

COVID-19

MagicBox report – June 5th 2020

**Socioeconomic and Rural-Urban differences on
the effects of physical distancing measures.**

Version 1

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More info at: <https://www.unicef.org/innovation/magicbox/covid>

Overview

Monitoring changes in mobility has become a key tool for COVID response (with globally available datasets like the ones release by [Google](#) or [Apple](#)). However, national and subnational averages can nonetheless hide strong underlying inequalities and differences.

This report aims at studying the effects that physical distancing policies are having on human mobility. In particular, the different effects these policies might be having in low income settings and for rural and urban areas.

Having empirical insights on how human mobility patterns are changing due to COVID and associated response efforts is critical to better understand risk, to improve forecasting models, to asses potential socioeconomic impacts and to identify potential vulnerabilities and needs in a timely manner.

This deck shows insights for 10 programme countries (listed alphabetically):

**CO Colombia CI Cote d'Ivoire IN India ID Indonesia MY Malaysia MX Mexico MZ Mozambique
MM Myanmar NG Nigeria and UA Ukraine**

Some highlights

- This report shows an analysis on the changes in human movements as a result of governmental physical distancing policies related to COVID. **It analyzes data from 10 programme countries and aims at understanding some fundamental differences in the effects of those policies according to poverty and urban-rural contexts.**
- Strengthening **physical distancing policies remains a go-to Government practice.** While some countries are starting to slightly relax the stringency of physical distancing policies, levels are still consistently very high.
- Though there are correlations, **Countries with the most stringent policies don't necessarily show the biggest reductions in human mobility.** It requires more research and analysis to understand applicability and sustainability of some of these control measures, especially in the most vulnerable contexts.
- **Poor populations** are increasing the time spent at home, but the **increase in poor areas is considerably less than what we observe in rich areas**
- **There are consistent differences in changes in movement behavior between Urban and Rural areas.**

Data

Mobility:

We used aggregated mobility data in this report, provided by Cuebiq, which collects first-party data from anonymized users who have opted-in to provide access to their location data anonymously, through a GDPR-compliant framework.

Poverty:

Indonesia and Colombia data are from national surveys, while Nigeria data is from the University of Southampton (WorldPop.org)

Missing poverty data for all other 7 countries

Urban-Rural:

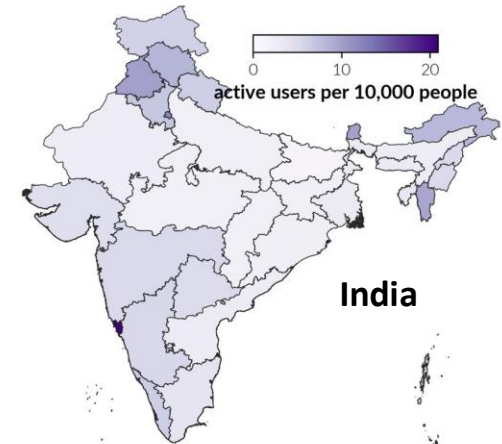
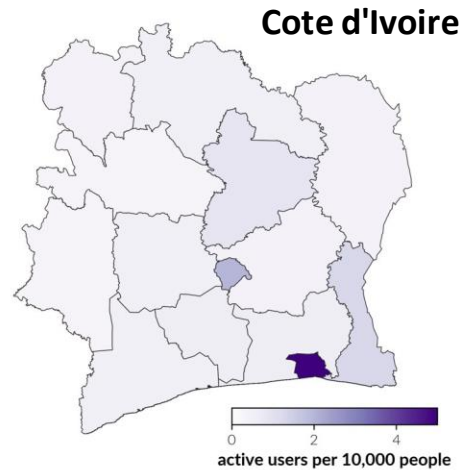
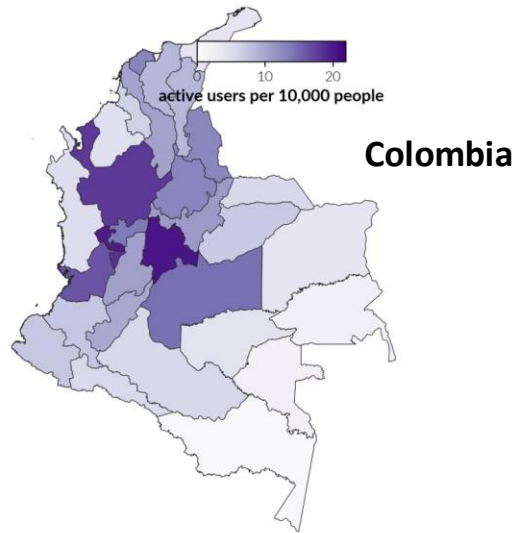
GHS SMOD settlement grid (1km x 1km) from the European Commission

<https://ghsl.jrc.ec.europa.eu/download.php?ds=smod>

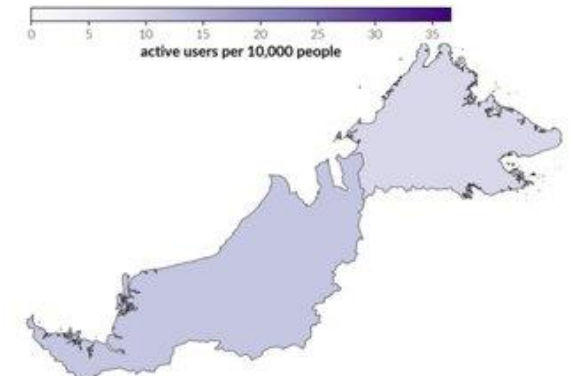
Representativeness of mobility data

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There are strong disparities in terms of data penetration both between countries and within countries. This should be kept in mind when reading this report. Below figures show data representativeness, in terms of number of users per 10,000 inhabitants.

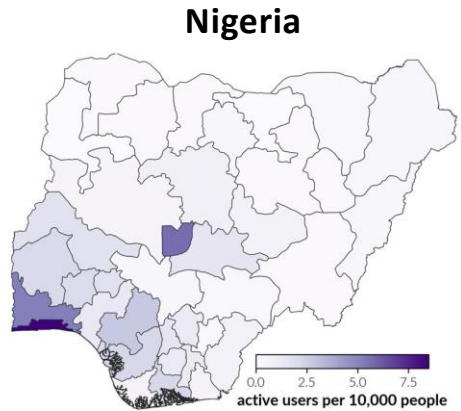
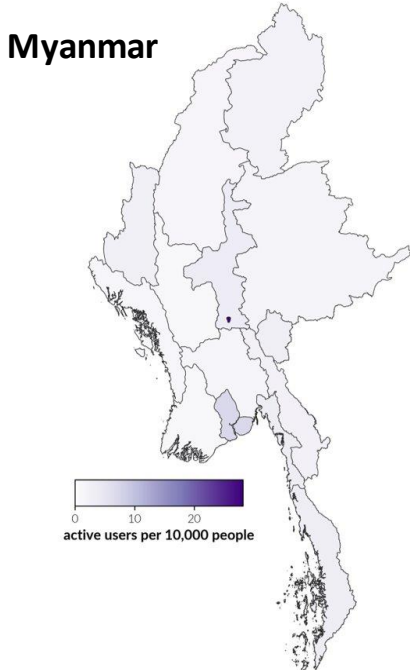
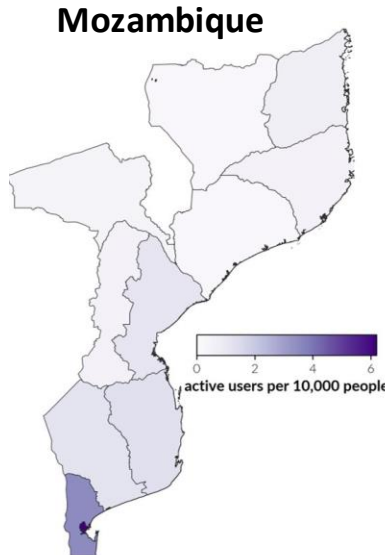
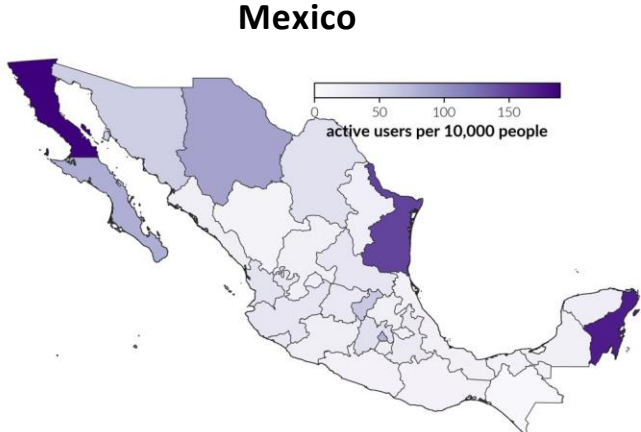


Malaysia



Representativeness of mobility data

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Limitations of current approach

The **Mobility data** presented here is collected through smartphones, **but not everybody has a smartphone**. Especially the **most vulnerable are not represented** in smartphone datasets.

To make the analysis more representative we need:

- Data partnerships with local mobile network operators
- More research and collaborations with local academics and data science groups to adapt the analysis to the local context: e.g. large cities, socioeconomic impacts and causalities, epidemic impact

Global Summary

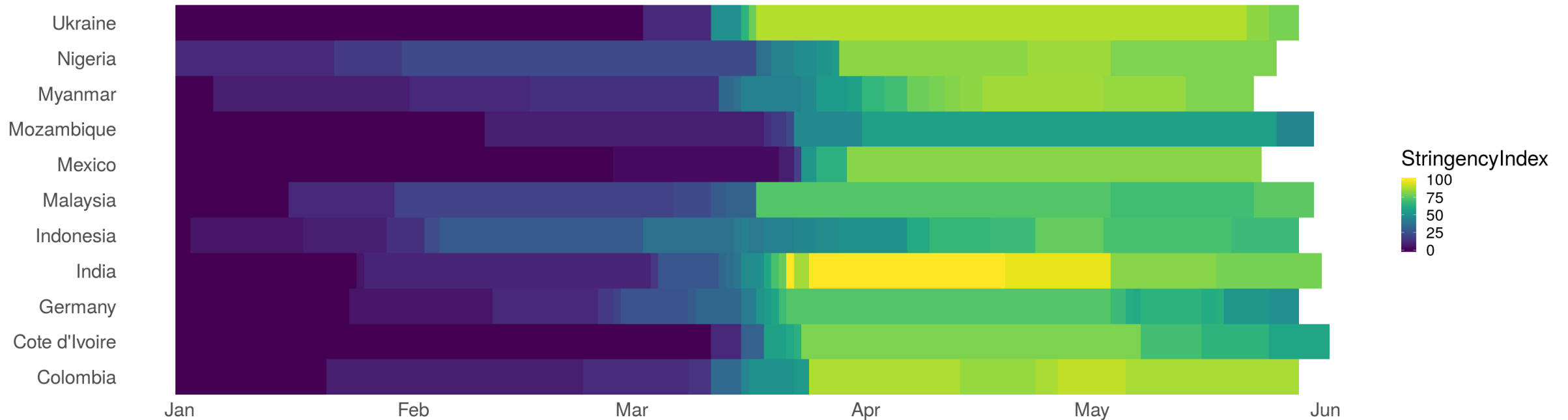
- In the absence of a vaccine, reducing the virus transmission rate is a challenging and critical component of COVID response. Information campaigns on safe practices like hand washing or proper mask wearing etiquette are coupled with policies aimed at reducing human contacts, from closing schools to lockdown policies.
- Governments are implementing policies and measures aimed at combatting COVID.
- Human mobility data is used to build risk-models of how COVID might spread (and estimate future case loads) and to understand the impacts of containment measures
- Little is known of how containment policies affect vulnerable communities

Policies

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Policies aimed at containing COVID through physical distancing have been widely applied globally.

