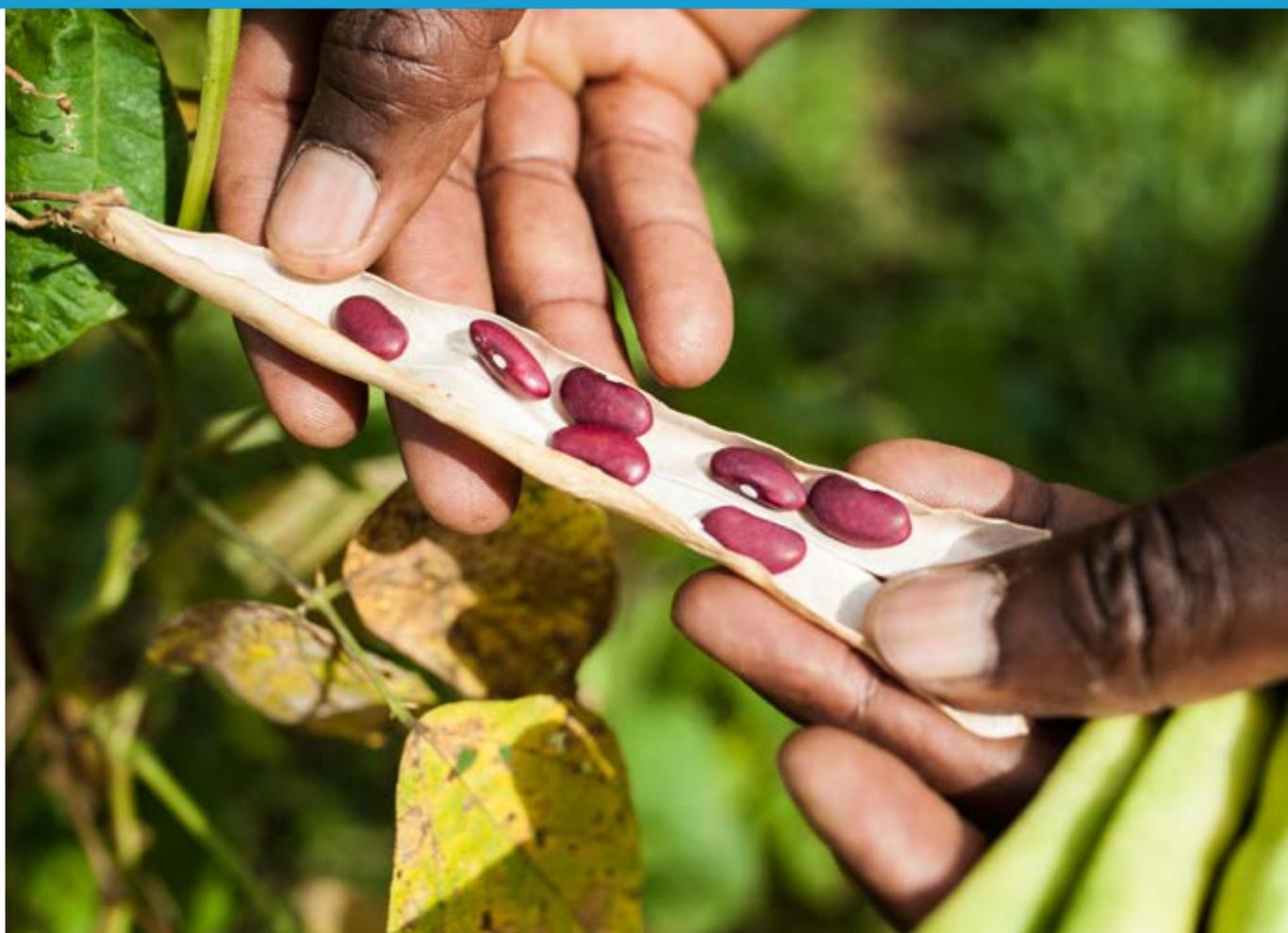


THEMATIC SERIES

# The ripple effect: economic impacts of internal displacement

This thematic series focuses on measuring the effects of internal displacement on the economic potential of IDPs, host communities and societies as a whole



## INTERNAL DISPLACEMENT AND DEVELOPMENT

A statistical analysis

OCTOBER 2018

# INTRODUCTION

Two thirds of the people internally displaced by conflict around the world live in low or lower middle income countries, and less than one per cent in high income countries.<sup>1</sup> Similarly, disaster displacement risk is unevenly distributed, with low income countries bearing the greatest risk in relation to population size.<sup>2</sup>

Understanding how socioeconomic development relates to internal displacement, as a driver or as an impact, can help governments assess displacement risk, improve crises prevention and response plans, track progress in reducing the severity of displacement situations, evaluate the effectiveness of policy decisions and support national accountability.

