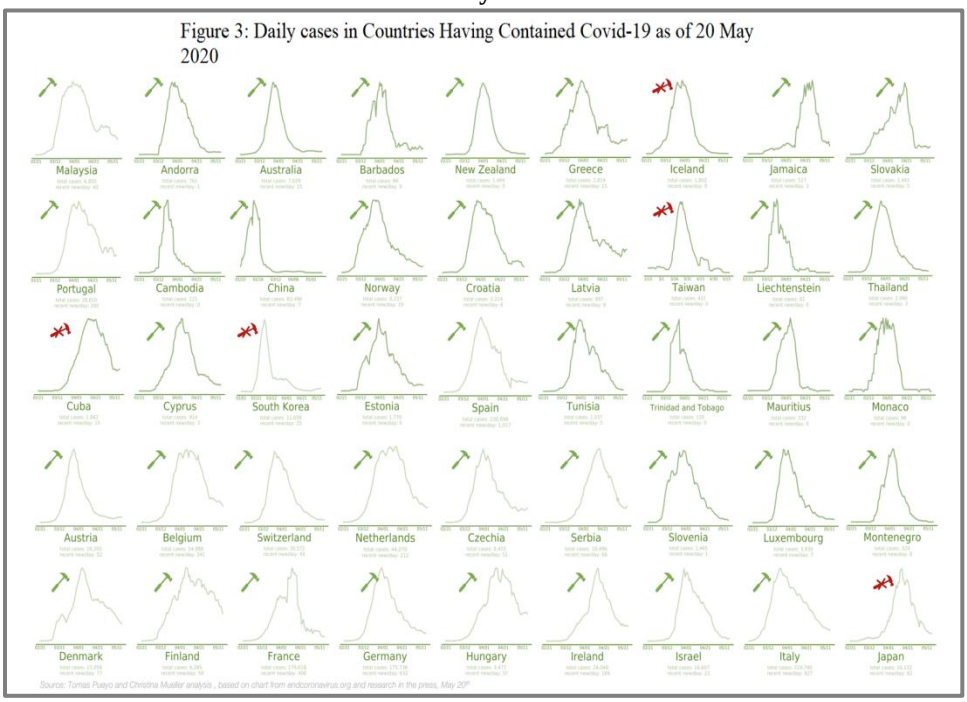
[7] Ibid

[8] Lancet. 2020. How will country-based mitigation measures influence the course of the COVID-19 epidemic? Comment. Vol 395. March 21, 2020.

[9] Milne and Xie (2020). The Effectiveness of Social Distancing in Mitigating COVID-19 Spread: a modelling analysis. University of Western Australia, Perth, Australia. Pre-print.

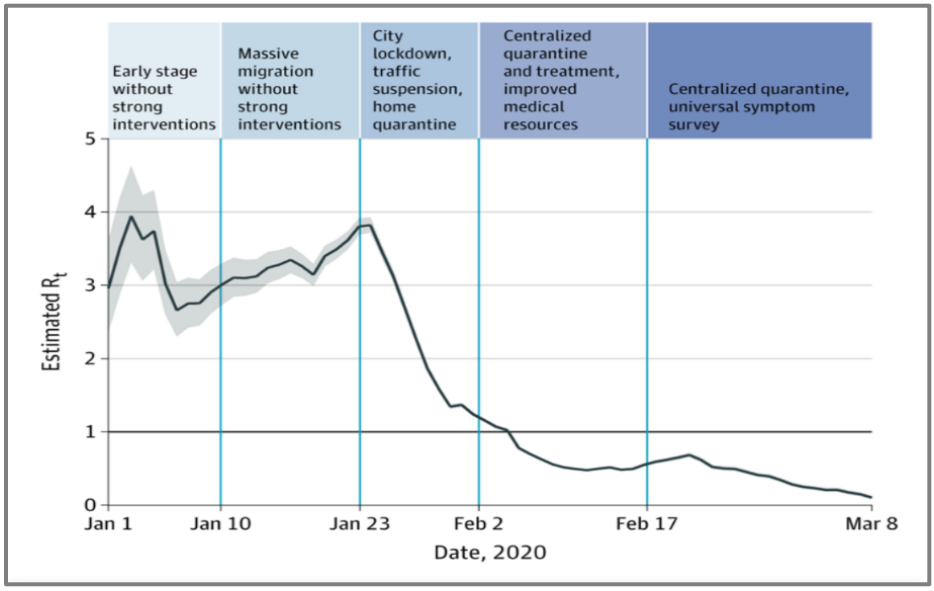
[10] Inglesby, Thomas. 1 May 2020. Public Health Measures and the Reproduction Number of SARS-CoV-2. JAMA 2020; 323(21): 2186-2187.

Fig. 3. Graphs of Daily Cases in Countries Having Contained COVID-19 as of 28 May 20



Source: www.endcoronavirus.org/countries.

Fig. 4. The Effective Reproduction Number Estimates Based on Confirmed COVID-19 cases in Wuhan, China[11]



[11] Ibid.

Not only does this argument strangely imply that countries that already have weak health systems should just allow them to become overwhelmed, it does not reflect what has occurred in most developing countries. Even in Pakistan, early provincial lockdowns prevented health systems from getting overwhelmed, and bought authorities precious time to enhance hospital, beds, ICUs, protective equipment, ventilators and testing capacity, to the point where the federal government was arguing as late as end-May (2 and a half months after the first case emerged) that the healthcare system still had the capacity to cope.[12] Similar enhancement of healthcare capacity during lockdowns has taken place in other developing countries like India, Bangladesh and Nigeria, countries the authors use as examples in their analysis.

Hence, it is clear that, whatever the costs of strict social distancing measures, they are not permanent impositions but time-bound public health measures that have clear benefits both in terms of containment as well as boosting healthcare capacity, including for developing countries. Multiple peer-reviewed studies on social distancing measures, from China to Iran have shown that "the policy has been able to help the health system of countries to reduce the burden of disease, provide better services to hospitalised patients and avoid overwhelming and straining the healthcare facilities."[13]

5. UNDERESTIMATING MORTALITY EFFECTS

The paper rests its argument of lower VSL in developing countries in large part on estimates by the Imperial College London study on COVID-19 impact. The model appears to indicate that developed countries in Europe/North America, where the population skews older, risk losing more lives in an unmitigated outbreak, while countries and regions with younger populations, such as Pakistan, Bangladesh and Sub-Saharan Africa, face much lower mortality risk from the spread of the pandemic (between 0.39 percent and 0.21 percent of cases respectively). The Yale authors do not mention the infection and fatality numbers in the Imperial College study, which, for Pakistan, amount to 206 million infections and 691,000 deaths from COVID-19.[14]

However, even these "low" numbers are based on a number of assumptions. One, as Mobarak and Howell themselves admit, the original Imperial College model did not account for the higher double burden of infectious and chronic disease in low-income countries that could have led to an under-estimate of mortality in those countries in the model. Pakistan's high rates of chronic disease – many of which are associated with higher COVID-19 mortality - make large sections of its population deeply susceptible – according to research by the Pakistan Medical Association (PMA) and Aga Khan University, an estimated 32 million people in Pakistan suffer from a heart condition; 40 million from hypertension; eight million from diabetes; 18 million from high cholesterol.[15]

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[12] Express Tribune. 26 May 2020. "'Everything's under control', NDMA Chairman assures nation on Covid-19" https://tribune.com.pk/story/2228934/1-everythings-control-ndma-chairman-assures-nation-covid-19

[13] Ghanbari et al. 2020. The impact of the social distancing policy on COVID-19 new cases in Iran: insights from an interrupted time series analysis. Health Policy. DOI:10.21203/rs.3.rs-25818/v1.