Some countries, have passed the epidemic peak and are exploring paths to normality, but policy stringency remains high, in general, and is still growing in some regions.



NOTE: The stringency Index is computed by the Oxford COVID-19 Government Response Tracker (see below) and is an indicator of the strictness of 'lockdown style' policies that primarily restrict people's behaviour.

Data from: <https://www.bsg.ox.ac.uk/research/research-projects/oxford-covid-19-government-response-tracker>

Analysis from: UNICEF MagicBox

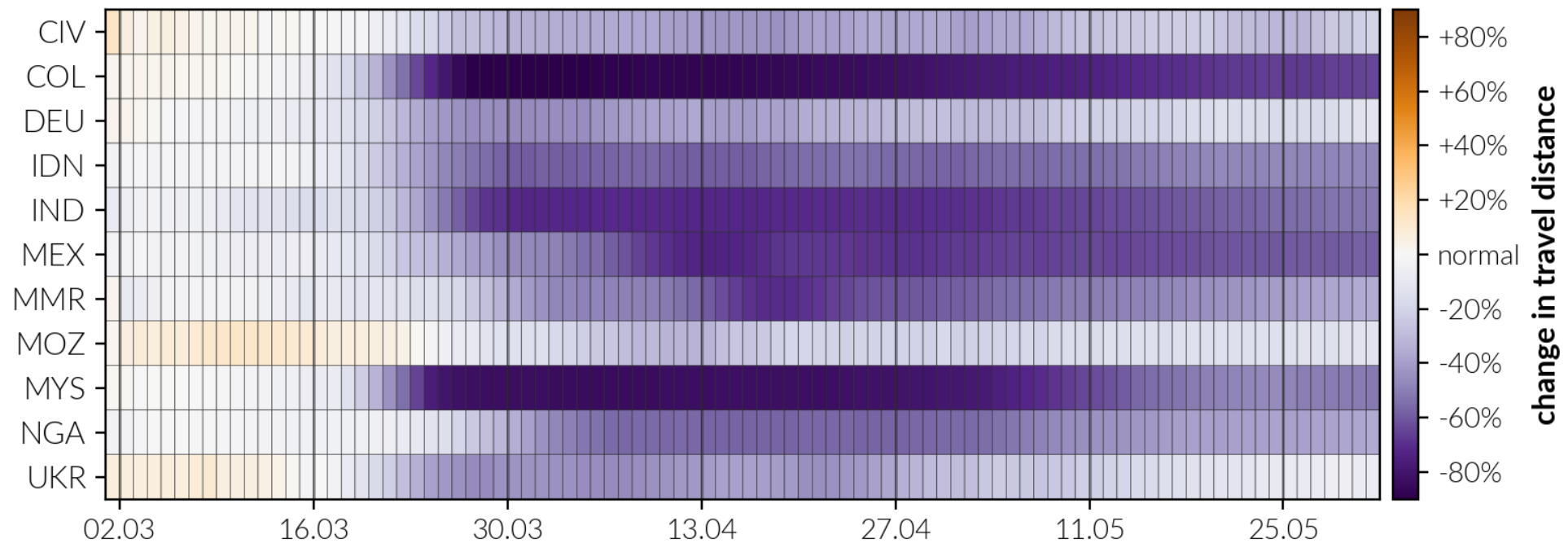
Distance travelled per day

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While some countries are begging to see a return to normal, physical distancing policies are still in place in many countries. Below figure shows the impact of these policies on people's daily travel patterns.

In general, people are traveling less, and this can be seen in a **reduction of average distance travelled per day, with drops close to 80% in some countries.**

There is, nevertheless, a lot of heterogeneity between countries.



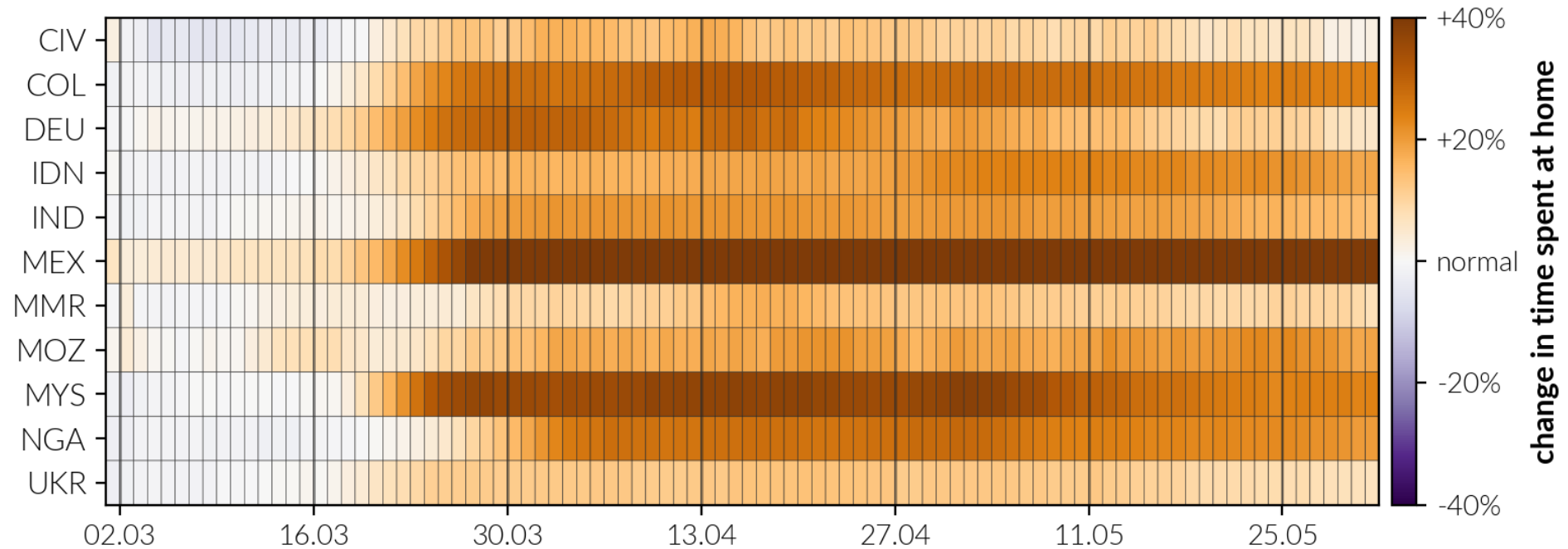
Time spent at home

Jun 5th 2020

Similarly, policies aiming at restricting movement have an effect on the time people spent at home. **We see increases of up to +40%**

IN India, with the highest Stringency Index in the data, does not show the highest changes on either time spent at home or travelled distance. Other countries, like Colombia, that show the greatest reduction in travelled distance per day do not show a large increase in time spent at home.

It is, therefore, important to understand what effects policies have on human mobility, especially in terms of varying contexts.



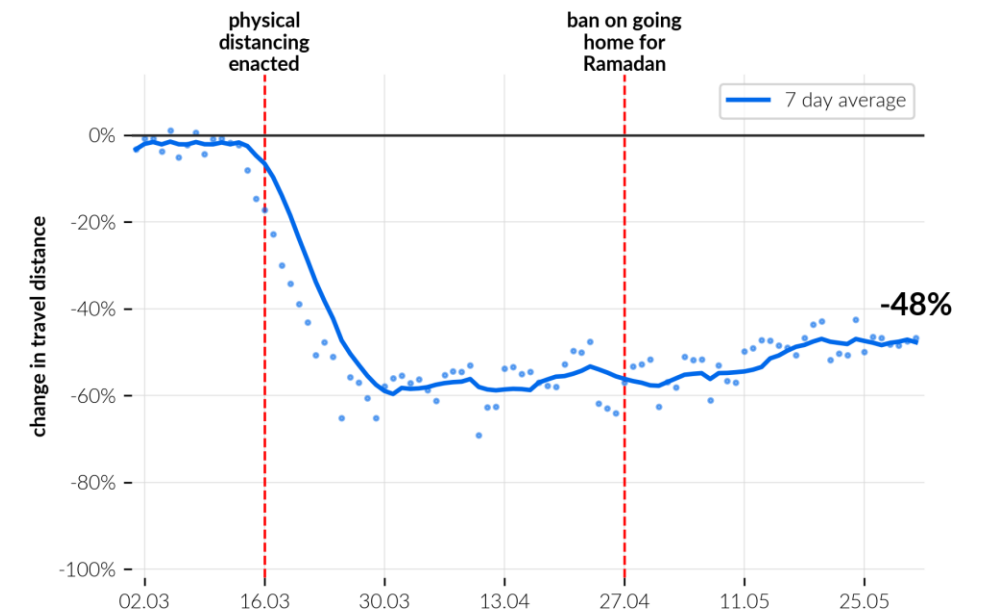
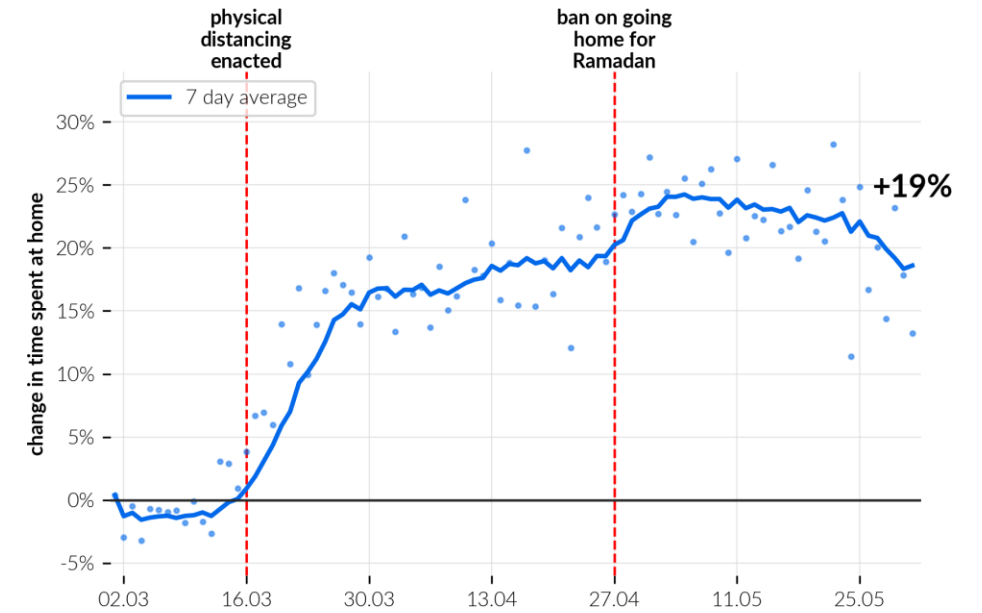
Events matter

The effect of policies can be affected by events or holidays, or due to other changing environmental conditions like weather.