The link between internal displacement and development has been highlighted consistently by IDMC and others, but never studied systematically. This paper presents the key findings of a statistical analysis highlighting correlations between the number of new internal displacements recorded by IDMC in conflict or disaster settings and approximately 1,500 socioeconomic indicators published by the World Bank.<sup>3</sup>

This analysis was conducted to inform IDMC’s research programme on the economic impacts of internal displacement.<sup>4</sup>

# METHODOLOGY

We used a correlation analysis to assess relationships between each socioeconomic indicator and the number of new displacements caused by conflict or disasters in a given country.<sup>5</sup> The method shows “significant” correlation when the absolute value of the coefficient R is larger than 0.4.<sup>6</sup>

In addition, we performed another test<sup>7</sup> to highlight differences in the values of each socioeconomic indicator between countries with high and low numbers of new displacements.

Taken together, these two methods allowed us to identify and cross-check the existence of relationships between the value of the indicators and the number of new internal displacements.

Although it does not identify which indicators represent drivers or impacts of internal displacement, or relate to other potentially less visible variables, it demonstrates the need to consider not only the economic, but also the social and environmental dimensions of development and highlights areas of interest for future analysis.

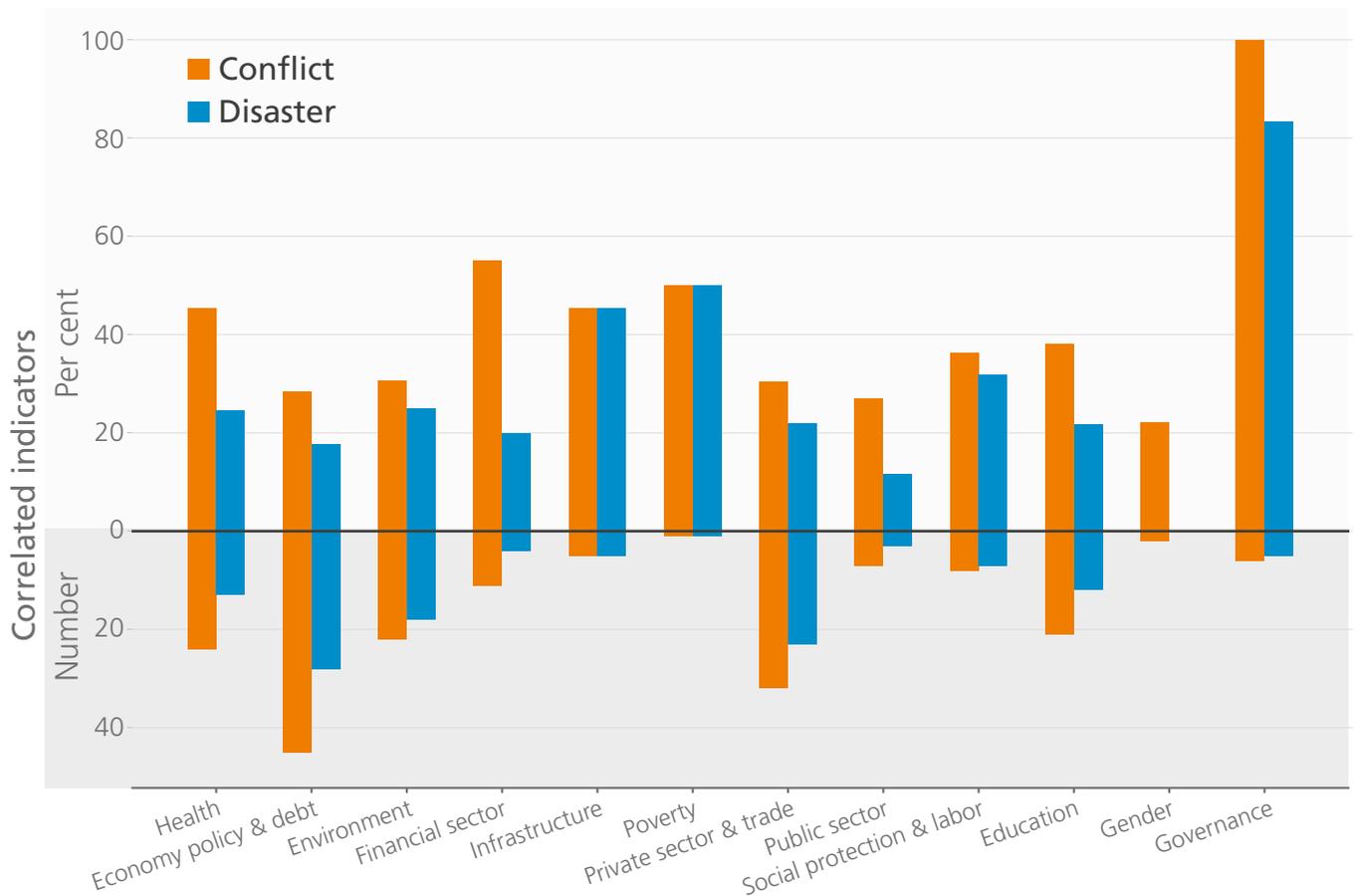


Figure 1: Number and percentage of World Bank indicators that correlate significantly with displacements associated with conflict or disasters, per topic