[14] Walker et al. 2020. The global impact of COVID-19 and strategies for mitigation and suppression. School of Public Health, Imperial College London. DOI: 10.25561/77735.

[15] Jafar, T et al. 2013. Non-communicable diseases and injuries in Pakistan: strategic priorities. The Lancet. Volume 381, Issue 9885, 29 June–5 July 2013, Pages 2281-2290.

Further, Barnett-Howell and Mobarak (2020) neglect to note that the Imperial study finds that peak demand for critical care would "outstrip supply 25 times in low-income countries, which could lead to more deaths in poorer countries as their healthcare systems collapse".[16] Given the endemicity of infectious diseases like malaria, hepatitis, and tuberculosis in Pakistan, the excess mortality from overwhelmed health systems in countries like Pakistan could be immense and could enhance the mortality estimates in the long run. A recent Imperial College study finds that in low-resource and high burden settings, tuberculosis (TB) and malaria related deaths over 5 years may be increased by up to 20 percent and 36 percent, respectively, compared to if there were no COVID-19 epidemic.[17] In Pakistan, where 70,000 die annually of TB and 50,000 die annually of malaria, this would mean an additional 160,000 deaths from just these two diseases over the next 5 years.

During the 1918 Influenza pandemic, populations experienced significantly higher mortality rates in Lower and Middle Income Countries (LMICs) than in High Income Countries (HICs), likely as a result of "higher levels of malnutrition and comorbid conditions, insufficient access to supportive medical care, and higher rates of disease transmission".[18] According to Madhav et al (2017) the mortality disparity between HICs and LMICs likely would be even greater today for a similarly severe event, because LMICs have disproportionately lower medical capacity, less access to modern medical interventions, and higher interconnectivity between population centres.

There are other important factors which the Imperial College model does not account for, such as air pollution. According to recent peer-reviewed studies, high PM2.5 concentrations have an interactive effect with COVID-19 exposure, raising the risks of infection. According to Aaron Bernstein, the director of the Centre for Climate, Health, and Global Environment at Harvard University, "people who have been living in places that are more polluted over time are more likely to die from coronavirus."[19] According to a recent Harvard study, an increase of just 1 μg/m3 in the atmosphere corresponded to a 15 percent increase in COVID-19 deaths.[20] The higher levels of air pollution in developing countries, according to Dr Krupnick, would "steepen the risk-response function" in those countries.[21]

The WHO standard for healthy PM2.5 levels is 10 μg/m3, whereas cities like Lahore regularly clock in at above 200 μg/m3. Some of this risk may have been mitigated by Pakistan's early lockdown, which caused a considerable drop in air pollution in Pakistani cities, including for dangerous pollutants like NO2.[22]

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[16] Walker et al. 2020.

[17] Hogan et al. 2020. The Potential Impact of the COVID-19 Epidemic on HIV, TB and Malaria in Low- and Middle-Income Countries. WHO Collaborating Centre for Infectious Disease Modelling, MRC Centre for Global Infectious Disease Analysis, Abdul Latif Jameel Institute for Disease and Emergency Analytics, Imperial College London. 1 May 2020.

[18] Madhav N, Oppenheim B, Gallivan M, et al. Pandemics: Risks, Impacts, and Mitigation. In: Jamison DT, Gelband H, Horton S, et al., editors. Disease Control Priorities: Improving Health and Reducing Poverty. 3rd edition.

[19] BBC. 28 April 2020. 'How air pollution exacerbates Covid-19'. https://www.bbc.com/future/article/20200427-how-air-pollution-exacerbates-covid-19

[20] Xiao Wu, Rachel C. Nethery, Benjamin M. Sabath, Danielle Braun, Francesca Dominici. 2020. Exposure to air pollution and COVID-19 mortality in the United States: A nationwide cross-sectional study. 27 April 2020. Retrieved from https://www.medrxiv.org/content/10.1101/2020.04.05.20054502v1

[21] Interview with Dr Krupnick conducted by the author.

[22] Dahiya S and Butt D. 2020. Air Quality before and after national lockdown during Coronavirus disease (COVID-19) outbreak across Pakistan. Centre for Research on Energy and Clean Air. https://energyandcleanair.org/air-quality-before-and-after-national-lockdown-during-coronavirus-disease-COVID-19-outbreak-across-pakistan/

Multiple studies have found that reductions in air pollution during coronavirus lockdowns across the world have reduced premature deaths in cities. An assessment of the first two weeks of lockdown in 27 countries estimated that 7400 premature deaths had been avoided.[23] Another study in China found that a 25 percent drop in city air pollution during the lockdown may have prevented between 24,000 to 36,000 early deaths over a month.[24] The higher mortality risk from far higher levels of pollution could significantly increase fatalities in Pakistani cities, as PM2.5 levels rise to normal levels with the easing of lockdowns.

The Imperial College model also does not factor in the prevalence of multi-generational households in developing countries, which complicates isolation of the elderly. According to Dr. Krupnick, this means that the "health externalities from permitting younger people to work without social distancing would be higher in developing countries".[25] Recent research from the UK has confirmed a significant statistical link between the COVID-19 case load and the proportion of multi-generational households in an area, particularly those with higher levels of deprivation, suggesting considerable increased risk of contagion in developing countries where this is the dominant living arrangement.[26] In countries like Pakistan and Bangladesh, where two or three generations of the same family routinely live under one roof and share toilets and scarce living space, isolating the elderly while the young continue to work normally may be next to impossible.

The belief about the relatively 'low mortality' in developing countries articulated by the Yale authors appears to be shared by the Pakistani government whose officials repeatedly boast about the relatively 'low' death toll in Pakistan, appearing to believe mortality will remain limited in the country. However, they seem to be ignoring that the most likely reason behind the limited impact thus far was the relatively early imposition of social distancing which, according to a recent study by the Sustainable Development Policy Institute (SDPI), may have saved 428,264 lives in the country.[27]

Given the above facts, there is more than enough reason to assume that the mortality projections for unmitigated spread of COVID-19 in Pakistan may have been grossly underestimated and could accelerate if suppression measures are not undertaken to contain the disease. Section 9 looks at some of the economic costs of unmitigated spread, which could further exacerbate mortality risks.