ID Indonesia, for instance, enacted physical distancing measures on Mar 16th and banned travels for Ramadan on April 27th.

As a result of these measures individuals now spend +19% more time at home (compared to Normal). However, the number was higher during Ramadan & Eid (~25%).

The average distance people travel in a day was initially reduced by -60%, (now -50%) but did not show an additional change for Ramadan.

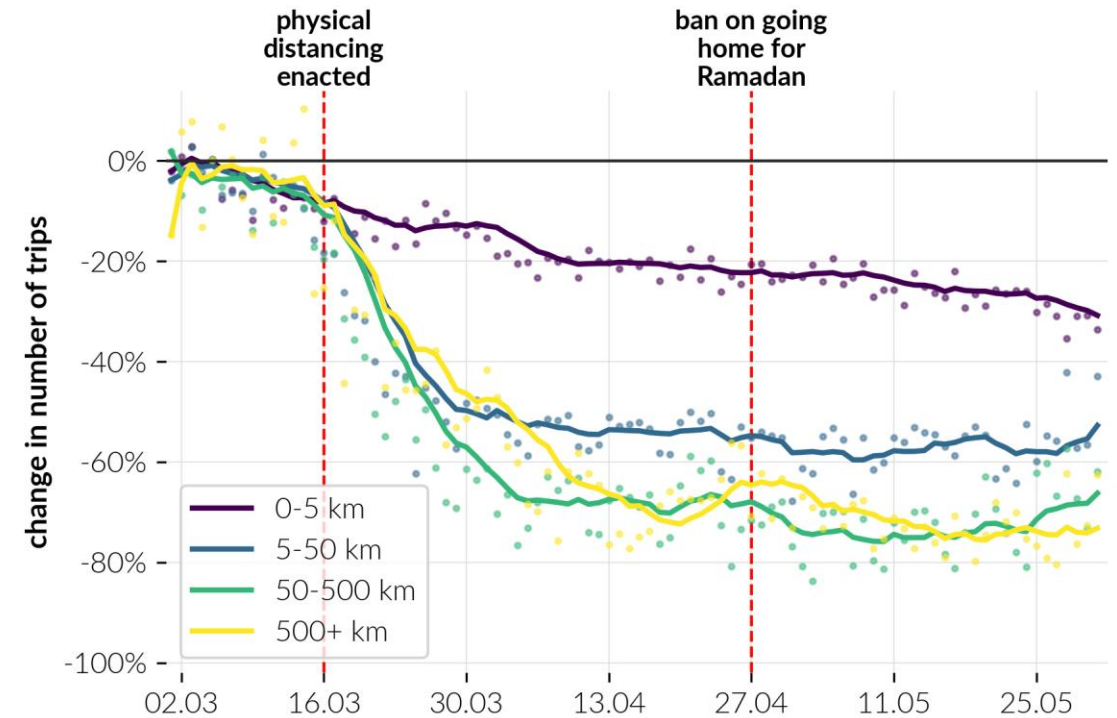


Long / Short trips

Not every type of trip is equally important in our daily lives. This is also reflected in the capacity of populations to reduce the amount of trips they do.

In Indonesia, for example, trips of above 5 km have dropped significantly more than trips shorter than 5 km. This behavior holds for most countries in our dataset.

Ramadan is an important religious period in which families and communities get together. Despite the extra ban on movement, this period shows a small increase in long distance trips, especially those with length of more than 500 km, although the general decrease is still high, around 70% below normal.



Socio-economic differences

The many challenges that the poorest communities face daily make them more vulnerable to COVID and its socioeconomic impacts.

Vulnerable communities are also less likely to be able to follow strict lockdown restrictions (if not complemented with mitigation measures and services).

It is critical to understand how Physical Distancing policies work (or not) in low income settings.

More work is needed including on understanding the different socioeconomic impacts this interventions might have on the poorest communities.

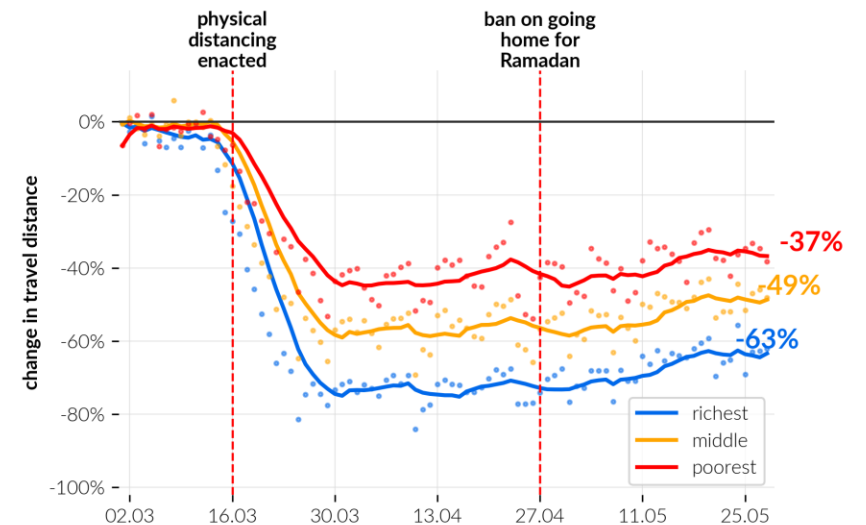
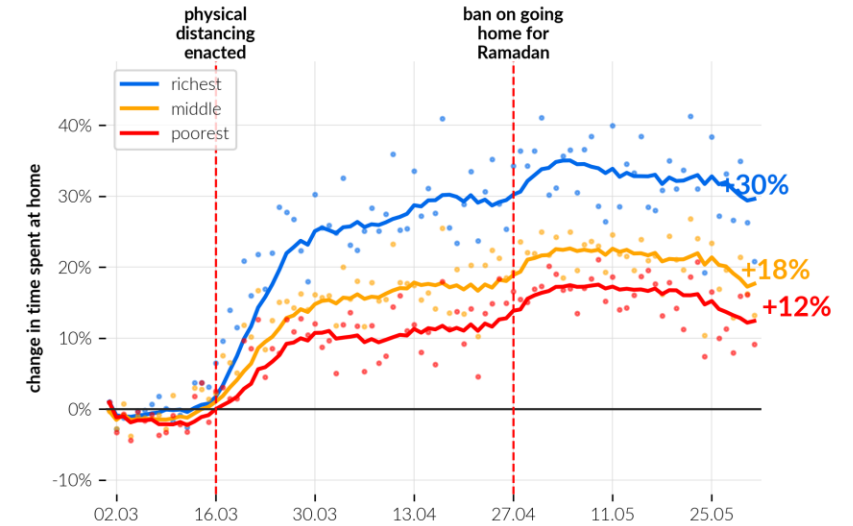
Socio economic differences

Averages can be misleading, especially when they can hide inequalities.

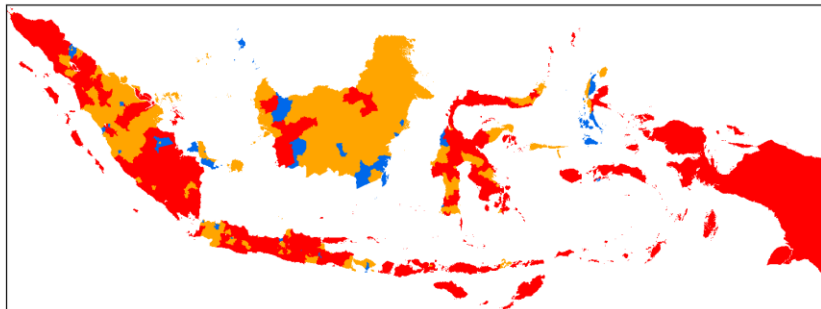
In ID **Indonesia**, for example, the **average increase in time spent at home is 19%**, while the **average reduction on traveled distance per day is 48%**

Disaggregating behavior according to poverty, we observe how these averages hide significant difference between the **poorest**, **middle**, and the **richest** communities.

The average is dominated by the behavior of **middle**-income areas. **Rich** areas can restrict their movements about **twice as much** as their **poorer** counter parts



SUSENAS Poverty data



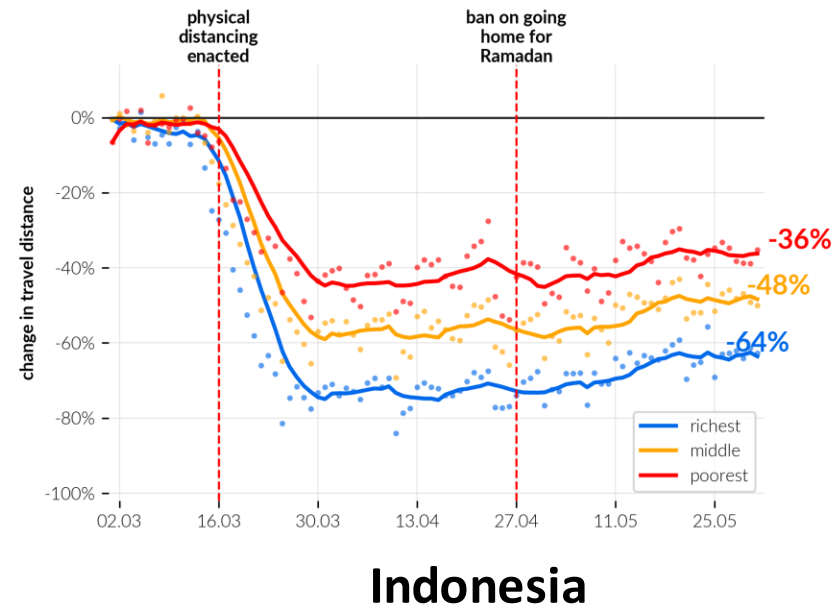
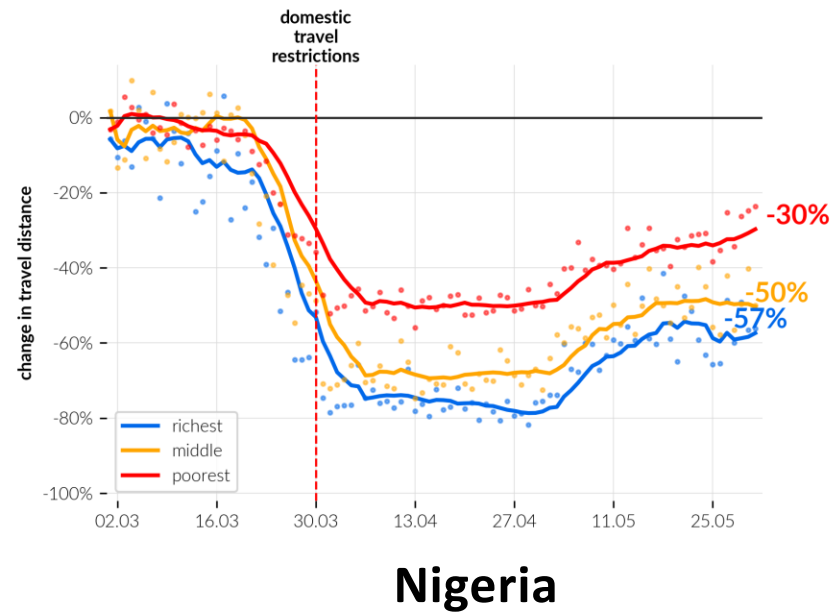
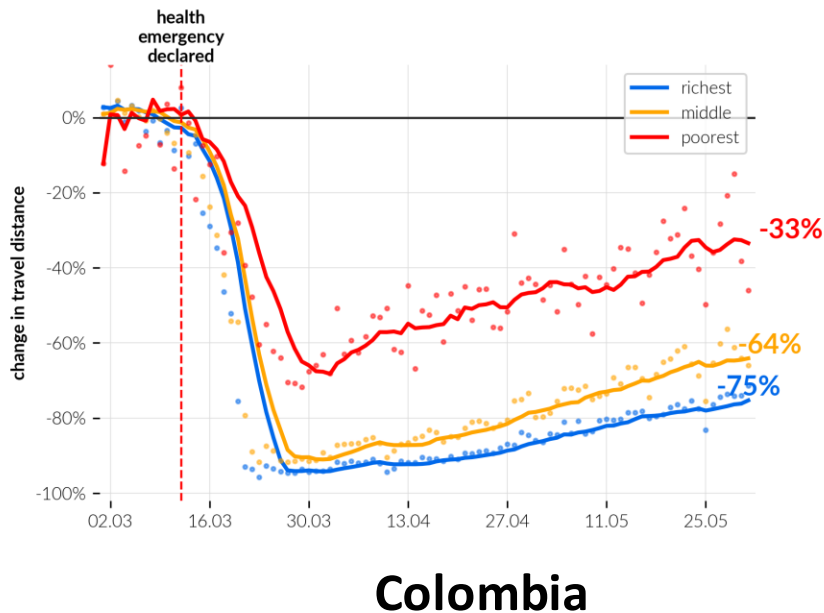
- 0-5% poverty rate
- 5-10% poverty rate
- 10+% poverty rate