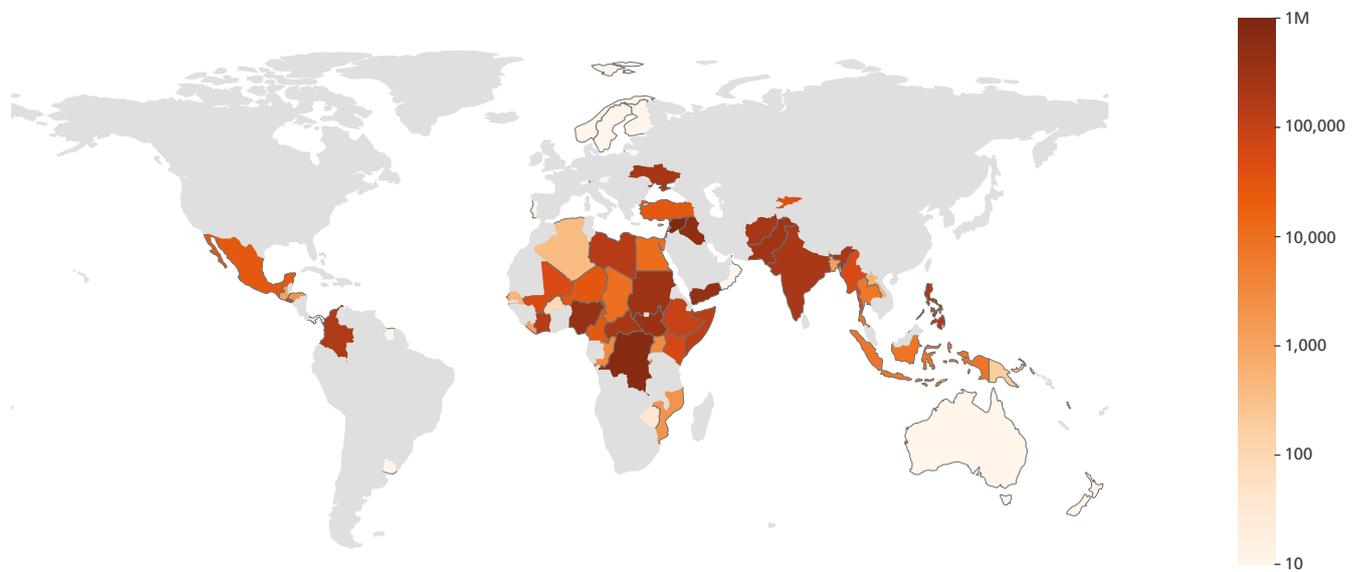


Figure 2: Average annual number of new internal displacements associated with conflict for 2010-2016

## KEY FINDINGS

Overall, we found stronger and more numerous correlations of socioeconomic indicators in conflict settings than in disaster settings. This can be explained by the fact that conflicts are more likely to happen in countries where certain conditions are met, including lower levels of development or poor governance. Hazardous events can cause displacements, including preventive evacuations, in any territory, but crisis management significantly depends on resources and governance. Correlation coefficients for displacements associated with disasters are therefore lower than for those associated with conflict. Another reason for the stronger correlation in conflict settings is the presence of a clear dichotomy between countries with and without displacements associated with conflict. For displacements associated with disasters, our values were more spread-out, ranging from dozens to millions of displacements on average for 2010 to 2016.

Figure 1 represents the number and percentage of indicators for which a significant correlation was found with displacements associated with either conflict or disasters. The topics correspond to the World Bank’s classification of indicators and are exclusive: one indicator can only be assigned to a single topic. The topics in which the highest proportion of correlations are found with displacements associated with conflict are “Governance”, “Financial sector”, “Poverty”, “Health”, “Infrastructure” and “Education”. For displacements associated with disasters, “Governance”, “Poverty”, “Infrastructure”, “Social protection and labour”, “Health” and the “Environment” include the highest proportion of highly correlated indicators.

This seems to indicate that economic measures such as the ones categorised under “Financial sector”, “Poverty” or “Social protection and labour” are relevant indicators to assess the drivers or impacts of internal displacement, but that governance, social and environmental topics are also important to consider.

It should be noted that the World Bank’s database of World Development Indicators largely focuses on economic data. Most of the indicators are categorised under “Economic policy and debt” or “Private sector and trade”. This explains the larger number of indicators showing significant correlation under these topics, illustrated in the bottom part of figure 1.

## DISPLACEMENT ASSOCIATED WITH CONFLICT

IDMC has published estimates of internal displacement caused by conflict in 49 countries from 2010 to 2016. Figure 2 shows their average annual number of new internal displacements associated with conflict for this time period. Twenty-two countries with no such displacements were added to our analysis for comparison.<sup>8</sup>

Figure 3 shows 30 indicators strongly correlated with displacement associated with conflict. Economic indicators classified by the World Bank under “Financial sector”, “Private sector & trade”, “Social protection & labor” or “Economic policy & debt” represent 27 per cent of them. But health alone represents nearly as many with 23 per cent, governance 20 per cent and education 17 per cent. Environment and infrastructure measures are also present.