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[23] Venter, Z S et al. 2020. COVID-19 lockdowns cause global air pollution declines with implications for public health risk. MedRxiv 2020.04.10.20060673; doi: https://doi.org/10.1101/2020.04.10.20060673

[24] Guojun He, Yuhang Pan, Takanao Tanaka. 2020. COVID-19, City Lockdowns, and Air Pollution: Evidence from China. Medrxiv. https://www.medrxiv.org/content/10.1101/2020.03.29.20046649v2

[25] Interview with Dr. Krupnick conducted by the author.

[26] Kenway, P and Holden J. 2020. Accounting for the Variation in the Confirmed Covid-19 Caseload across England: An analysis of the role of multi-generation households, London and time. New Policy Institute, London. 11th April 2020. https://www.npi.org.uk/files/2115/8661/6941/20-04-11_Accounting_for_the_variation_in_Covid_cases_across_England.pdf.

[27] Haider, Azad and Javed, Sajed Amin. 2020. Social Distancing in Pakistan: Estimates for lives it can save under different scenarios and dollar value of the saved lives. Sustainable Development Policy Institute. Policy Review. May 15 2020. https://sdpi.org/publications/social-distancing-in-pakistan-estimates-for-lives-it-can-save-under-different-scenarios-and-dollar-value-of-the-saved-lives/.

6. THE COMPLICATED HISTORY AND ETHICS OF VSL

The authors' central argument in the paper – that social distancing is too costly for developing countries – relies on its use of VSL to undertake a cost-benefit analysis. Before analysing whether their application of VSL to assess the benefits of social distancing is appropriate, it is worth looking at how the debate on the application of the framework has evolved over time.

Coined by American Economist and Cold War strategist Tom Schelling in 1968, the term 'Value of Statistical Life' was used to refer to 'the valuation of a reduction in the risk of dying', which he suggested be measured by 'the willingness to pay' (WTP) for the reduction of risk. The context of the framework initially related to debates over Cold War military planning and the need to evaluate the economic costs of loss of life from different war tactics.[28] Over time, particularly since the 1980s onward, it became applied to a far greater range of policies, particularly in the US, as government agencies began employing it as a tool for cost-benefit analysis, particularly for environmental policy.

Methods to estimate VSL can be broadly categorised into two approaches: revealed preferences and stated preferences. Stated preferences studies use survey techniques to query individuals about their preferences to estimate much they would be willing to pay for a reduction of risk at work. Revealed preference methods work by finding observed market behaviour where individuals make trade-offs between risk and income. For example, a researcher may observe how much people are willing to pay for a safer car and then combine that information with data on how much the technology decreases the risk of death, in order to estimate the VSL.[29] So, for instance if an individual is willing to pay $100 to reduce a risk of death of 1/10,000, the VSL would be estimated at $1,000,000.

Because the calculation of the VSL depends on both income and risk, the reliability of estimates of the VSL depends crucially on individuals' ability to perceive, understand, and place a value on risk reductions. However, research in the areas of risk perception and behavioural economics suggests that individuals' ability to perceive risk levels accurately is subject to a wide variety of psychological biases and conceptual limitations.[30] One of the most well-known cognitive biases is the tendency for individuals to overestimate small risks and underestimate large risks (See Lichtenstein et al. 1978 among many others).

Some of the main objections to this framework have centered on how it treats goods like workplace and environmental safety as commodities. In an early critique of VSL cost-benefit analysis in her book 'Value in Ethics and Economics' (1995), Elizabeth Anderson writes that "by regarding (safety and environmental quality) as only commodity values, cost-benefit analysis fails to consider the proper roles they occupy in public life. Market norms and social relations do not supply an adequate context for people to autonomously express how they value their lives."[31]

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[28] Bosworth, R, Hunter A and Kibria, A. 2017. The value of a statistical life: economics and politics. Strata. https://strata.org/pdf/2017/vsl-full-report.pdf.

[29] Ibid.

[30] Ibid.

[31] Anderson, Elizabeth. 1995. Value in Ethics and Economics. Chapter 9. SBN 9780674931909.

Anderson argues that people can and do value environmental and health goods "in higher ways" than they value commodities, and using standard welfare economics to measure environmental valuation does not capture this. Her proposed alternative to using VSL-informed CBA to assess policies in these domains is to use "democratic institutions of voice," in which individuals are given autonomy through the democratic process rather than only insofar as they are willing to pay for improvements in safety or the environment.[32]

The monetary valuation of life via VSL also generated a great deal of heated debate in the area of climate change mitigation, including in the Intergovernmental Panel on Climate Change (IPCC), for reasons very relevant to the current COVID-19 debate.

Orthodox economists in the IPCC initially argued against stricter mitigation measures based on costs estimated through market valuations of lives lost based on VSL to highlight the high costs of mitigation while arguing the catastrophic scenarios were too uncertain to plan for. Climate scientists argued for stricter mitigation measures, often citing the 'precautionary principle', defined in the 1992 Rio Declaration on environment and development as: "where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation".[33]

Climate scientists argued that any unadjusted measures of the monetary value of life drawn directly from market prices or surveys would mean that the global poor would be assigned a lower value even if they were facing a similar chance of death or injury. More specifically, through this form of valuation, the decreased risk of death from policies which reduce climate change would be assigned a lower monetary value in poor countries, as, compared to rich countries, the extra wage earned in dangerous jobs will be lower, and so too will the amount people are willing to pay to avoid an increased risk of death.[34]

It is worth noting that most governments in the IPCC rejected such a skewed valuation of life. Particular controversy was generated by the discovery that, in the initial reports of the IPCC, a group of orthodox economists had estimated the costs of mitigation policies by "valuing lives in rich countries at $1,500,000, middle-income countries at $300,000 and low-income countries at $100,000" based on VSL estimates. In the IPCC, this debate was eventually resolved by establishing a base value of $1,000,000 for VSL across countries.[35]

Ultimately, VSL is an economic valuation of life that is heavily dependent on income; most empirical studies indicate that, on an individual level, VSL increases as income increases, as those with higher incomes are more willing to pay to reduce risk. Because richer individuals tend to have higher WTP, textbook VSL benefit-cost analysis and the policies that result give them priority in risk reduction.

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[32] Ibid.

[33] Hanson, M. (2003) The precautionary principle, in: Page, E.A. & Proops, J. Environmental Thought, Cheltenham (UK), Edward Elgar, 125-143.

