



Targeting the World's Slums as Fat Tails in the Distribution of COVID-19 Cases

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Abstract A recent article by Corburn et al. lays out the policies that would help slum communities in the global south deal with COVID-19. That article notes the vulnerabilities of people in these informal settlements and argues that any assistance program must recognize these realities so that the policies do not further jeopardize the survival of large segments of the population of these communities. This note extends the arguments in that paper, focusing on some of the logistic issues involved in providing assistance to informal settlements. It argues that such assistance is essential not only for the help it would provide to people in these settlements but also because the residents of these communities should be key targets of assistance. Because of the location and occupation of most of the residents of these communities, targeting them simultaneously addresses health and economy-wide concerns generated by COVID-19. Their characteristics make them much more likely to be afflicted by the virus and spread it to others. The main conclusions of this note with respect to policy are that the scale of such assistance is likely to be larger than has so far been proposed, that in countries with limited testing ability slums provide one of the most effective places to target assistance, that the role of community groups in providing the assistance is difficult to exag-

gerate, and that philanthropy has a role to play in supporting innovation.

There is a great deal of talk about “flattening the curve” of the number of those infected by the coronavirus. The idea is to give health services a chance to keep pace with increased needs. At the same time, however, there has been little discussion of a part of the curve that will be very difficult to flatten—the part occupied by the world’s nearly one billion slum dwellers. Unless immediate steps are taken, there will be little flattening of the curve. In fact, without dramatic action it is likely that the curve everywhere will flatten much less quickly and, indeed, could well become much steeper in many low-income countries. An important reason for the curve’s resistance to flattening in slum communities is that there is no excess capacity to cope with the increased number of those who will require assistance. The medical capacity of these communities, such as it is, is already at capacity; slowing the rate at which the virus occurs will not help these communities [1].

However, the biggest reason that the curve will not flatten for slum communities is that these communities are so crowded, often with entire families in one room, that isolation is often nearly impossible [2, 3]. Nor are many of the basic services needed to deal with virus conditions, particularly water, available. Moreover, as the virus visibly takes hold, one can be sure that current residents, many already infected, will flee to their villages, spreading the disease to places with even less in the way of medical care. This spreading of sickness will,

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in turn, either shut these countries off from exchange with the rest of the world or recycle the virus once more as massive flight takes place. In short, the world's densely populated slums are now posed to provide either an almost endless supply of victims for the virus or to impose an economic depression on some of the world's poorest people [4, 5]. In this connection, while not often noted, prior to the pandemic sub-Saharan Africa was already in a mild depression, as the region's per capita income for the region at the end of 2019 was lower than it was 5 years earlier [6].

From an epidemiological point of view, people living in slum communities represent observations from the fat tail in the likely distribution of the infected. Accordingly, targeting resources on these locations would be far more productive than more spatially-neutral policies. Fortunately, a group of medical experts and slum community leaders have laid out the dimensions of a plan of action called "Slum Health: Arresting COVID-19 and Improving Well-being in Urban Informal Settlements," in the *Journal of Urban Health*, hereafter, the slum-coronavirus paper [7]. That paper provides a well-thought out, eight step program that is an excellent starting point for how to proceed. The objective of this note is not to repeat all the initiatives discussed in that paper but rather to identify some of the logistics that would be involved in implementing it. Another objective of this note is to expand upon why targeting assistance on slums is both so important and of such urgency.

Three of the proposed components of the assistance will be discussed: the likely scale of the assistance needed, the importance of community organizations in structuring and allocating the assistance, and some steps that might be taken to enhance the spread of the virus. Prior to that discussion, I briefly review economic rationales for providing such assistance.

The Economic Rationales for the Assistance

As is detailed below, this kind of program would be expensive. These high costs and the concerns that some lower-income country policy-makers are hoping that pandemic will not hit hard have led to delays against incurring such costs [8]. For example, the fact that African countries are spending 0.8 of 1% of GDP on

fighting the virus while richer countries are spending 8% suggests that many poorer countries have indeed been slow to act [9].

This argument could, of course, be countered with humanitarian arguments for saving lives. However, there are at least two stronger economic counterarguments on behalf of undertaking such a program: first, the value of the lives saved, even under conservative assumptions, will far exceed the costs of the assistance and the economic disruptions that prophylactic policies would entail; and second, the deeper reduction in per capita income, possibly for a longer period of time will similarly be multiples of the likely program costs [10, 11].