The top-ranking economic indicators measure access to banking, entrepreneurship, consumption and trade. These are all signs of dynamic economies that are likely to both influence and be affected by internal displacement. Figure 4 illustrates a clear correlation between the average annual number of new internal displacements associated with conflict in 2010-2016 and the percentage of the population owning a bank account, one of the highest ranking economic indicators in our analysis. The higher the percentage of bank account owners in a country’s population, the lower its number of displacements associated with conflict. The histogram at the top also shows a clear difference between the group of countries with high numbers of

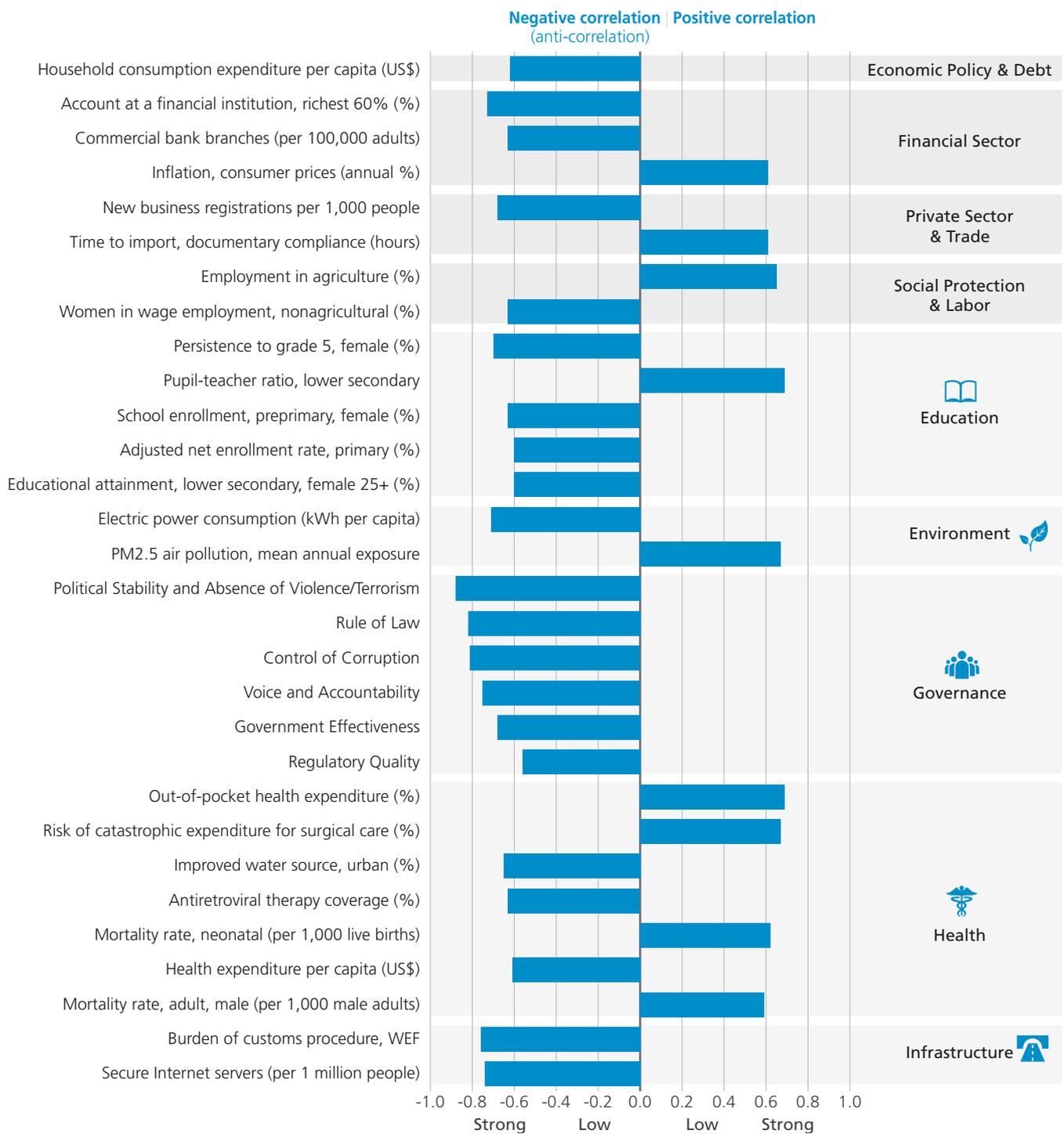


Figure 3: Indicators strongly correlated with displacement associated with conflict

displacements, where the percentage of bank account owners is lower, and the group of countries with low numbers of displacements, where most of the population owns a bank account.

Social development is equally relevant. Displacements associated with conflict occur more in countries where public health expenditure is low, access to medicine is limited and mortality is high. Quality education is also associated with lower numbers of displacements. This is illustrated in figure 5 showing a clear correlation between the number of pupils per teacher in lower secondary schools and the average annual number of internal displacements associated with conflict for 2010-2016. The higher the number of pupils per teacher, a proxy for lower quality of education, the higher the number of displacements. The histogram at the top highlights a clear distinction between

groups of countries with low levels of displacement associated with conflict, where the number of pupils per teacher is lower, and the group of countries with high levels of displacement, where teachers have more pupils.

The number of new displacements caused by conflict is very strongly correlated with governance indicators assessing political participation, accountability, political stability, violence, government effectiveness, rule of law and corruption. Unsurprisingly, the strongest correlation was found with indicators of political stability, violence and terrorism ( $R = -0.88$ ). But other indicators of governance were also highly related, including the level of corruption, the extent of the rule of law, the quality of political participation and the government's degree of accountability.