Changes in daily travel distance

The limited capacity of **low-income** communities to change their behavior is clearly seen in their relative changes in daily travels.

The reduction of distance travelled per day is about half the size for **low-income communities** when compared to **high-income areas**.

High-income regions have been able to reduce their trips by approximately **-80%** while **low-income** regions **hardly reach a 50% reduction**.

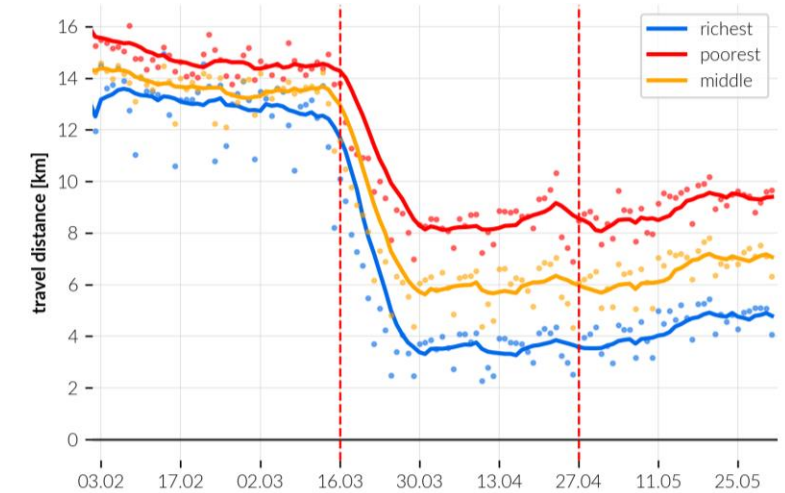
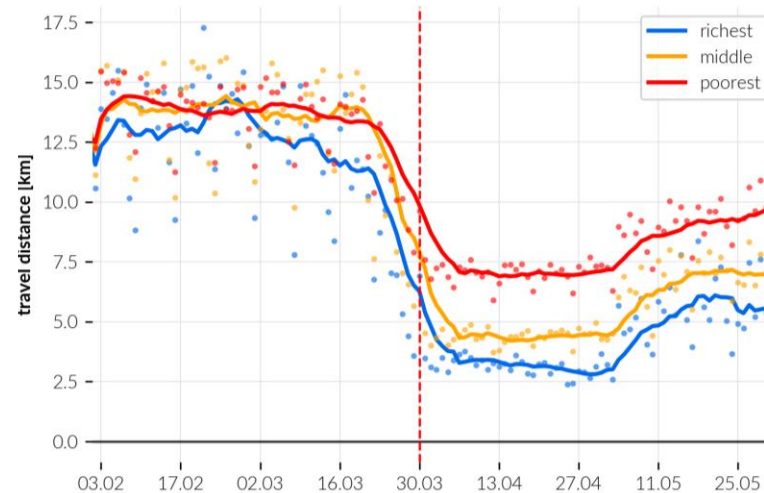
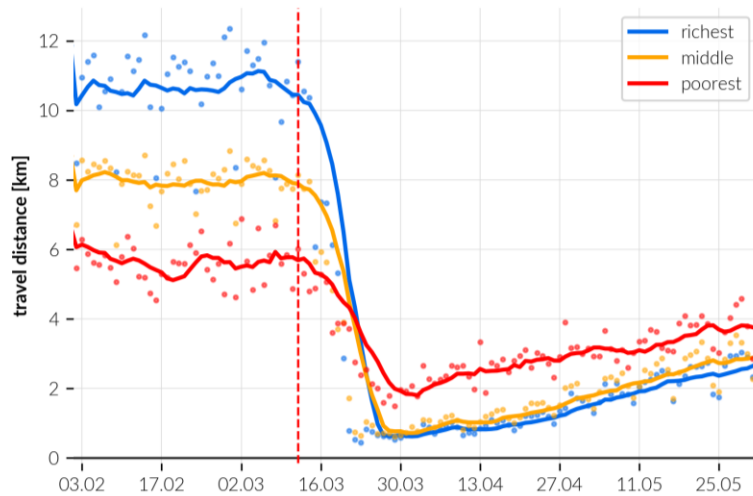


Daily travelled distance

Before mobility bans were put in place different countries showed different patterns. In Colombia, for example, people from **poor areas** used to travel less distance per day than those in **rich areas** (**6 km vs 11 km**). In Nigeria and Indonesia show different behaviors, where **rich individuals** travel approximately as much as **poorer** ones (before the lockdowns), but their capacity to reduce their behavior is greater.

After travel restrictions are put in place, **people in poor areas are consistently travelling more km per day than those in richer ones**. An average of **twice the distance travelled per day**.

This **homogeneous inequality after mobility bans** (independently of the trends before policies) is a **clear sign of the limitations that low income communities have** in reducing their daily travels despite the health risks that this might bear.

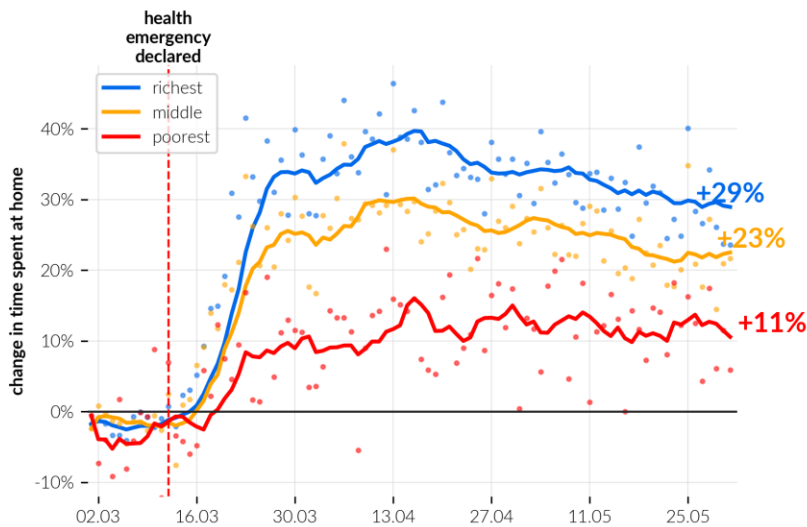


Change in time spent at home

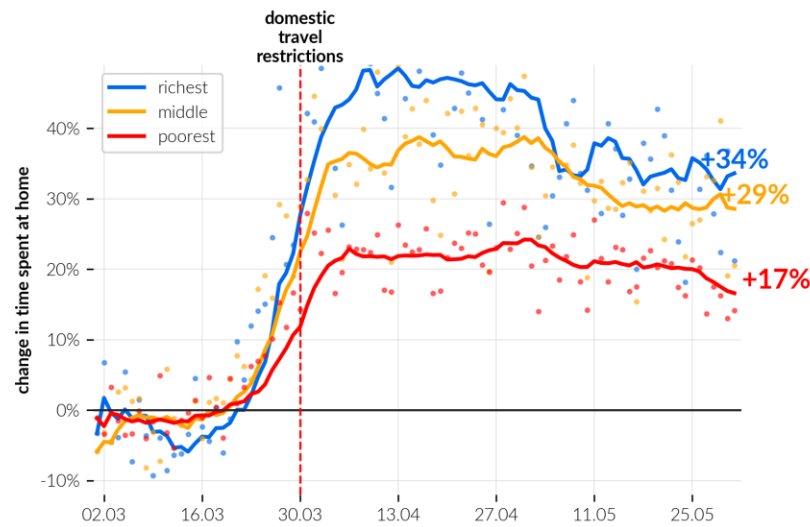
Looking at the change in the amount of time individuals spend at home, we see that socio-economic disparity is even greater.

Poor communities have been able to increase the time they spent at home less than half of what the **richer areas** have been able to.

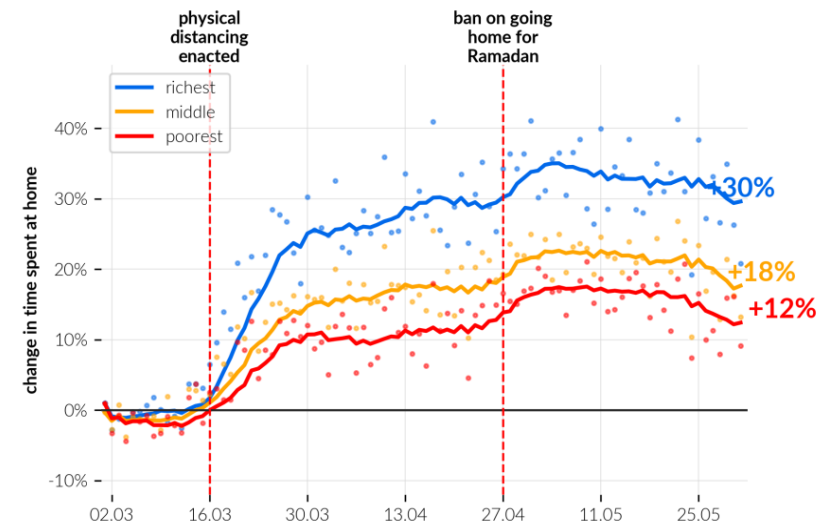
Response time has also been, consistently, slightly slower in poorer areas, which might point to additional inequalities on access to information