[34] Aldred, Jonathan. 2009. Ethics and Climate Change Cost-Benefit Analysis: Stern and after. University of Cambridge. Discussion Paper Series.

[35] Ibid.

Extrapolating from individual WTP, as the authors do, to aggregate country-level valuations of health risk reduction and then comparing the benefits between rich and poor countries would in most circumstances imply relatively lower benefits from life saving public health, environmental and safety measures in developing contexts as individuals in those contexts have relatively less individual ability to pay for risk reductions. Applied widely, such comparative VSL analyses would have disastrous consequences for environmental safety and public health.

In a pandemic, this methodology is even more fraught with risks. Tying life-saving public health measures to individual (and thus, income-bound) WTP in the context of a deadly infectious disease outbreak poses serious moral hazards. If an individual is unable to pay more to reduce his or her own risk, does that mean they should be allowed to endanger themselves and others around them without regard to the collective consequences? Or does it make more sense for governments to take these larger decisions in the interest of a normative prioritisation of overall public health, while mitigating economic tradeoffs through the provision of public goods?

Moreover, relying on individual preferences expressed in markets reduces critical public policy decisions to the narrow concerns of individuals as consumers, removing any sense of civic responsibility from an equation which sorely demands it. Policymaking on matters of collective pubic and social importance such as climate change – or indeed, pandemics – should be premised on the preferences – or rather, judgments – of individuals as citizens who consider what society should do.

7. THE PROBLEM WITH THE VSL ESTIMATES USED

Even if one accepts at face value the authors' application of VSL for assessing the costs and benefits of social distancing, do they apply the framework appropriately to estimate the economic benefits of such policies for the COVID-19 pandemic? The answer is a resounding no.

The authors claim themselves that VSL is a measure of "how society as a whole assigns value to saving a life". But how do they assess society's valuation of saving life?

As mentioned earlier, VSL is usually measured through either stated or revealed preferences. One relatively reasonable way to estimate VSL in the context of a pandemic could have been undertaking a stated preferences survey of a representative sample of Pakistani workers that accurately communicated to them the risk of infection and death as per the current scenario and arrive at a country estimate of VSL based on their aggregated willingness to pay for reducing that risk. Stated preference studies estimating the VSL have become increasingly common in recent years, in part because such studies can estimate a VSL from any form of fatality risk that a researcher wishes to investigate.[36]

However, this paper does not do that: instead, it uses VSL values derived from a pre-COVID-19 paper (Viscusi and Masterman, 2017) that arrives at country-level VSL values by transferring a 'base VSL value' from the United States to other countries using a study sample of 953 estimates from 68 labour market studies around the world. The paper arrives at a VSL estimate of $248,000 for Pakistan, $205,000 for Bangladesh and $275,000 for India.[37]

[36] Viscusi, K and Masterman, C. 2017. Income Elasticities and Global Values of a Statistical Life. J. Benefit Cost Anal. 2017; 8(2):226–250.

[37] Ibid.

In the first instance, there is a huge question around the representativeness of the sample of studies used to extrapolate country-level VSLs. Of the 68 wage-risk studies in the VM 2017 paper only two were from developing countries (based on the World Bank's 2015 classifications) while the remainder were from countries categorised as high income. Viscusi and Masterman themselves admit this, putting it down to the lack of quality VSL studies from low income countries. Further, VM (2017) use market exchange rates instead of purchasing power parity for converting rich country datasets to estimate low-income country GNIs, which significantly lower VSL estimates for poor countries. They also do not adjust for the different valuation of risks in different age groups, which, in younger populations, would lead to a higher VSL.[38]

In a discussion of the VM 2017 paper in a study on VSL in low and middle income countries, Robinson et al (2018) state that "it is difficult to validate these results without more high-quality research from middle- and low-income countries, which can be compared to the results of extrapolating from an estimate for a high-income country using alternative elasticities. In addition, more work is needed to better understand how factors other than income affect these values."[39]

But perhaps most critically, most of the studies in the Viscusi and Masterman paper – like most VSL studies in general – are revealed preference studies that estimate workers' WTP for reducing **small changes in relative workplace risk**, often in the range of 1:10,000. However, the relationship between probability of death and willingness to pay is not linear: If a worker is willing to accept 100$ in compensation to undertake a task with a 1/10,000 risk of death, that does not necessarily mean the same worker will accept $100,000 to embrace a 1/10 risk of death, or $500,000 to accept a 50 percent risk of death.

Both the actual risk of COVID-19 and the difference in relative risk posed by various COVID-19 mitigation scenarios is far greater than regular workplace risk and grows exponentially as the epidemiological models show. It stands to reason that people would think and behave very differently about their willingness to pay for measures that threaten their lives in the way that the unchecked spread of an infectious disease like COVID-19 does.

Furthermore, unlike regular workplace risk, which usually threatens individual workers alone, the infectious nature of COVID-19 poses a credible risk to entire families and households, which would likely lead to a significant increase in peoples' willingness to pay to reduce risk from infection and hence, lead to far higher VSLs.

Further, in the VSL literature, risk perceptions are also dependent on the relative dread of the source of risk. As Krupnick points out, multiple studies exist that show that "when a cause of death is more dreaded, the willingness to pay to avoid that death is

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[38] Robinson L, Hammit, J, and O'Keefe, L. 2018. Valuing Mortality Risk Reductions in Global Benefit-Cost Analysis. Guidelines for Benefit-Cost Analysis Project. Working Paper No. 7.

[39] In their own study, Robinson et al (2018) use a more representative sample of VSL studies from low-income countries using mostly stated (instead of revealed) preference studies. Using age-adjusted and life-expectancy-adjusted valuations of mortality risk reduction and GNI per capita (based on purchasing power parity), they estimate an upper VSL limit for Pakistan at around $850,000 (over thrice the estimate in the VM study).

higher."[40] Opinion polls, while not WTP preference surveys, seemed to reflect this dread in recent weeks, with a majority of Pakistanis agreeing with the need for a lockdown irrespective of the personal economic loss to them.[41] It is highly likely hence, that if VSL was estimated for developing countries in the context of an accurate understanding of the mortality and morbidity risks posed by COVID-19, it would likely result in far higher estimates of the welfare benefits of social distancing than what the Yale authors estimated.

Thus, even if market valuations of individual risk reduction (VSL) were to be accepted as a basis for evaluating social distancing policies, it is still methodologically inappropriate to estimate, as the authors did, the WTP of entire societies to reduce risk from the deadliest pandemic to hit humanity in a century through estimates gauged from past studies on more commonplace workplace risk considerations that represent far lower and more linear risk probabilities.

8. ASSUMING A LACK OF GOVERNMENT INTERVENTION

The Yale paper's entire cost-benefit analysis is made based on an assumption of either an absence or ineffectiveness of government interventions for reducing the risk-income tradeoff for low-income workers. The authors cite the high levels of informal employment in developing countries to completely rule out the likelihood of success of any state intervention to provide social protection for low-income workers during a lockdown in their analysis.