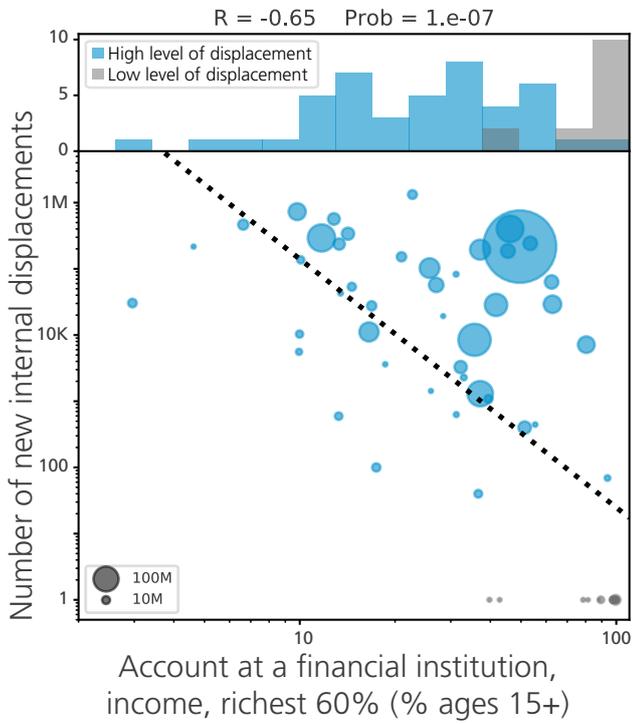


Figure 4: Correlation between displacement associated with conflict and bank account ownership. At the top, we report the value of the correlation coefficient  $R$  and the probability that countries with high and low levels of displacement have similar values for the indicator.

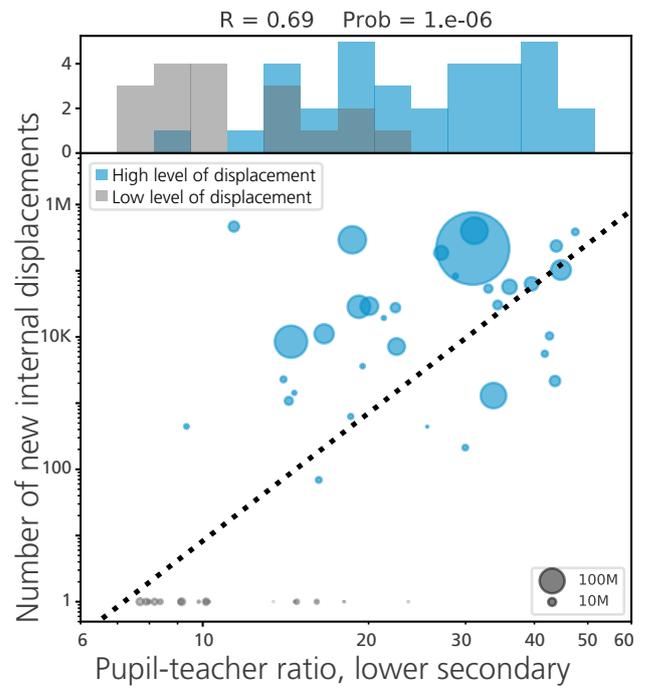


Figure 5: Correlation between displacement associated with conflict and education quality. At the top, we report the value of the correlation coefficient  $R$  and the probability that countries with high and low levels of displacement have similar values for the indicator.