Nevertheless, some may agree with the policy-makers who are concerned about the nature of the "bet" for undertaking public spending on fighting a virus that either may not appear or may appear in a mild form. In such a case, the program costs would be real, while if the virus does not appear, its costs would not. However, in just 10 weeks, the virus has already affected more than three million people in 190 countries [12]. There is no reason to expect this rapid spread to stop at the door of poorer countries. Moreover, the virus comes at an inauspicious moment for emerging economies. It has accompanied a sharp drop in real oil prices—a central driver of sub-Saharan Africa's growth—to 1950 levels [13]; job losses of migrants in North America, Europe, and the Middle East that will greatly reduce the remittances they send home, remittances which are multiples of foreign aid sent to the affected countries; 18 developing countries in debt distress or high risk of debt distress [14]; and, perhaps most of ominously, an emerging deep contraction in global GDP [15]. The longer it takes to "place the bet," the larger the bet will have to be to realize the same gains. Waiting is costly in lives and treasure [16].

The Components of the Assistance Program

The slum-coronavirus paper identifies a number of needs:

- The establishment of emergency planning committees in every community
- Three months of income for the poor as well as immediate food assistance

- Expenditures on health care, particularly on the training and expansion in the uses community health workers
- A moratorium on evictions
- Efforts to assure that basic services such as sanitation, water, and solid waste removal are at least maintained, if not improved

I focus on the first three of these.

The Scale of Assistance Needed

One of the most important ways to think about this assistance is to consider how much it would cost.

Income Maintenance

The largest expenditure of these items would be the grants required to fund the living expenses of the poor who work largely in the informal sector, usually on a daily basis. One way to begin to think about the costs involved in pursuing a “lockdown” in these locations, of the sort being undertaken in most countries, is to consider the per capita income of the population of developing countries. The IMF estimates that in 2019 dollars, this was \$5380 [17]. Slum inhabitants of course have a lower than average per capita income, but exactly how much lower is difficult to say for a number of reasons. First because in most cities, the share of the population in slums exceeds the poverty rate, so by definition, many slum dwellers are not in poverty. Second, urban income levels tend to be on the order of 20% above that of their rural counterparts, so the average urban per capita income is higher in cities than the national figure [18]. To get a very rough sense of how much funding would be required, a figure that could be much more accurately estimated, suppose the per capita income of slum dwellers is one-fifth of the average national figure, i.e., about \$1100. Providing that level of support for 3 months to the roughly one billion slum dwellers, less than \$3 per day, comes to \$275 billion, and that amount, it is important to remember, is only a beginning [19]. More may well be needed over time. The point is not that the estimate is accurate, but that almost certainly, it will be a very large amount, and it is a significantly larger amount than the funding that the international institutions have pledged in additional assistance [19].

To consider just how large this figure is, consider how it compares with the new efforts to respond to

combat COVID-19: the African Development Bank has established a \$10 billion emergency fund [20]; the World Bank has similarly developed a \$14 billion emergency fast disbursing health loan mechanism and a \$160 billion fast disbursing coronavirus relief fund. In addition, along with the IMF, the World Bank is calling for \$14 billion in debt relief by bi-lateral donors as a first step in a more comprehensive program [21]. These programs should help address some of the health-related expenditures taken to fight the virus. At the same time, the Government of India has budgeted \$23 billion for income relief during a 21-day lockdown, while the Brazilian government is discussing a separate coronavirus “war budget” of \$100 billion, also to provide income maintenance for informal sector workers. Cumulatively, these amounts are clearly significant, but much of their focus is on the health-related concerns and general income assistance rather than on where the resources can be most effectively targeted to reduce the spread of the virus.

The slum-coronavirus paper also calls for foundations to help fund income maintenance for slum dwellers. This approach, I believe, would be a mistake. The amounts needed could easily go beyond what even large foundations could provide on a sustainable basis. A far better would be the approach that The Rockefeller Foundation followed in New Orleans in the wake of Hurricane Katrina or that of the Ford Foundation in Detroit’s revival. In both cases, as well as in the Gates Foundation’s imaginative approach to funding for the development of the manufacturing capacity for seven of the most promising vaccines, the aspiration was to focus on innovation rather than subsistence [22]. In the Gates case, it went beyond just securing the supply chains to try to help build an essential one more rapidly. The funding supports different vaccine options in the hope that at least one of them will work so that a vaccine can be quickly produced at scale.

Immediate food assistance is also given priority by the slum-coronavirus paper. This recommendation is vitally important given the problems with the access to food described in the World Bank’s recent review of the effects of COVID-19 on sub-Saharan Africa [23]. A slow response in these communities could lead to starvation and increased immune deficiency. In addition, food prices in many emerging economies, particularly in sub-Saharan Africa, are already much higher than is the case in developed countries, and it is likely that they will increase rapidly [24], particularly when it is noted

that breakdowns in supply chains are already occurring [25].