Colombia



Nigeria

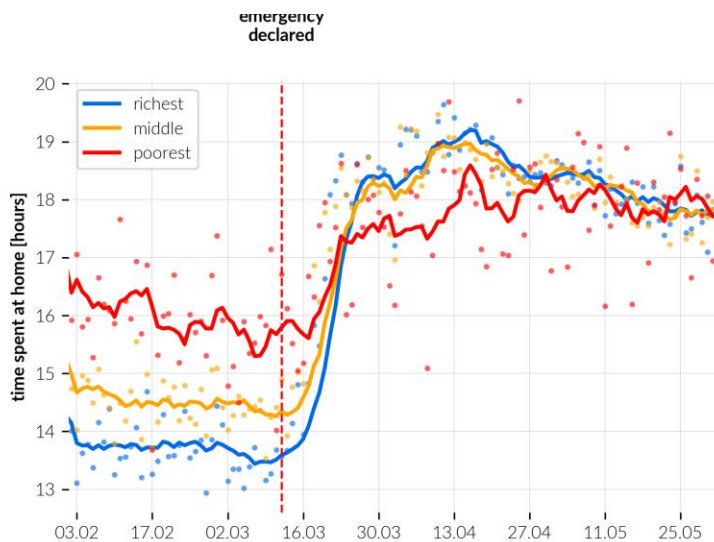


Indonesia

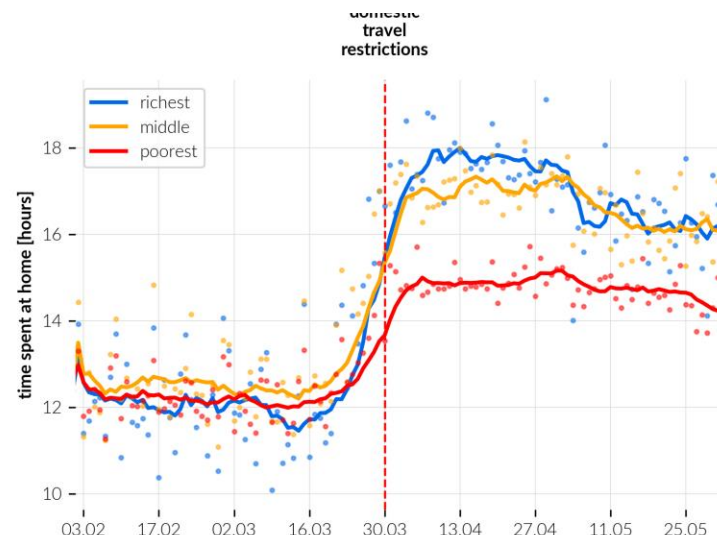
Time spent at home

In Colombia, for example, **poorer communities** used to spend more time at home than **rich ones**, which might explain why the relative change after policies it is smaller. Nevertheless, after policies are put in place this difference disappears and, at some point it even reverse, with poorer communities staying less at home than richer counterparts.

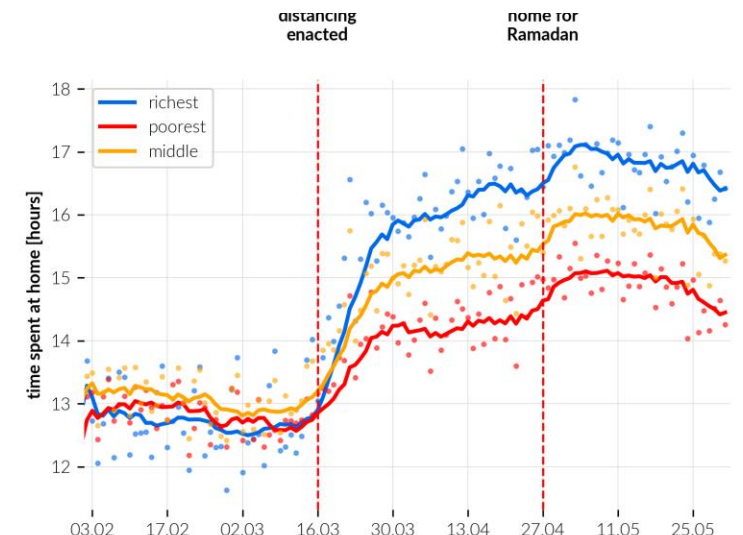
Indonesia and Nigeria show a very similar pattern, somehow in line with Colombia, in that poor communities, though increasing the time spent at home after policies are enacted, have a limited capacity on the amount of time they can remain at home.



Colombia



Nigeria



Indonesia

Urban-rural differences

- Urban and rural environments have different dynamics as well as varying proximity to basic services.
- Despite different dynamics and needs some countries are applying physical distancing policies at national level – without taking urban/rural contexts into account.
- In this section we explore mobility patterns and the effects that physical distancing policies have in urban and rural areas.
- *Please note that there are strong data inequalities between rural and urban areas and for some countries rural data will be vary noisy. Check pages 6 & 7 for data representativeness.*

Urban rural

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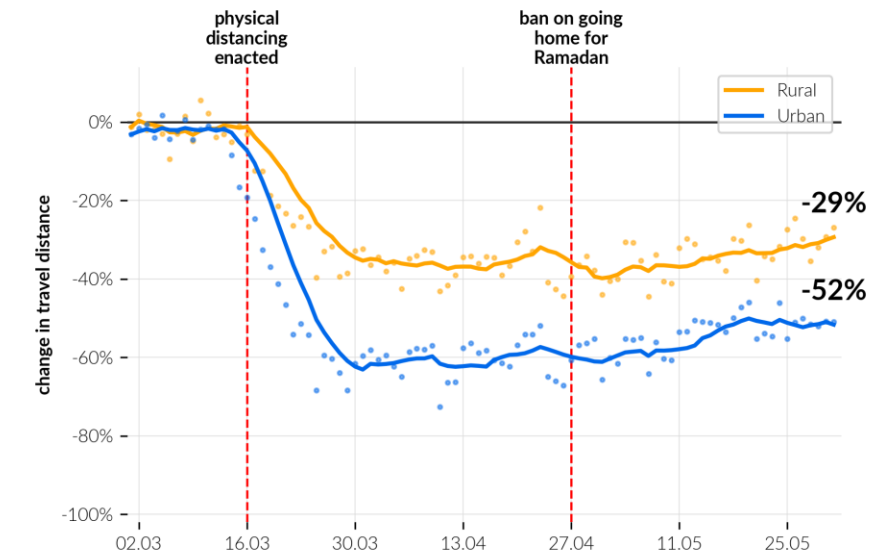
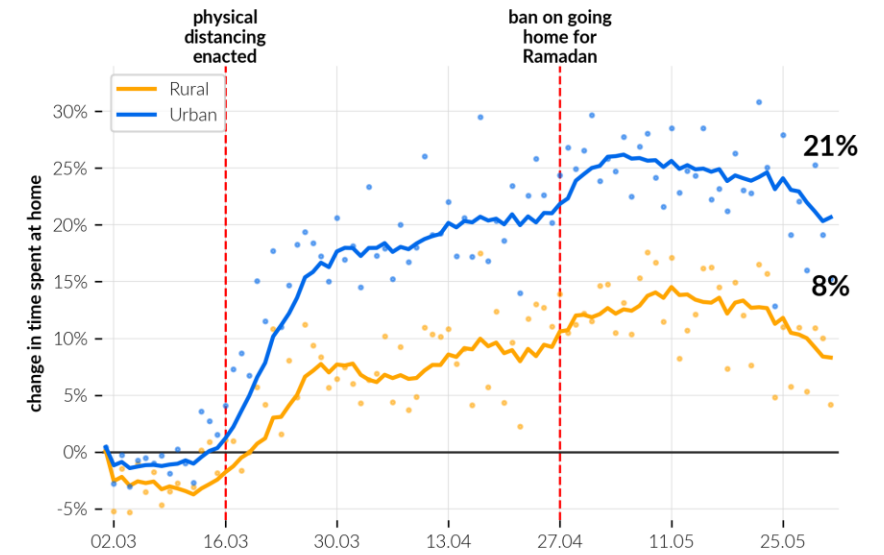
National averages can hide strong differences in behavior. Further, because of unequal access to technologies rural areas can be underrepresented in “Big Data” if not treated carefully.

For instance, in ID **Indonesia** the **average increase in time spent at home is 19%**, and **48% reduction on traveled distance per day**.

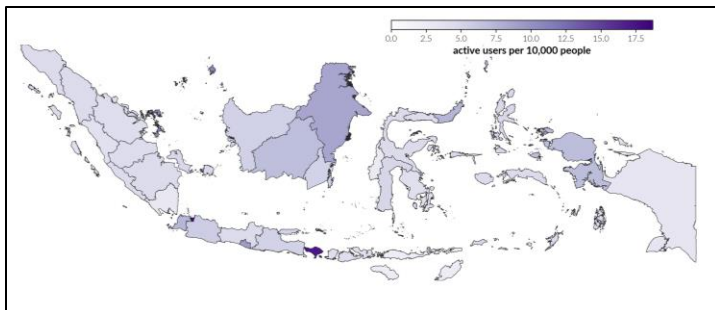
Disaggregating effects of government measures according to **Urban** and **Rural** areas **reveals large differences**. National averages seem to better represent urban patterns.

Rural areas show smaller increases in time spent at home reduction and lower decreases in travel distance.

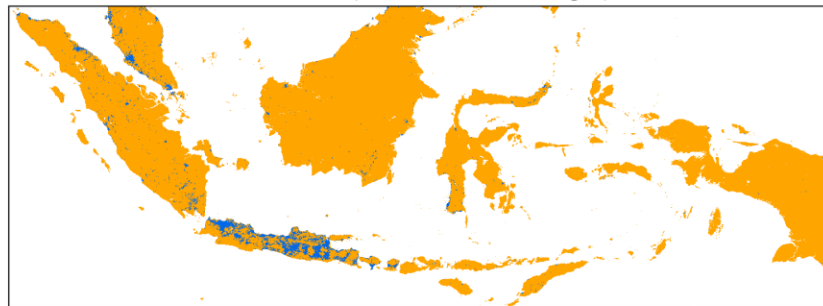
(This is potentially also confounded by rural areas being poorer.)