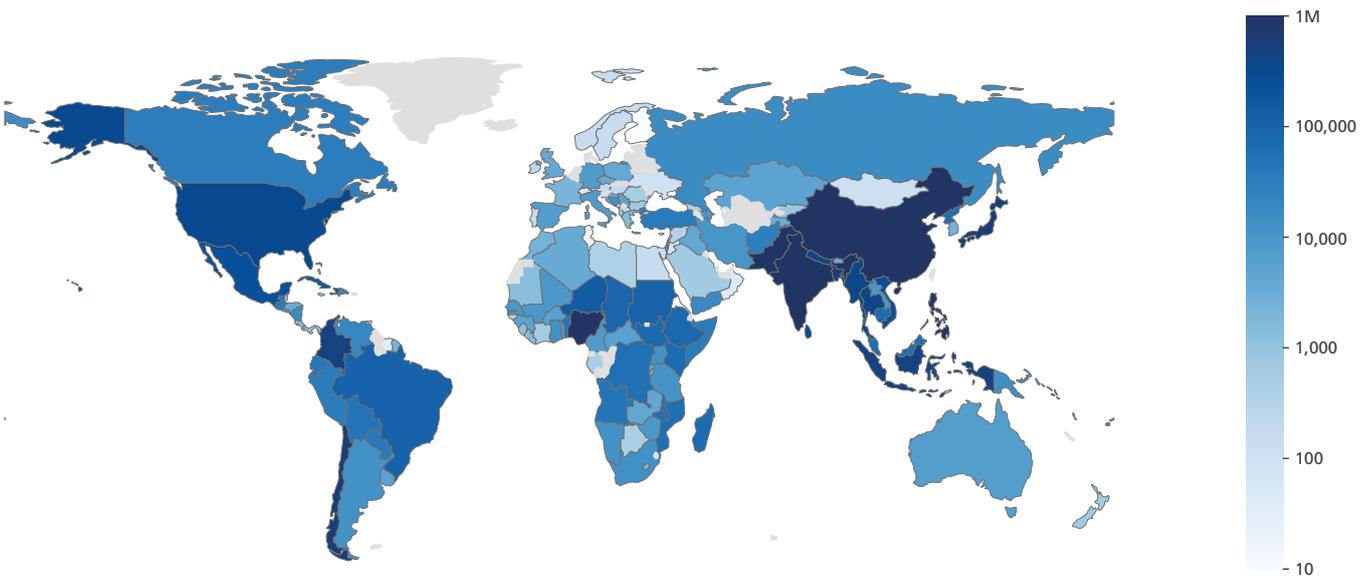


Figure 6: Average annual number of new internal displacements associated with disasters for 2010-2016

## DISPLACEMENT ASSOCIATED WITH DISASTERS

Displacement caused by disasters is much more widespread around the globe than displacement associated with conflict. Between 2010 and 2016, IDMC reported numbers of displacements associated with disasters in 164 countries (see figure 6). IDMC's figures include preventive evacuations that can be a sign of effective disaster-risk management strategy and are recorded in countries with high or low levels of socioeconomic development alike. Although natural hazards can strike anywhere, different factors will influence the extent to which

they force people out of their homes, and how long for. Exposure and vulnerability have been known to determine the scale of a disaster.<sup>9</sup>

Figure 7 (p.6) presents 30 socioeconomic indicators strongly correlated with displacement associated with disasters. Economic measures including public sector revenue, private sector & trade, social protection & labor, poverty, economic policy & debt and financial sector indicators represent nearly half of them. Environmental indicators include electric power consumption, agriculture value added, access to clean fuels