It is true that both resource mobilisation and targeting present serious challenges for most developing countries. But to presuppose the impossibility of any state intervention that could reduce is not only a deeply conservative assumption, it also flies in the face of evidence and economic necessity.

The experience from recent months shows that multiple developing countries can and have in fact undertaken various food support and cash transfer programs to reach the poor with varying degrees of success. The public food distribution system in India has been key to providing millions of families with food rations during the pandemic. The Pakistan government, while undertaking a far smaller stimulus in terms of proportion to GDP, has managed to provide over 10 million families with income support, even with challenges related to mis-targeting. There are several other COVID-19 social protection programs in developing countries from Vietnam to Bangladesh to Nigeria that have reached tens of millions of households, which demonstrate that governments in developing countries can intervene in crucial ways that can influence the choices workers have to face.

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[40] Krupnick, A, Raimi, D and Wason, E. 2020. The Value of a Statistical Life and Coronavirus, with Alan Krupnick. Resources Radio. 7th April 2020. Retrieved from https://www.resourcesmag.org/resources-radio/value-statistical-life-and-coronavirus-alan-krupnick/.

[41] Gallup Pakistan. 2020. Rising by 6 percent, nearly 3 in 4 Pakistanis (74 percent) now support the lockdown and feel that it is a necessary measure for health and safety. 21 April 2020. https://gallup.com.pk/rising-by-6-nearly-3-in-4-pakistanis-74-now-support-the-lockdown-and-feel-that-it-is-a-necessary-measure-for-health-and-safety/.

Dr. Krupnick (2020) also reminds that "policy interventions can lessen the risk-income tradeoffs workers need to make" to reduce mortality risk.[42] Thus any reasonable cost-benefit analysis of social distancing cannot rule out their impact in its estimation of the costs.

Furthermore, the authors also do not discuss any of the fiscal or monetary options available to developing country governments before ruling out the possibility of intervention, which raises questions about the veracity of the conclusions. Given the magnitude of the global economic recession – which is increasingly being viewed as a consumption or demand crisis – it makes eminent macroeconomic sense to undertake large cash transfer programs that can support consumer demand. As Sardar (2020) argues for Pakistan, since the Pakistani economy is in the midst of a recession, an expansionary fiscal policy focused on food security is the need of the hour and proposes an additional fiscal stimulus (focused on cash transfers, public works programs for low-skilled workers and public health) financed in part by savings from lower oil prices, while also suggesting an expansionary monetary policy in light of falling inflation.[43]

Such programs are likely to be what is necessary to enable the recovery out of the recession. Even if one might debate their specifics, any economic analysis about the costs and benefits of mitigation strategies must at the very least review the fiscal and monetary options available to governments, rather than assume without evidence that any attempt at mitigating the lives-livelihood trade-off is impossible.

The simplistic view that developing country governments are helplessly constrained when it comes to social protection or redistribution policies is not just empirically inaccurate; it also plays into the hands of rent-seeking elites in those countries who oppose any increased allocations for social protection that could crowd out their existing share of the resource pie or deprive them of the surplus armies of unemployed workers needed to maintain low and stagnant wages. Macroeconomic and public policy advice on COVID-19 must take great care to ensure it does not hinder the generation of or legitimise the lack of political will to undertake necessary redistributive measures to protect the vulnerable from both infection and economic devastation.

9. UNDER-ESTIMATING THE COSTS OF CONTAGION

Perhaps the most serious omission of the Yale paper is that it fails to assess or quantify the overall costs of the unmitigated spread of COVID-19 while claiming to conduct a cost-benefit analysis of social distancing. The paper assumes that the only cost inflicted by the spread of the pandemic will be the loss of lives (which, even if projected to be 691,000, is dismissed as 'too low' to warrant the enactment of strict disease suppression measures). It is likely however, that the total costs of mass contagion will far exceed just the lives lost.

9.1. Non-linearity and Fat-tailed Distributions

One reason for this is because the authors mistakenly assume the pandemic to have linear consequences. As risk analysts like Pasquale Cirillo and Nicholas Nassim Taleb

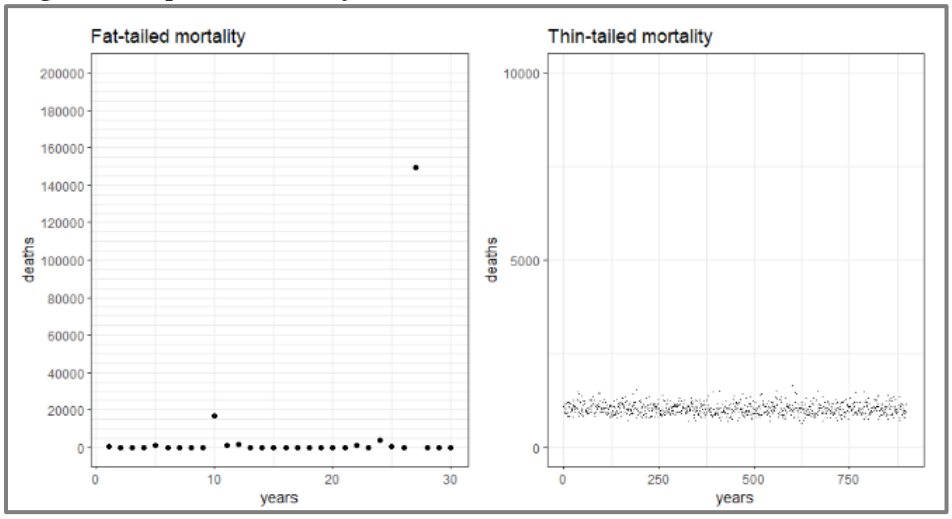
[42] Interview with Dr. Krupnick by the author.

[43] Sardar, Naafey. 22 May 2020. Pakistan's Second Covid-19 Lockdown: Fiscal And Monetary Policy For When Infections Spike. Tabadlab.

argue through an examination of mortality from major infectious disease pandemics in history, pandemics have 'fat-tailed' mortality distributions, i.e., they have potential for large, significant outlying events, representing a "marked potentially existential risk for humanity". Taleb says that while the costs of mitigating pandemics are linear, the fat-tailed distributions associated with their spread are non-linear and involve a greater likelihood of extreme mortality. Much of this has to do with the multiplicative network dynamics of infectious diseases and the existence of super spreaders.[44]

He states that with COVID-19 "we are looking at a very fat-tailed phenomenon, with an extremely large tail risk and potentially destructive consequences, which should not be downplayed in any serious policy discussion." They argue that the empirically correct framework for assessing (and managing) the real risk of pandemics is provided by extreme value theory (EVT), "an approach that has historically been developed to treat phenomena in which extremes (maxima or minima) and not averages play the role of the protagonist, being the fundamental source of risk".[45] Figure 5 shows examples of mortality rates from thin-tailed distributions (e.g., traffic accidents) vs. fat-tailed distributions (e.g., pandemics) over time, with two extreme mortality events in the latter.