One step that can contribute to less price gouging while simultaneously having minimal adverse effects on supply would be to declare a moratorium on rent payments. The paper calls for a stop to evictions. This step will almost certainly increase rent arrears. Going further and stopping rent payments altogether would provide immediate relief to poor households and allow them to use these funds to purchase the food needed so that malnutrition does not weaken the immunity needed to resist the virus. The reduction in the income of landlords could be compensated for at a later date.

Health Policies

The recognition that at least some of the supplies should be given in-kind rather than as cash payments raises the question of who should deliver the food? For instance, food stalls and hawkers are a commonplace in most slum communities. These entrepreneurs have not only established supply chains; they have built up a clientele who trust them. But can they be trusted in the new virus environment? The answer is not if they have not been tested for the virus. Hence, along with the realization that a significant portion of the income maintenance grant should be food-based comes the realization of the importance of testing, particularly for food providers and healthcare workers, including of course the community health workers called for by the paper.

Testing Nobel Laureate Paul Romer argues that if testing can be applied to 7% of the population, even with a high rate of false positives, and those found to be infected were isolated for 14 days, it would be possible for the numbers afflicted to not continue to expand [26]. Such a level of testing will not be achieved in emerging economies. For example, in Iceland, the world's leading tester, 10% of the population has been tested 10 weeks after the first case [27]. So, instead of striving to achieve such high levels of testing, resources could be targeted on geographical areas and occupations that would allow this to be achieved with lower rates of testing. Slum communities provide rich samples of both populations—those whose location and informal occupations—which, again, put them in the so-called fat tails of the distributions of those likely to be affected. Moreover, within those communities, more precise targeting, such as of food vendors, could be highly productive.

Such fat tail targets are particularly attractive when it is recognized both how important testing is and that the numbers tested are likely to be far lower in emerging economies. It may be even more important if the uncertain etiology of the virus is asymptomatic as some early survey results indicate may be the case. As a number of recent studies have shown, if COVID-19 is indeed asymptomatic, the much higher economic costs of lockdowns can be reduced. If testing is available so that those infected but not ill can return to work, less economic activity can be shut down [28]. The result would be lower economic costs without an increase in sickness and death.

Four measures are possible: masks, social distancing, housing, and migration to the countryside. Of the first three policies, a recent study of African countries indicates that while masks and social distancing are helpful, the most effective policy by far is to shield the vulnerable [29], a step that requires that some portion of the population be moved to more isolated housing. The relative importance of shielding, in turn, has implications for how assistance is distributed.

Masks After a slow start in providing masks, even for healthcare workers, it is now recognized that masks are an effective way to slow the virus' spread [30]. Hundreds of millions of masks are now being produced at low costs—mask prices were on the order of \$2 apiece in the USA before the crisis—so even with price surges, the main difficulty with this measure is the logistical one of moving large quantities of them to the right places.

Social Distancing Of course, effective in reducing the spread of the virus as the incidence of COVID-19 has been greatly reduced relative to model predictions in countries that have practiced such actions. However, the question remains as to how much social distancing can occur in settlements where the density is many times that of New York City, where that city's lower density has played a significant role in the city's high rate of infection [31].

Housing The slum-coronavirus paper calls for the building of new housing near to current locations to help reduce density. This measure too could be highly effective, and the World Bank has experience in supporting many such projects, both for disaster relief reconstruction and sites and services for new housing. Once again, however, the difficulty is not in providing

the good; it is in the logistics of how it should be done. How can sufficient trust be developed so that the residents of slum communities agree that such relocations are not part of efforts to simply tear down the slums and destroy the housing of those who live there? Such destructions have a long history, and their violence was one of the motivations for the World Bank to begin to provide support for sites and services projects. To create the trust needed to isolate the sick and the infirm requires community buy-in.

Migration to the Countryside Another target of testing would be those who chose to migrate back to rural areas. Ideally, they could be tested and certified as virus free before being allowed to migrate, but such constraints and regulation are not likely to be achieved. Perhaps the tracking app for phones that is now under development by Google and Apple offers some promise on this score.