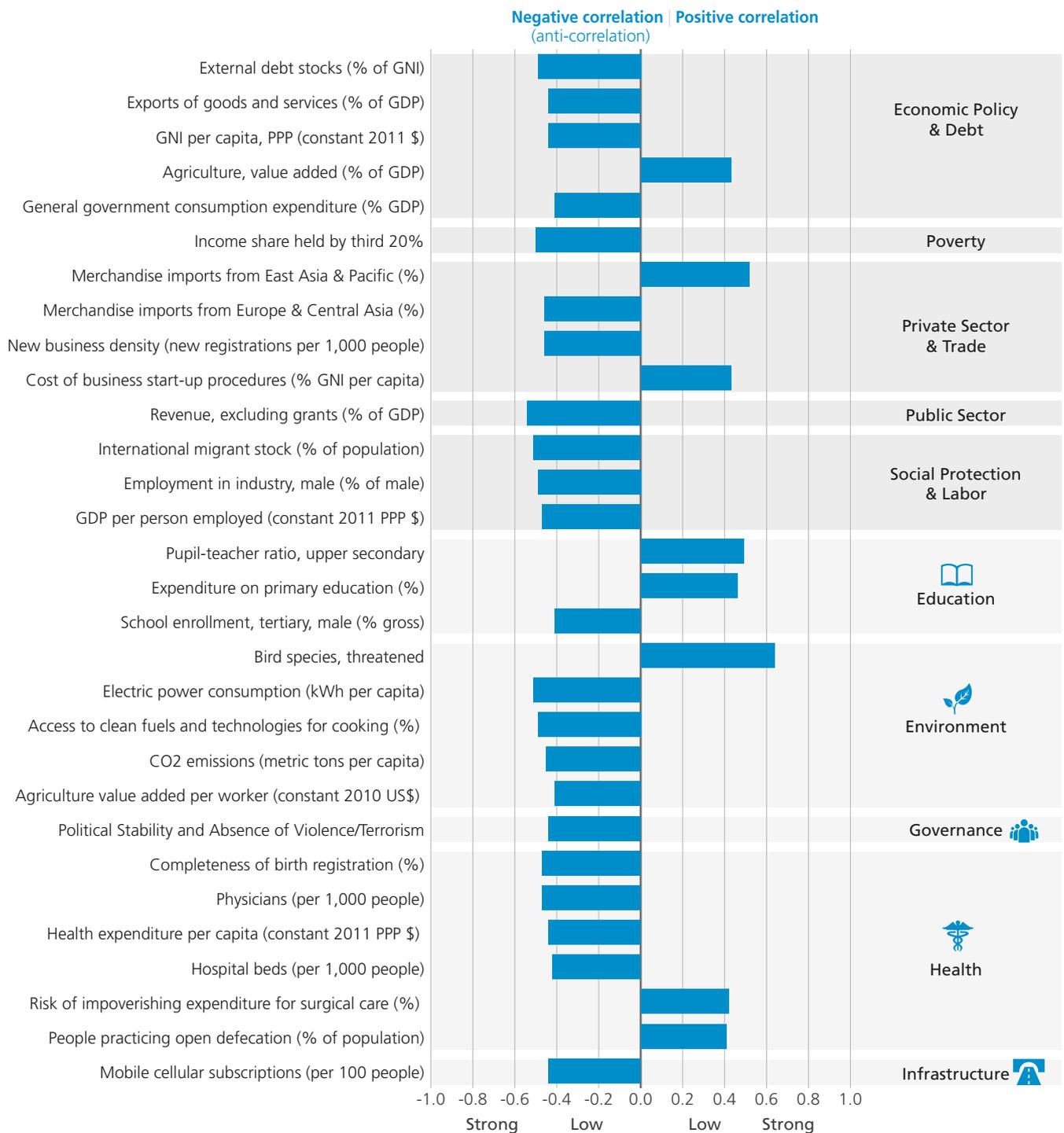


Figure 7: Indicators strongly correlated with displacement associated with disasters

and technologies, CO2 emissions and number of threatened animal species. Health appears to be the second most relevant sector with 20 per cent of the correlated indicators, followed by environment and education.

The measures of economic development most highly correlated with displacement associated with disasters concern public revenue and expenses, imports, international migration, debt, income, employment and entrepreneurship. They all indicate how dynamic and open economies are, which can point to a country's economic ability to cope with natural hazards and limit related internal displacement. They are, in turn, likely affected by the cost of high levels of displacement.

Figure 8 (p.7) shows an example of correlation between the average annual number of new internal displacements caused by disasters and the proportion of public revenue excluding grants in the GDP. The two groups of countries with high or low levels of displacement are clearly distinct. Countries with a higher proportion of revenue in GDP recorded less displacements, while countries with a lower proportion of revenue in GDP recorded more.

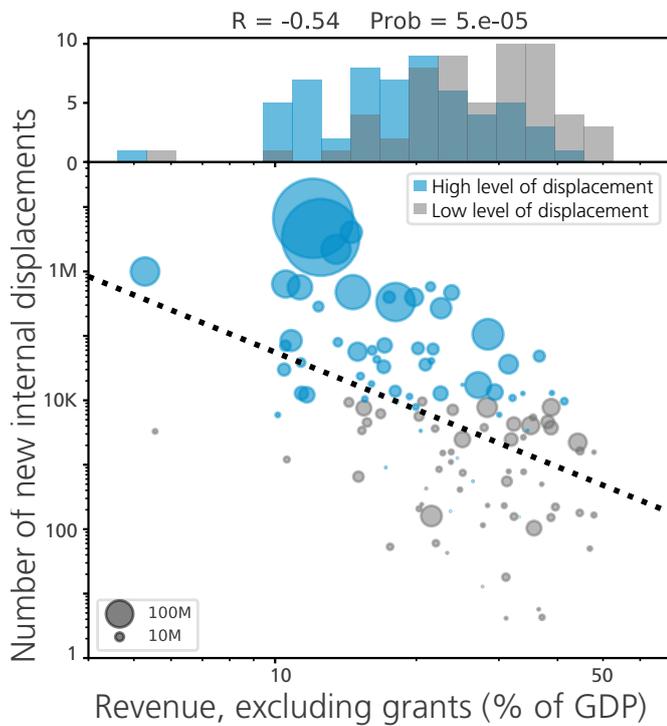


Figure 8: Correlation between displacement associated with disasters and public revenue. At the top, we report the value of the correlation coefficient  $R$  and the probability that countries with high and low levels of displacement have similar values for the indicator.

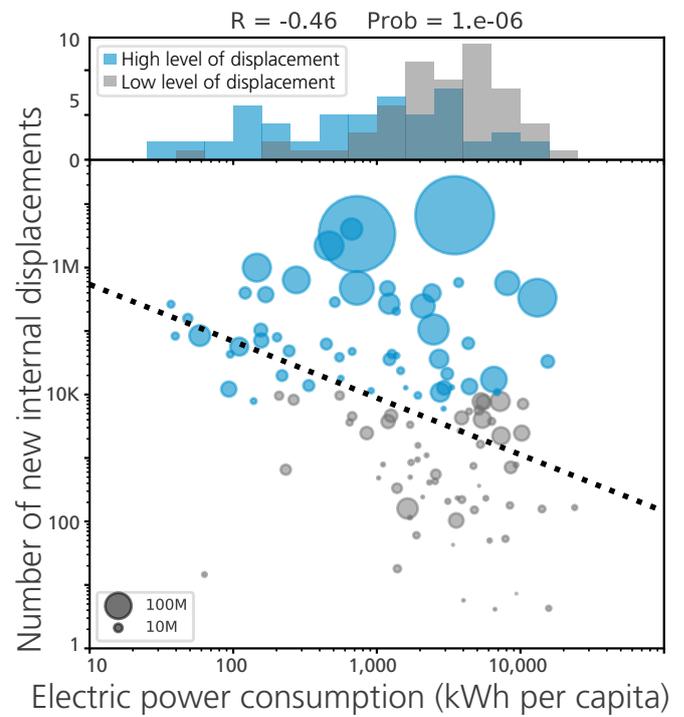


Figure 9: Correlation between displacement associated with disasters and electricity consumption. At the top, we report the value of the correlation coefficient  $R$  and the probability that countries with high and low levels of displacement have similar values for the indicator.