Fig. 5. Examples of Mortality Rates from Fat-tailed vs Thin-Tailed Distributions



(*Source:* Heino 2020).

As public health behaviourist Matti Heino (2020) explains about nonlinearity: "A pandemic that "knocks-off" (i.e. prevents from working, for any reason) 0.1 percent of the workforce is bad but not that bad. A pandemic that "knocks-off" 0.1 percent of the workforce in a clustered way is much worse: it means that some companies lose a large percentage of their workforce for a few days or weeks and must close the operations (whereas others are directly unaffected). A pandemic that "knocks-off" (i.e. prevents from working, for any reason) 0.2 percent of the workforce is ten times worse than a 0.1

[44] Cirillo, P., Taleb, N.N. 2020. Tail risk of contagious diseases. Nature Physics. https://doi.org/10.1038/s41567-020-0921-x.

[45] Ibid.

percent pandemic – for there are less workers to covers those who are sick, for one company closing creates problems downstream the supply chain, and so on."[46]

In their book Principles and Standards for Benefit Cost Analysis (2013), Farrow and Zerbe argue that "because of the large number of uncertain parameters in a pandemic", the best-suited cost-benefit analyses for such events are multi-variate, probabilistic analyses that construct a range of possible outcomes."[47]

9.2. Long-term Health Impact

What could some of these possible outcomes be? In the first instance, there are the serious long-term public health effects to consider. According to recent research on COVID-19 survivors, the virus appears to cause serious and lasting morbidities in survivors. Lung scarring appears to be a common impact of both hospitalised and asymptomatic COVID-19 patients; in a Chinese study published in Radiology, 66 out of 70 recovered patients (92 percent) showed some amount of lung damage in CT scans and over 50 percent had lesions that develop into scars. [48]

About 20 percent of hospitalised patients in China suffered heart damage and 36.4 percent suffered from neurologic issues, including dizziness, headache and taste and smell impairment.[49] Another study discovered about 16 percent patients developed arrhythmia, while reports from the American College of Cardiology warned of cases of acute onset heart failure, heart attack and cardiac arrest after coronavirus infection.[50]

While it is still early to estimate the exact long-term health effects, there is little doubt that the virus causes significant long-term damage in a large percentage of those who survive it. In Pakistan's context, unmitigated contagion could mean around 150 million people infected, out of whom millions could suffer chronic damage to their health, adding billions of dollars in long-term health costs and shortened life spans. Among these would be potentially thousands of deaths and morbidities among the health workforce, skilled workers on whom billions have been spent to train and who cannot be replaced in short periods of time.

9.3. Supply Chain Breakdown

The costs of unmitigated contagion among the labour force would also have enormous implications for commodity supply chains. According to WHO data on the distribution of confirmed COVID-19 cases in Pakistan, 74 percent of cases (as of 18th May 2020) are of a working age of 20-59.[51] If this distribution were applied to the

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[46] Heino, Matti. 2020. Coronavirus, lifestyle diseases and the Shadow Mean. https://mattiheino.com/2020/03/01/shadow-mean/.

[47] Farrow, Scott and Richard, Zerbe O. 2013. Principles and Standards for Cost-Benefit Analysis. Edward Elgar. Cheltenham, UK.

[48] Mao, L, Huijuan, J and Wang, M. 2020. Neurologic Manifestations of Hospitalised Patients With Coronavirus Disease 2019 in Wuhan, China. JAMA Neurol. Published online April 10, 2020.

[49] Mao, L et al. 2020. Neurological Manifestations of Hospitalised Patients with COVID-19 in Wuhan, China: a retrospective case series study. Preprint. February 2020.

[50] CardioSmart. 2020. Heart Patients Warned of Risks from Coronavirus. American Institute of Cardiology. 13 March 2020. https://www.cardiosmart.org/News-and-Events/2020/03/Heart-Patients-Warned-of-Risks-from-Coronavirus.

[51] WHO Pakistan, 15 May 2020. Situation Report COVID-19 Pakistan. World Health Organisation. Islamabad.

Imperial College projection of infections in Pakistan (assuming a lack of social distancing measures), it could imply over 100 million working age Pakistanis to be sick with the disease over the course of the coming year, which could have an incalculable impact on the economy in terms of productivity losses.

A glimpse of the potential devastation to food supply chains is already visible in the United States, where the rapid spread of COVID-19 – in large part due to individual resistance to social distancing measures – has led to outbreaks in the meat packing and poultry industries, with over 19,160 workers in 220 plants in the industry having tested positive and 72 having died as of May 22.[52] This has also caused factory closures and significant drop in production – US meat production had declined 20 percent by end April as a result, also causing spikes in meat and poultry prices.[53]

Similar fates could await developing countries that fail to contain the virus before it infects a significant part of the labour force. As economist Asad Sayeed puts it: "by not implementing a lockdown until the R0 declines (or the curve of Covid-19 positive cases starts declining) we will be trading off livelihoods in the immediate term with more cycles of the pandemic in the future. We will thus have more cycles of shortages in labour supply – because of higher rates of death, morbidity, and caregiving for those who are sick – as well as disruptions in supply chains and aggregate demand in the short and medium future."[54]

An outbreak during harvest season that necessitates the isolation and quarantine of a large proportion of the agricultural labour force could create actual food shortages, by impacting the production and supply of staples like wheat and rice. The Imperial College COVID-19 response team has pointed out that the timing of the COVID-19 epidemic in low-resource settings including South Asia and East Africa has the potential to interrupt planting and harvesting seasons for staple crops, thereby worsening this vulnerability.[55]

The human, health and economic consequences of mass contagion combined with agricultural production disruption and famine would likely far outstrip the linear effects of a time-bound lockdown.

Also missing from the conversation on the economic consequences of contagion is the widespread fall in investment likely to result from contagion in the labour force and supply chains. As already appears to be the trend, investors are likely to shift sites of production to countries and regions where covid-19 is not endemic. Already, countries like Vietnam that have quickly contained the pandemic are looking to reap the economic rewards by positioning themselves as safe destinations for manufacturing.[56] The trend of international travel bans on countries where COVID-19 is endemic will impose its own

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[52] https://thefern.org/2020/04/mapping-covid-19-in-meat-and-food-processing-plants/.