Data representativeness



Urban/Rural (GHS Settlement Model grid)

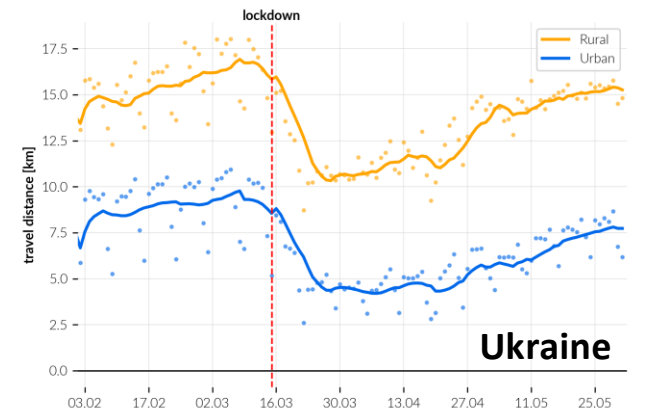
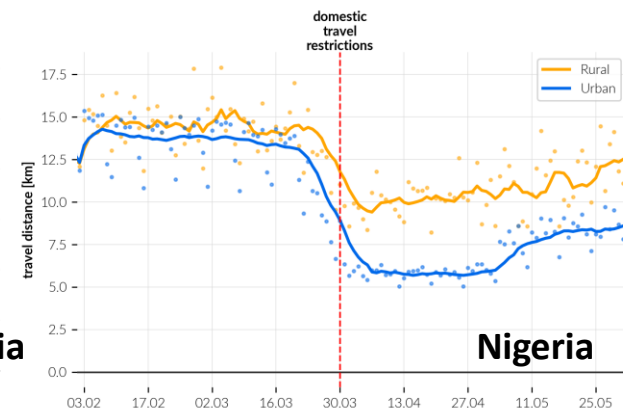
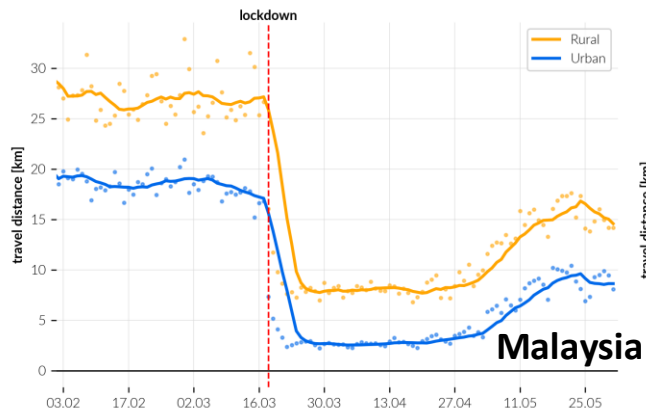
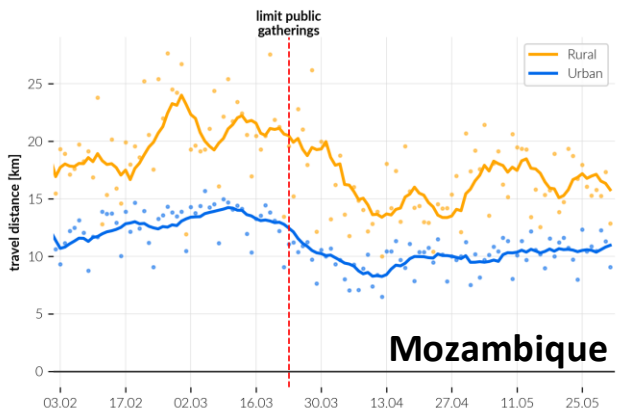
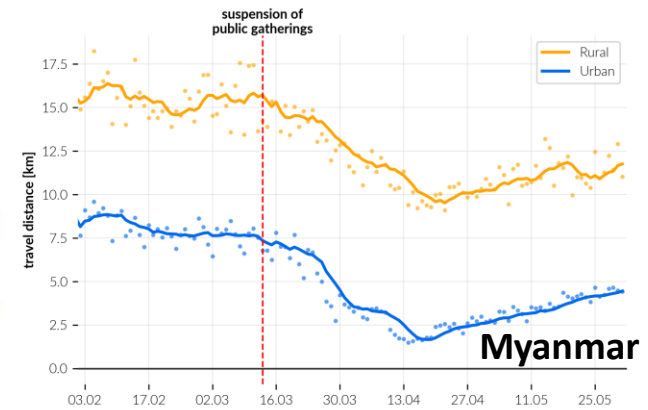
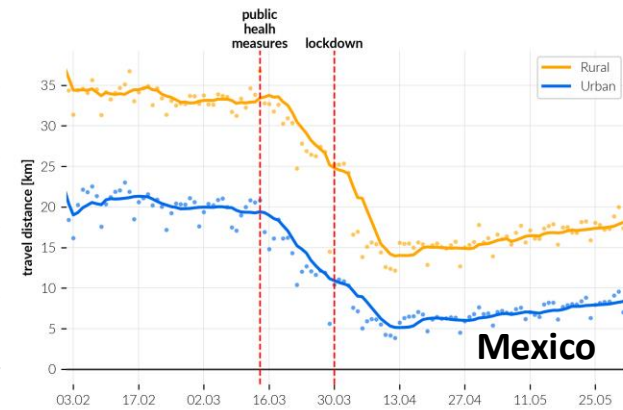
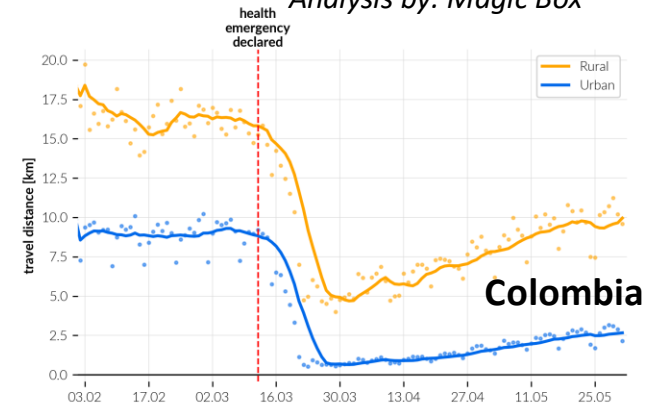
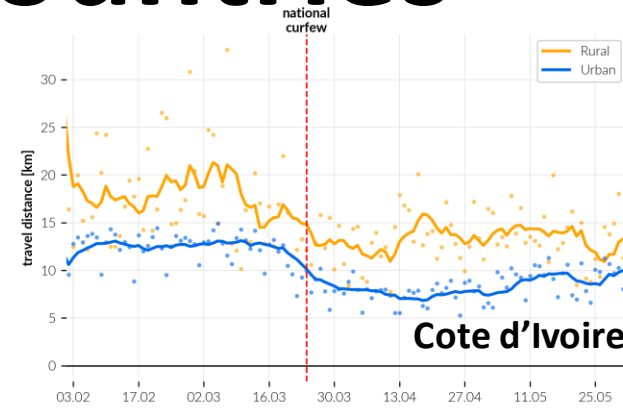
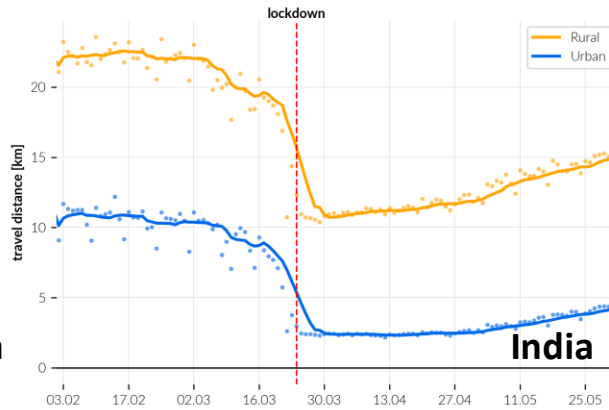
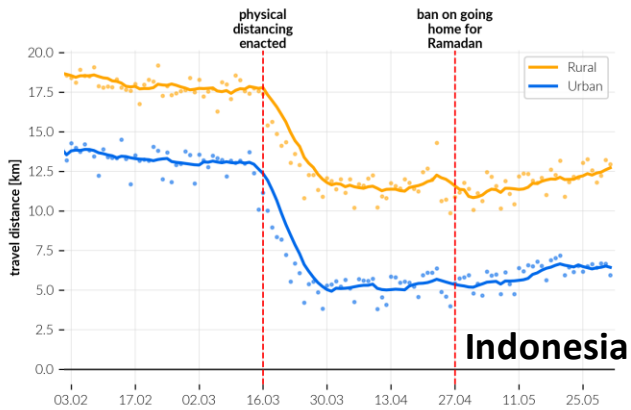


Distance travelled - countries

Consistently across countries, rural areas show a higher (about as twice as much) amount of Km travelled per day than urban areas, both before and after physical distancing policies are enacted.

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Data from: Cuebia
Analysis by: Magic Box