The Inputs of Community Organizations Are Essential

The paper's foremost recommendation is to recognize and enhance the community organizations that can serve slum communities. Without the trust and guidance about the rich sources of information as to who lives in a community, what are the most important needs, and how best to address those needs in the highly idiosyncratic situations, it is impossible to engage community members in addressing the very deep problems they face. Certainly, efforts to shield the most vulnerable, by separating them from their families, as was done in China, would face strong opposition without trust in the implementer. In effect, community organizations can serve as the agents of donors who are trying to protect both the communities and the broader societies. They can help guide resource flows to those who need it most as well as to incorporate community knowledge about how to best use the resources.

On first blush, quickly establishing viable slum community groups to undertake such action would appear to be an impossible task. But this is not the case, as the slum-coronavirus paper indicates. Slum Dwellers International, SDI, is an organization that has already established internet-based methods of sharing skills and practices across more than 30 countries for hundreds of thousands of slum dwellers [32]. It has supported the implementation of large World Bank loans and government programs in India, South Africa, and elsewhere. Moreover, SDI's approach in some respects

is more akin to developing a franchise than it is to building a community organization from scratch. It provides fledgling community groups with a handbook and internet support as well as cross country visits to enable newly formed organizations to quickly establish community cohesion and sustainable community organizations. This approach could easily be augmented by the webinar-based learning called for Banerjee and Duflo on how to most effectively address some of the concerns raised by the pandemic [33].

Conclusion

In thinking about the concerns of the vulnerable populations who reside in the slums of poorer countries, it is of course essential to recognize the existential threat to the lives and well-being of the hundreds of millions of people who live there. This threat should be motive enough to move quickly to provide the support needed. And, while it is clear that significant steps have already been called for and are beginning to be implemented, it is also useful to think beyond the humanitarian motivation for assistance. In this connection, a biblical parable used by John Maynard Keynes, often referred to as the father of macroeconomics, is adaptable to the current situation. He was discussing the role of profits in a capitalist economy and compared it to the endless supply of oil that was magically provided by a cuse, or cup, used by a widow to provide assistance to Elijah. He writes "Thus, profits, as a source of capital increment for entrepreneurs, are a widow's cuse which remains undepleted,..." [34]. In other words, no matter how entrepreneurs spend their profits, it does not diminish their wealth. The supply of such income, like the oil in the widow's cuse, is endless.

With only slight exaggeration, and unfortunately, it may be said that a similar situation applies to the effect that the large number of slum dwellers can have on supply of those infected by the coronavirus, at least until a vaccine is found. Without assistance, and if they act only as individuals rather than as communities, they will be ravaged, and in their attempts to flee from their disease-burdened locations, the virus will continue to spread [34]. Thus, the population of these communities present two high quality targets—densely populated locations as well as large numbers of people who cannot isolate themselves because they have to work in order to live and because they live in such crowded conditions.

Targeting assistance on them makes macroeconomic sense as well as providing distributional justice.