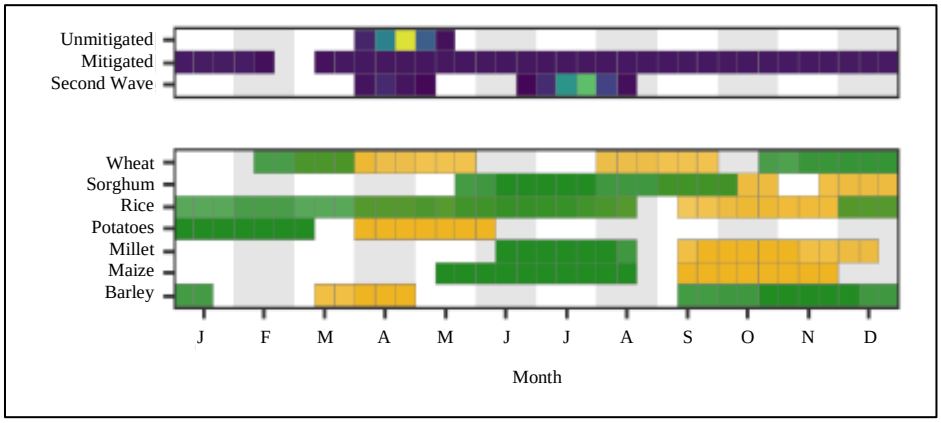
[53] Douglas, Leah. 2020. Mapping Covid-19 outbreaks in the food system. Food and Environment Reporting Network. 22 April 2020 [Updated 22 May 2020]. https://thefern.org/2020/04/mapping-covid-19-in-meat-and-food-processing-plants.

[54] Sayeed, Asad. 2020. Economic Dynamics and Resource Envelopes. Research Collective. 14 May 2020. http://researchcollective.blogspot.com/2020/05/economic-dynamics-and-resource-envelopes.html.

[55] Winskill et al. 2020. Equity in response to the COVID-19 pandemic: assessment of the direct and indirect impacts on disadvantaged and vulnerable populations in low- and lower middle-income countries. Imperial College London (12-05-2020), doi: https://doi.org/10.25561/78965.

[56] DW. 2020. Coronavirus: Vietnam upbeat about economic recovery. 22 May 2020. https://www.dw.com/en/coronavirus-vietnam-upbeat-about-economic-recovery/a-53531222.

Fig. 6. Key Seasons for Planting and Harvesting of Staple Crops in South Asia and Exemplar Unmitigated, Mitigated and Second Wave COVID-19 Epidemic Trajectories in South Asia



Source: Winskill et al, May 2020.

economic costs in terms of falling FDI and disruptions to international trade.[57] While difficult to quantify, it is clear these costs of unmitigated contagion cannot be ignored while assessing the costs and benefits of strict disease suppression measures. These possibilities and their enormously destructive potential consequences have to be planned for, however unlikely the probability of their occurrence seems at this stage.

10. CONCLUSIONS

In sum, the Yale paper falls short of its objective of conducting an appropriate evidence-based cost-benefit analysis of social distancing in developing countries due to a number of serious errors with potentially enormous consequences for policy.

1) The paper inaccurately frames social distancing as a policy associated with rich countries while failing to justify why the welfare benefits of social distancing to poorer countries have to be compared to those of rich countries (instead of comparing the welfare benefits and costs of social distancing within each country or within countries with similar levels of development).
2) It mischaracterises the goal of social distancing as solely buying time for the development of a vaccine instead of a time-bound measure to contain outbreaks by bringing down the reproduction number below 1, reducing new cases and buying time to build healthcare capacity.
3) It underestimates mortality risks in developing countries by failing to account for added risks from pollution, health system breakdown, and endemic infectious and non-communicable disease in poor countries.
4) It relies on a framework of analysis – VSL - that commodifies risk reduction and reduces the benefits of saving lives to the observed market valuation of mortality risk reduction or the willingness to pay of individuals to reduce workplace mortality risk, which creates considerable moral hazard in the context of a pandemic.

[57] Recently, Japan added countries like Pakistan and India to a list of countries from where travel to Japan is banned, citing the growth of COVID-19 in those countries.

5) It relies for its entire analysis on the extrapolation of VSL values for developing countries through an unrepresentative dataset largely consisting of studies on workplace risk in developed countries, questionably assuming the poor in developing countries will respond to risk to their and their families' lives during a pandemic the same way as they would to lower, less dreaded and linear workplace risk.
6) It wrongly assumes an absence of any form of government intervention that could reduce the risk-income trade-off that the poor would have to make, despite evidence to the contrary from multiple developing countries and the macroeconomic necessity of such interventions to address the crisis of demand that is likely to persist regardless of social distancing measures.
7) It limits its estimation of the costs of covid-19 contagion to the valuation of lives lost and fails to consider the costs of tail risks, potentially including long-term morbidities, health worker mortality, supply chain breakdown, potential famine from food production shortages and risks from plummeting investment and travel bans, among others.

The authors, like many other development economists in this crisis[58], fall into the trap of dismissing the importance of universal public health measures without fully understanding their goals and implications and exceptionalising developing countries and the poor by assuming they will care less for reducing the risk of death from COVID-19 to themselves and their families. In doing so, they downplay the potentially catastrophic consequence of contagion for the poor in developing countries.

Empirically, it is clear that multiple lower-and-middle income countries have managed to implement social distancing and other NPIs to contain the pandemic better than developed countries, without the materialisation of any of the warnings of neoliberal economists about dire economic consequences for the poor in terms of mortality. Multiple countries – developing and developed - that enacted such measures early and aggressively, against the warnings of economic orthodoxy, have managed to contain the disease and move toward the resumption of normalcy, while those that, like Pakistan and Brazil, chose to prioritise the economy over public health, as implicitly suggested by the authors, are now facing both uncontrolled outbreaks and economic devastation.[59]

10.1. Social Distancing in a Pandemic isn't Negotiable

Social distancing is not a negotiable measure that exclusively applies to rich countries any more than the sanctity of life is exclusive to rich countries. It is an age-old time-tested measure designed to reduce the contact transmission of infectious diseases which functions to bring outbreaks to a manageable level, which dozens of countries have successfully applied during the COVID-19 pandemic. It has an effect on reducing virus

[58] Similar arguments have been forwarded by the International Growth Center, a UK-Based research consortium on developing economies, which has argued against strict social distancing measures. See www.igc.org/covid-19.

[59] Reuters. May 26, 2020. Special Report: Bolsonaro brought in his generals to fight coronavirus. Brazil is losing the battle. Stephen Eisenhammer and Gabriel StarGardter. https://www.reuters.com/article/us-health-coronavirus-brazil-response-sp/special-report-bolsonaro-brought-in-his-generals-to-fight-coronavirus-brazil-is-losing-the-battle-idUSKBN2321DU.

reproduction and mortality even if practiced by a proportion of the population and a significant part of its application relates to community contact which entails no economic costs.