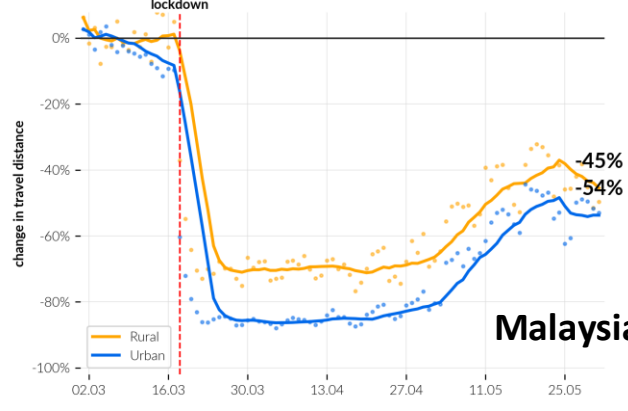
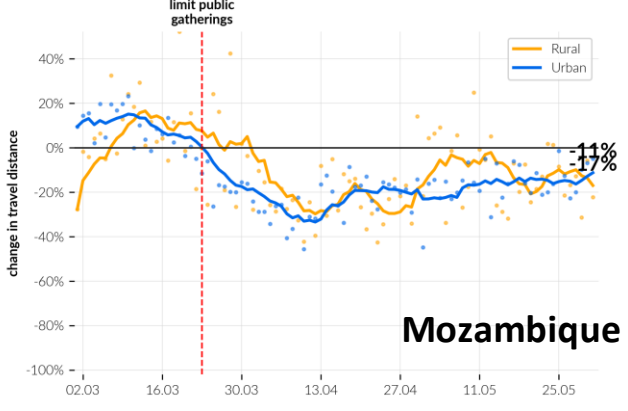
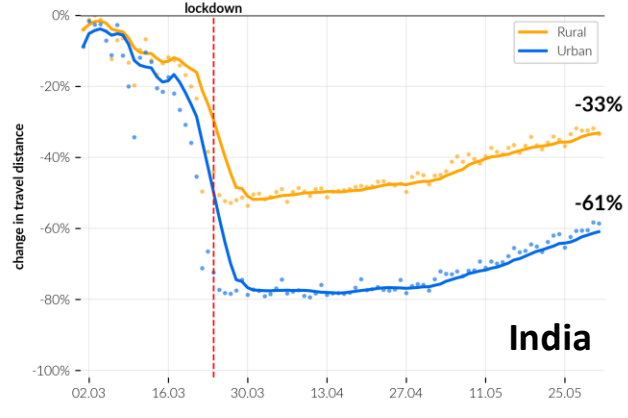
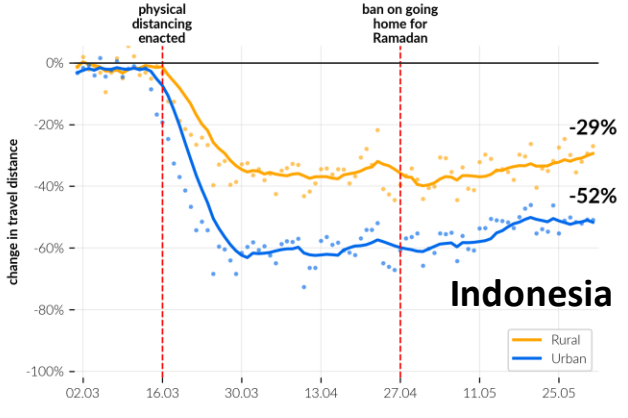
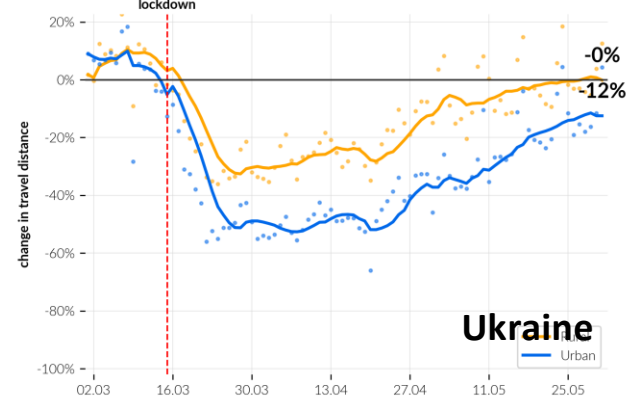
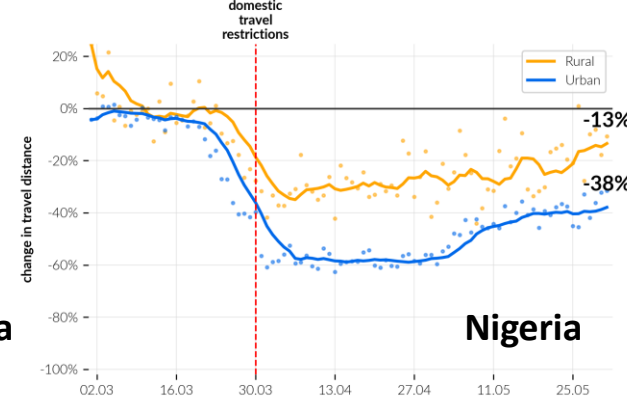
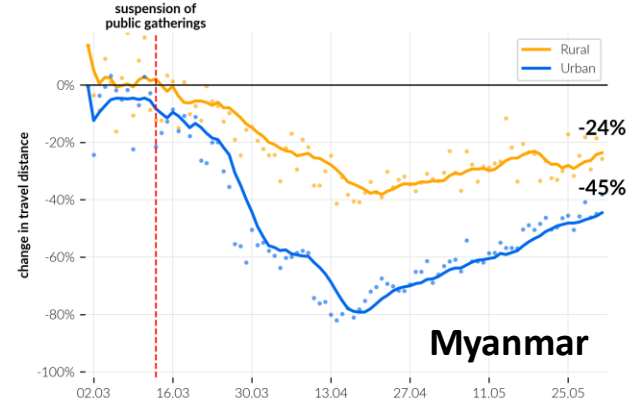
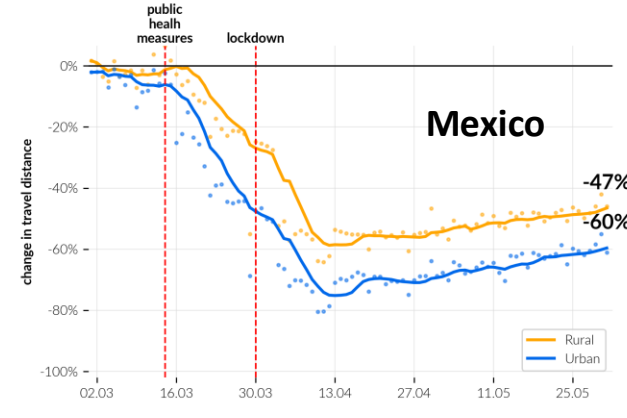
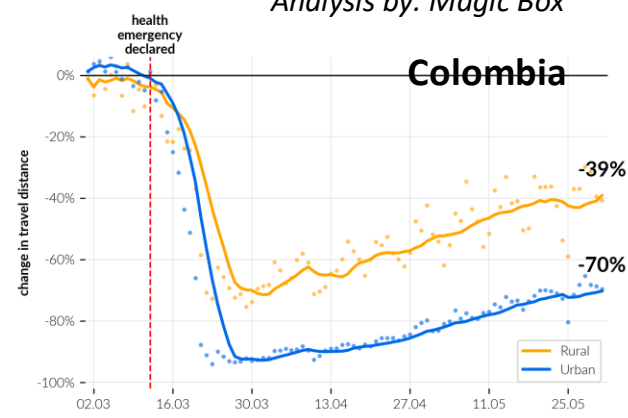
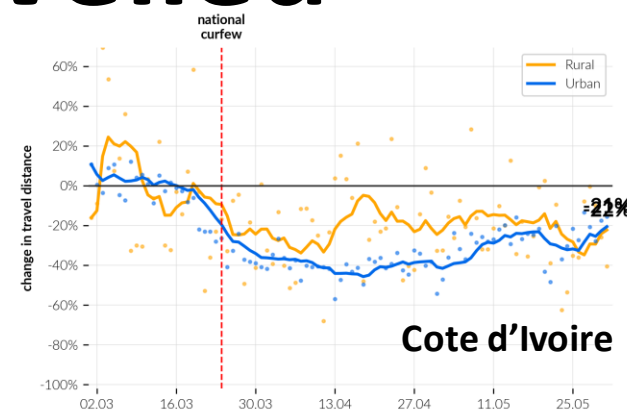
Change in distance travelled

Relatively speaking Rural areas have been able to reduce their daily distance travelled much less than urban areas.

Change has also been slightly slower in rural areas

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Analysis by: Magic Box



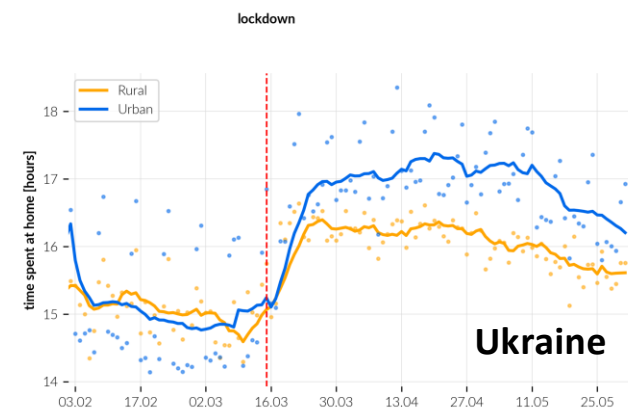
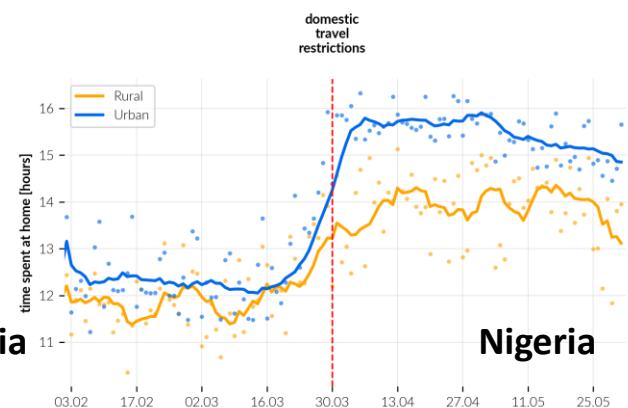
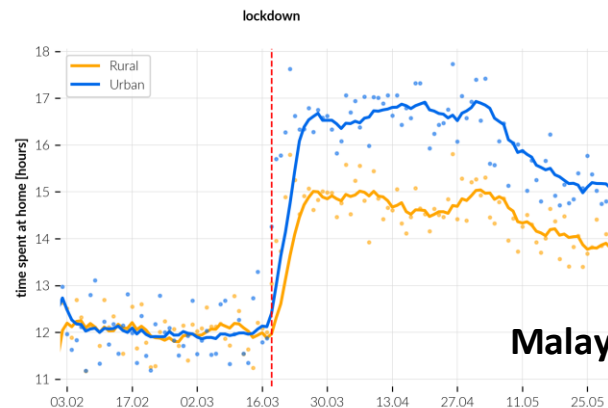
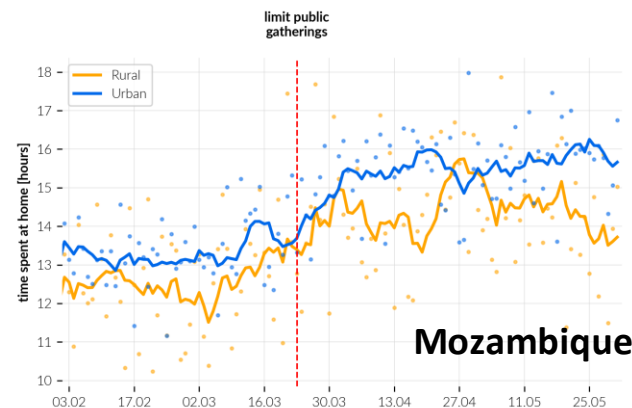
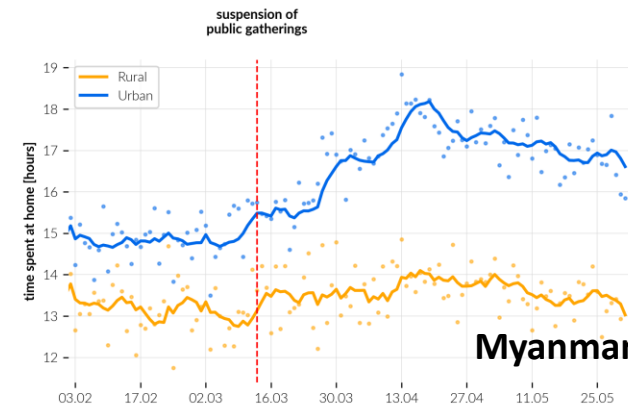
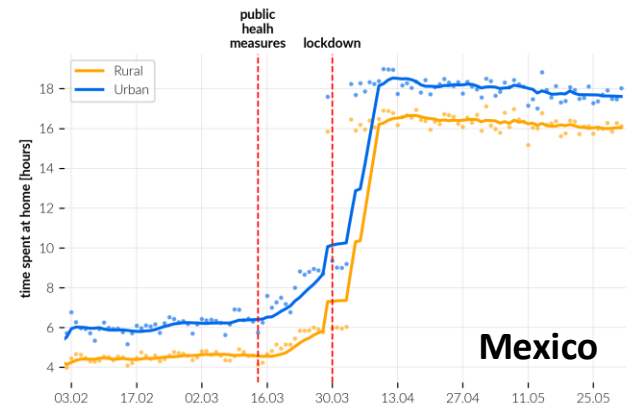
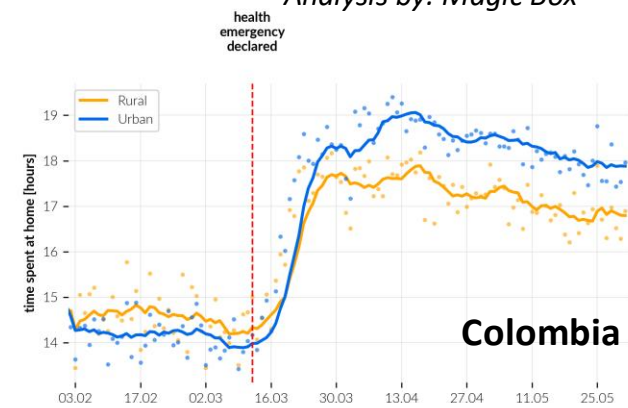
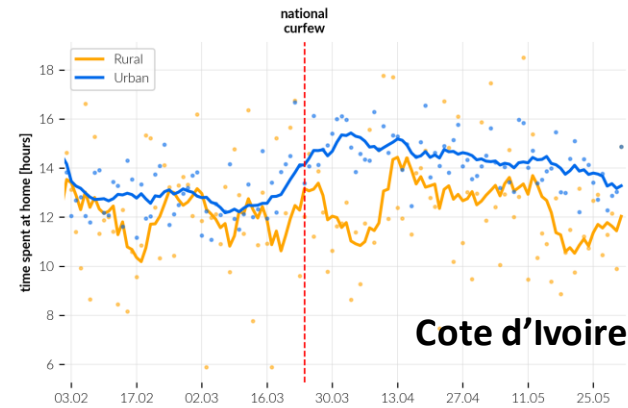
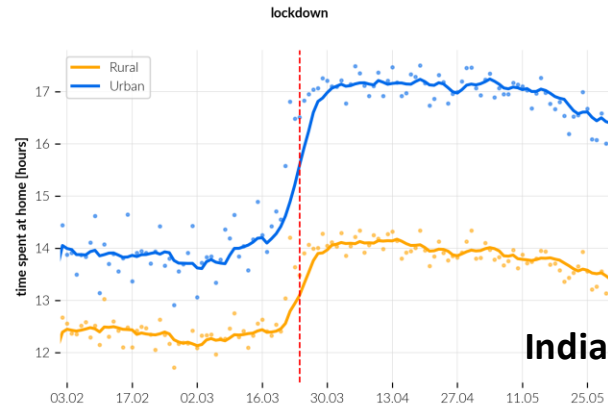
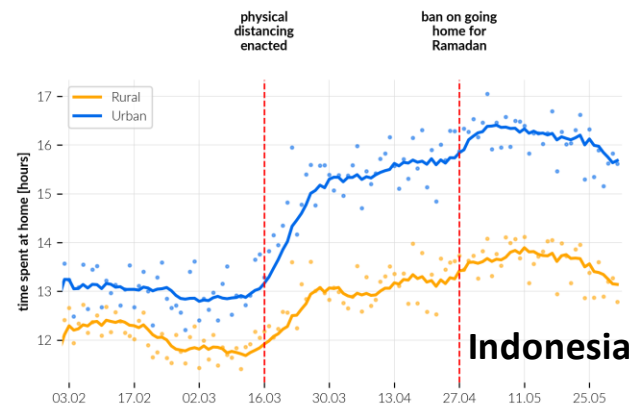
Time spent at home - countries