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References

- Riley LW, Ko AI, Unger A, Reis MG. Slum health: diseases of neglected populations. *BMC Int Health Hum Rights*. 2007;7:2. <https://doi.org/10.1186/1472-698X-7-2>.
- According to 24/7 Tempo, 2019, Mumbai's population density in 2016 was almost three times higher than New York City's, and the New York Times, Upshot, reported that the city's density was a primary reason for the high virus infection rate, April 10, 2020.
- The Census of India 2011 indicates that 37 percent of Indian urban households live in either one room or without any exclusive rooms, Table s00-0012: the distribution of households by size and number of dwelling units. In Ghana the share of urban households living in one room is almost 60 percent, Table 21, Ghana Housing Profile, UN Habitat, 2011.
- Job losses in the US In the first month of the current pandemic, 17 million, were double the amount of such losses in the 18 months of the 2008–2010 Great Recession. That recession reduced world GDP by 4 percent, and has had a lasting adverse effect on economic growth for the past decade. For example, in one of their Economic Letters, The San Francisco Federal Reserve estimates that the slower economic growth after the recession has reduced US per capita income by \$70,000. See Lansing, K. Gauging the Impact of the Great Recession. July 11, 2011.
- A recession is at least two quarters of negative economic growth; a depression is marked by more prolonged and more significant reductions in economic growth, lasting for several years.
- World Bank data and the International Monetary Fund. Sub-Saharan Africa Regional Economic Outlook: Navigating Uncertainty; 2019.
- Corburn J, et al. *Slum health: arresting COVID-19 and improving well-being in urban informal settlements*. *J Urban Health*. 2010;
- McKinsey Institute, *Tackling COVID-19 in Africa, April 2020*, discusses an apparent reluctance of government officials in Africa to actively prepare for the virus.
- The Economist. "Debt and disease," April 11-17, 2020.
- Mulligan, C., K. Murphy, and R. Topol. "Some basic economics of COVID-19 policy." *Chicago Booth Review*, the University of Chicago estimate that in an unrestricted pandemic infecting 60 percent of the US population and an infection fatality rate below 1 percent would result in roughly 1.4 million deaths, heavily concentrated among the elderly with a total value of lost lives of about \$6 trillion. To make a back of the envelop estimate of the costs for a similar infection rate for slum dwellers we take the following steps:
 - (1) the above assumptions are applied to the one billion slum dwellers, so that 600,000,000 people are affected, (2) we use Stock's (2020) estimate \$9.3 million of the value of statistical life for the U.S. in 2019; and (3) apply Viscusi, K. and J. Aldy 2003. "The Value of a Statistical Life: a Critical Review of Market Estimates throughout the World," *J Risk Uncertain*. Springer. 2020;27(1):5–76, August, their estimates of the income elasticity of the value of a statistical life of .5 or .6 to the difference in the per capita income of the U.S. and that of developing and emerging countries, \$13,200, we find that the comparable cost estimate for slum dwellers exceeds \$20 trillion.
- Romer P. Princeton University Webinar, April 8, 2020 presents the macroeconomic case for fiscal policy. *The McKinsey study also forecasts a 2020 drop in per capita income in Africa of as much as 10 percent. That would place the region at its 2008 level*.
- Financial Times on-line coronavirus update*, April 30, 2020.
- Macrotrends*, on-line, April 11, 2020.
- The IMF SUB-SAHARA Africa region report, *op cit*. 2020.
- The IMF Director forecasts a global recession in 2020 that will be deeper than the 2008 Great recession. IMF press release, March 23, 2020.
- Eichenbaum M, Rebelo S, Trabandt M. The Macroeconomics of Epidemics. *Northwestern University argue that because of the nature of the externalities involved with both consumption and the labor market, that the lack of aggressive early policies can be very costly in lives lost*. 2020.
- World Bank data*, on-line. 2020.
- See Jones P, D'Aoust O, Bernard I. *The urban wage premium in Africa. Global Research Program on Spatial Development of Cities, funded by the World Bank and supported by the UK Department for International Development, for a review of estimates of the urban wage premium*. 2015.
- Many would argue that this amount per day is a paltry sum and it certainly is. However, it exceeds the \$1.90 per day figure used as the poverty threshold by 50 percent.
- The African Development Bank creates a \$10 billion fund for virus aid. *Outlook*, Abidjan. April 9, 2020
- New York Times. see also "The World Bank group moves quickly to help countries respond to COVID-19" press release April 2, 2020. 2020.
- World Economic Forum*, April 6, 2020.
- Assessing the Economic Impact of COVID-19 and Policy Responses in sub-Saharan Africa. *World Bank*. 2010.
- Wodon Q, Zaman H. Higher food prices in Africa. *World Bank Research Observer*. October 2008. 2010. <https://doi.org/10.1596/1813-9450-4738>.
- Poorer Nations can't compete even for Masks. *NY Times*. 2020.
- Berger D, Herkenhoff K, Mongey S. *An SEIR infectious disease model with testing and conditional quarantine*. Duke University economics Dept. find that testing of more than 7 percent of the population is required. 2020.
- By April 15th after 10 weeks of testing, Iceland had tested 10 percent of its population of 360,000, France 24.
- Stock J. *Data gaps and the policy response to the novel coronavirus*. *National Bureau of Economic Research Working Paper*, 26902 shows that given the considerable

- uncertainty as to the share of the population that is asymptomatic how high or low rates of such infection affect the optimal policy response.* 2020.
29. Zandvoort K, Jarvis C, Pearson C et al. Response strategies for COVID-19 epidemics in African settings: a mathematical modelling study. *Working Paper Centre for the Mathematical Modeling of Infectious Diseases.* 2020.
 30. Leung N, Chu D, Shiu E, et al. Respiratory virus shedding in exhaled breath and efficacy of face masks. *Nature/Medicine.* 2020.
 31. See note 2 above.
 32. *SDI's leadership has won numerous awards and honors as well as the support of many foundations and bi-lateral donors. Its leadership has also served as advisors to UN Habitat, the Cities Alliance, and the Governments of India and South Africa among others.*
 33. Battling coronavirus: nobel laureates Abhijit Banerjee, Esther Duflo have this advice. *Bus Today.* 2020.
 34. Keynes JM. *A treatise on money, reproduced in volume.* In: Moggridge, DV, editor. *The Collected Writings of John Maynard Keynes.* London: MacMillan; 1930.

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