Already, in the current COVID-19 outbreak, studies have found NPIs to enforce social distancing have yielded enormous dividends; in China, they were said to have prevented an expansion in the size of the outbreak by 67 times by February 2020. In Iran, social distancing was also found to be associated with a significant reduction in new cases and deaths.[60] In Pakistan itself, the roughly 6-week-long lockdown is estimated to have prevented over 400,000 deaths from COVID-19.[61] In many other countries, the disease has been all but eliminated locally through such measures, with new cases dropping to zero.

10.2. Intervention to Mitigate Economic Risks is Possible and Necessary

It is likely, given the expected longevity of this pandemic, that varying levels of enforcement of periodic social distancing measures will be required in developing contexts to save lives, which will entail economic costs, particularly for low-income groups. However, as the evidence from around the world tells us, mitigating the risks to workers' incomes and livelihoods in such periods is both possible and economically necessary.

Rather than obfuscating the importance of life-saving public health measures because of the difficulty of such measures, economists should have constructive, evidence-based conversations on how governments can mitigate and avert such risks to achieve both disease containment and livelihood protection goals through an appropriately designed basket of interventions, encompassing but not limited to income support, food distribution, employment and stimulus programs (that will also help boost public demand). Before making a judgment on the potential of mitigating the economic impact of public health measures, economists should make an effort to assess the full range of fiscal and monetary options available to governments with the normative goals of saving citizens' lives and protecting their basic needs (while also supporting macroeconomic objectives during a crisis of consumer demand).

Rather than seeing informality as an insurmountable obstacle that rules out life-saving measures, this massive crisis should be taken as an opportunity to establish systems for the delivery of essential public goods and develop mechanisms for the social protection, registration and employment of those in the informal economy and public investment in and support for businesses. Governments should particularly make use of the immense opportunities afforded by rapidly expanding mobile phone banking in developing countries like Pakistan for reaching the informal poor and constructing sustainable safety nets.

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[60] Ghanbari et al. 2020. The impact of the social distancing policy on COVID-19 new cases in Iran: insights from an interrupted time series analysis. Health Policy. DOI:10.21203/rs.3.rs-25818/v1.

[61] Haider, Azad and Javed, Sajed Amin. 2020. Social Distancing in Pakistan: Estimates for lives it can save under different scenarios and dollar value of the saved lives. Sustainable Development Policy Institute. Policy Review. May 15 2020. https://sdpi.org/publications/social-distancing-in-pakistan-estimates-for-lives-it-can-save-under-different-scenarios-and-dollar-value-of-the-saved-lives/.

10.3. The Crisis is the Pandemic not Public Health Interventions

It is important to bear in mind that the principal cause of these economic shocks is not social distancing measures but the pandemic itself. It is ultimately the rapid spread of the virus which has depressed demand and consumption, reduced economic activity by nearly a third globally, and caused businesses to crash and workers to be laid off. As long as the virus is around, many people will be reluctant to return to work or go shopping, they will hesitate to take on major financial commitments, such as buying houses or cars, and businesses will be reluctant to make major investments or hire workers.

This is critical to remember as it reminds us that the choice between lives and livelihoods is a false one. The threat to lives and livelihoods comes from the same source – the pandemic – and saving lives and livelihoods both require containing the pandemic.

This is borne out by evidence from past pandemics like the 1918 influenza pandemic which tells us that addressing public health through NPIs is precisely what generates a stronger economic recovery afterward. A study by Correia, Luck and Verner (2020) titled 'Pandemics Depress the Economy, Public health Interventions Do Not' found that cities that acted more aggressively to implement social distancing during the 1918 pandemic had both lower mortality and greater economic growth following the end of restrictions.[62] There are already indications that countries that managed to contain COVID-19 quickly through aggressive measures will likely recover faster and those that failed to prioritise public health for short-term economic concerns will face protracted economic crises.[63] Recent research on lockdowns in Europe also confirms this: countries that implemented NPIs faster not only had better health outcomes in terms of mortality but also better economic outcomes.[64]

10.4. Economic Policy Must Listen to Public Health Models

In an economic crisis that is fundamentally driven and determined by the outbreak of a deadly infectious disease, economic analysis and prescriptions must remain intimately tied to the models of epidemiologists and public health experts. Already, careless economic policy advice – such as that put forth in the Yale paper - about the 'low' economic benefits of critical public health measures in developing countries has played a role in governments like Pakistan's prematurely easing social distancing measures and causing a rapid rise in cases and deaths that is likely to spiral further out of control in the coming days.

Instead of making blanket claims about the inherent inapplicability of life-saving public health measures in developing countries, economists need to better familiarise themselves with existing public health models, evidence and debates. The coming months will require careful evidence-based deliberation about appropriate health and economic

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[62] Correia, Sergio and Luck, Stephan and Verner, Emil, Pandemics Depress the Economy, Public Health Interventions Do Not: Evidence from the 1918 Flu (March 30, 2020). Available at SSRN: https://ssrn.com/abstract=3561560 or http://dx.doi.org/10.2139/ssrn.3561560.

[63] VOA Learning English, 4 June 2020, Vietnam Post-Virus Recovery: Economy Soars.

[64] Demirguc-Kunt, Asli; Lokshin, Michael M.; Torre, Ivan. 2020. The Sooner, the Better: The Early Economic Impact of Non-Pharmaceutical Interventions during the COVID-19 Pandemic (English). Policy Research working paper; no. WPS 9257; COVID-19 (Coronavirus). Washington, D.C. : World Bank Group.

measures based on observation of epidemiological indicators like the reproduction number and rates of growth in infections and deaths, public health capacities like testing, laboratories, hospital and ICU capacity, as well as socio-economic indicators like unemployment, inflation, poverty and nutrition.

Some of the more reasonable proposals thus far from scientists and researchers appear to be the options of periodic disease suppression measures in affected regions similar to the cyclical lockdown model[65] proposal by Nayab and Haque (April, 2020) at PIDE in Pakistan and the 50-30 day cycles suggested by scientists at Cambridge[66] – which could enable the reproduction number to be kept below 1 while also allowing for periods of necessary economic productivity. Combined with measures like universal mask usage, improved hygiene and clean water, and enhanced testing and isolation, these policies could help contain the outbreak in multiple countries and significantly reduce mortality while sustaining livelihoods.

These measures – tailored to each country's circumstances - will need to be accompanied by careful government planning and substantive fiscal and monetary resource mobilisation that is allocated towards ensuring people's basic needs, from income, to food, to water, to shelter, to jobs can be ensured while productive economic activity can be supported. In this unprecedented crisis more than ever, we must dispense with the neoliberal assumption that the fulfilment of people's survival needs must necessarily hinge on their ability to earn, and take the long-delayed redistributive measures and allocation of resources needed to ensure well-functioning public institutions and safety nets that can secure both people's health and their subsistence needs.

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