Jun 5th 2020

Data from: Cuebia
Analysis by: Magic Box

Rural areas tend to spend less time at home than urban areas before the epidemic.

Physical distancing policies have in general exacerbated this difference.



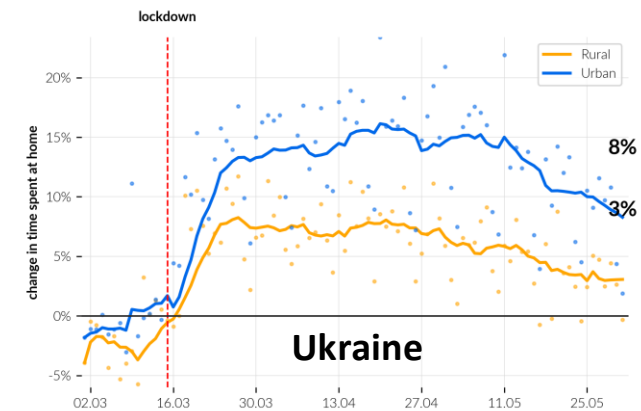
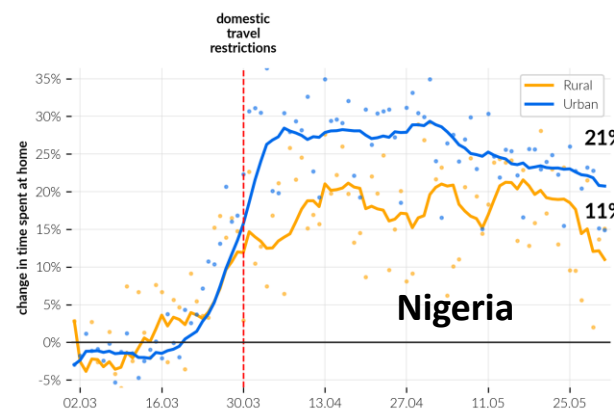
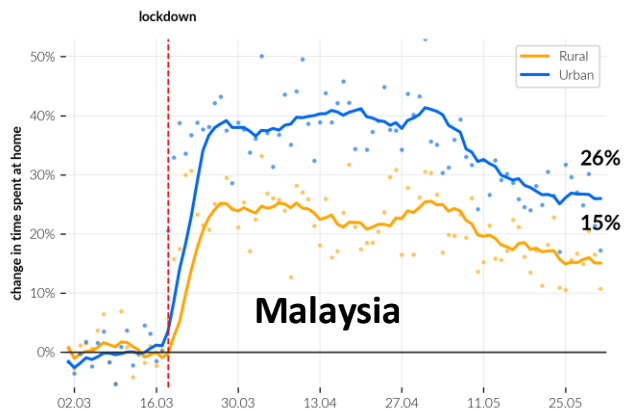
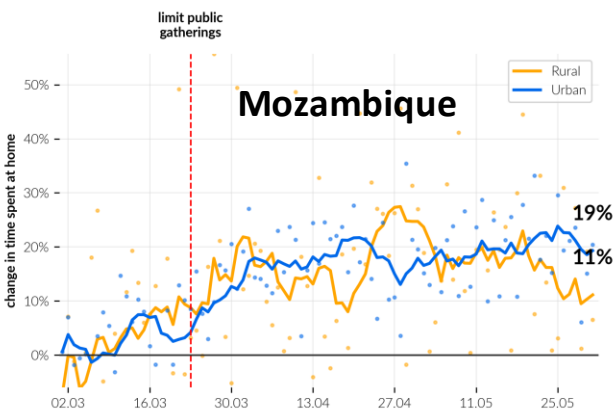
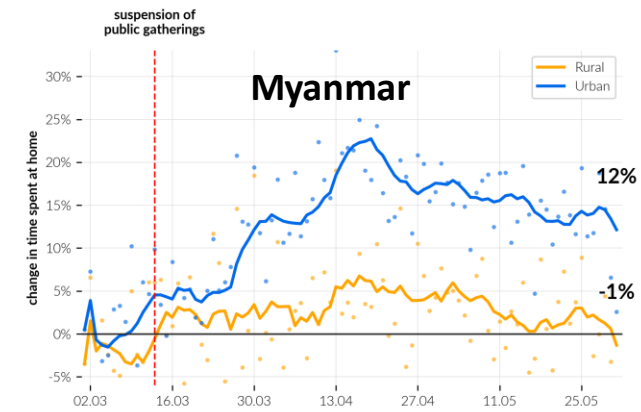
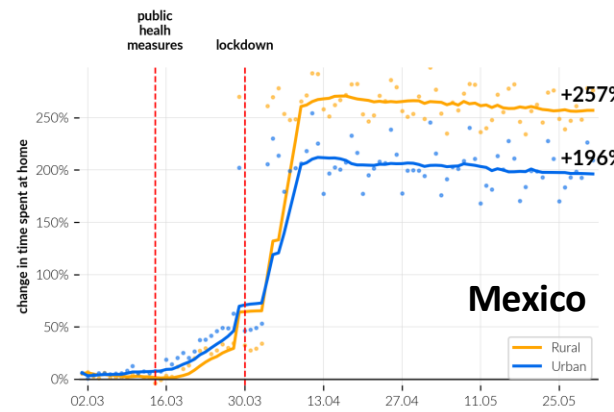
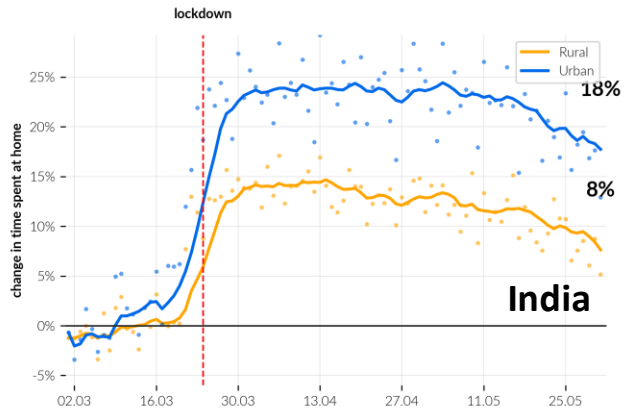
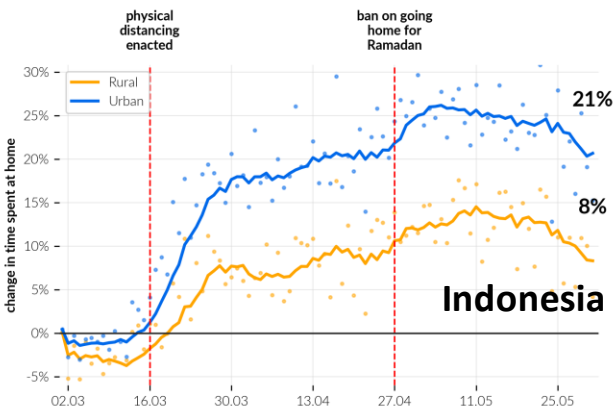
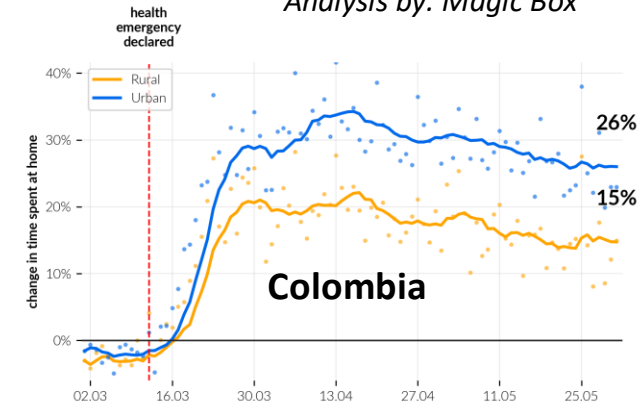
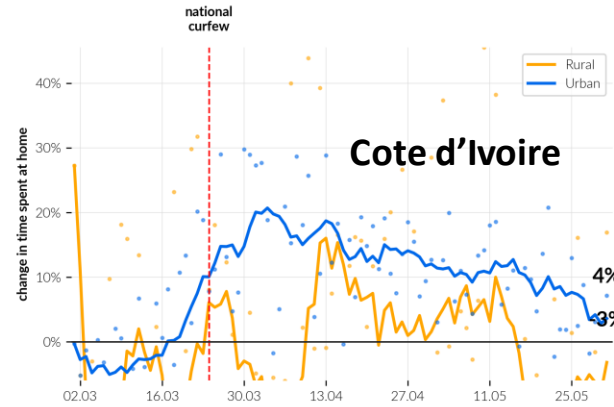
Change in time spent at home

Relatively speaking Rural areas have been able to reduce their daily distance travelled much less than urban areas.

Change has also been slower in rural areas.

Jun 5th 2020

Data from: Cuebia
Analysis by: Magic Box



Summary

- In the absence of a vaccine, reducing the virus transmission rate is a challenging and critical component of COVID response. Information campaigns on safe practices like hand washing or proper mask wearing etiquette are coupled with policies aimed at reducing human contacts, from closing schools to lockdown policies.
- Our analysis shows that governmental policies and measures aimed at combatting COVID impact individuals living differently depending on socioeconomic, urban/rural context, etc.
- More knowledge is needed to understand how mitigation strategies affect vulnerable communities, and to develop and implement necessary mitigation efforts.