Environmental indicators related to displacement associated with disasters measure threats to animal life, agricultural productivity, access to clean fuels and CO2 emissions per capita. The extent to which sustainable environmental practices influence displacement associated with disasters, are influenced by it or are linked with external factors such as economic development, must be investigated further.

The health indicators at the top of the list mostly relate to the quality and capacity of the national health system. They include the number of physicians and hospital beds, health expenditure per capita and completeness of birth registration. The same can be said of education-related indicators that include government expenditure and the number of pupils per teacher. They may be signs of a government's capacity to respond to its population's needs, be they in health, education or disaster risk reduction.

Figure 9 illustrates how displacement associated with disasters is lower in countries where electricity consumption is higher. Low electricity consumption could be the result of the disruption caused by high numbers of displacements, or an indicator of a driver of displacement such as poverty or insufficient infrastructure.

## A PLEA FOR MULTIDIMENSIONAL ANALYSES

Additional research is needed to understand the significance of these correlations. One of the main caveats of this analysis is the limited availability of data. The level of completeness of the World Development Indicators database, across all countries, years and indicators, was approximately 50 per cent before 2015, but only 20 per cent in 2016. This was partially addressed by using average values for all indicators for the period 2010-2016. Indicators for which data was available only in a few countries were discarded from the analysis. Better data, across countries and indicators but also over time, is needed to obtain more precise and solid conclusions on the linkages between displacement and development.

Moreover, detecting correlations between two variables does not tell us much about the causal relationship between them. Future research, including further statistical analyses but also more in-depth qualitative studies, are needed to identify which aspects represent drivers or impacts of internal displacement.

The general picture that emerges is that only a multidimensional analysis can provide a comprehensive view of impacts as well as root causes of internal displacement. This analysis pointed to some of the dimensions that should be considered: the economy, health, education, the environment and governance at the top of the list.

## NOTES

1. IDMC, Global Report on Internal Displacement 2017, 2017, <https://goo.gl/pdSFzX>
2. IDMC, Global Report on Internal Displacement 2018, 2018, <https://goo.gl/CSqRBV>
3. World Bank, World Development Indicators, <https://goo.gl/R3X1XC>; World Bank, Worldwide Governance Indicators, <https://goo.gl/2wMj7A>
4. IDMC, The ripple effect: economic impacts of internal displacement, 2018, <https://goo.gl/oigCDx>
5. Spearman's correlation coefficient R. See methodological annex for more details.
6. The absolute value of the coefficient R is between 0 and 1. The closer it is to 1, the stronger the correlation.
7. The two-sample Kolmogorov Smirnov test. See methodological annex for more details.
8. In order to better highlight the correlation between indicators and internal displacement, we added 22 countries with no internal displacement associated with conflict to the 49 countries with displacements associated with conflict recorded by IDMC between 2010 and 2016. We used the number of refugees as proxy to select Antigua and Barbuda, Australia, Austria, Belgium, Brunei Darussalam, Switzerland, Cyprus, Finland, Kiribati, Lithuania, Norway, New Zealand, Oman, Panama, Portugal, Suriname, Sweden, Tuvalu, Uruguay, Vanuatu, Samoa, Seychelles.
9. UNISDR Global Assessment Report 2009, 2011, 2013, 2015, <https://goo.gl/7znWwx>; IDMC, Global Disaster Displacement Risk: a baseline for future work, 2017, <https://goo.gl/YJgSvG>
10. The Spearman's coefficient is preferred to the more common Pearson's coefficient because it measures the rank correlation that is less sensitive to outliers and gives same results for variables in linear and logarithmic scale.
11. This threshold is supported by Monte Carlo simulations, in which we compared the average value of indicators for high-displacement countries with the one coming from random choices of countries.

## METHODOLOGICAL ANNEX

In order to study the relationship between socioeconomic indicators and displacement, we used the Spearman's rank correlation coefficient R that assesses monotonic relationships between two variables.<sup>10</sup> Correlation coefficients are between +1 and -1, corresponding to a perfect monotonically increasing and decreasing relationship respectively. On the other hand, coefficient values close to zero indicate a negligible rank correlation between two variables. In our analysis, we assumed that a significant correlation between indicators and displacement is present when the absolute value of R is larger than 0.4. We have verified that below this threshold indicator-displacement correlations are typically very weak.

Because the number of IDPs is larger in densely populated countries, fake correlations between indicators and displacement can arise when indicators are also related to the country population. For this reason, the correlation analysis has been performed both on the total number of new displacements and on the relative number with respect to the country population. Indicators with a real and robust link to displacement are expected to have a strong correlation with both these figures. On the other hand, for indicators that are clearly dependent on the country population or area (for instance "Rural population" or "Agricultural land"), the correlation analysis was performed using relative numbers (such as "Rural population rate" and "Agricultural land rate").

In addition to the correlation analysis, we used an alternative approach to highlight links between indicators and displacement. We first separated countries in two groups, with high and low numbers of new displacements. This is quite straightforward for conflict-related displacement: the 49 countries with reported displacement are supposed to belong to the "high-displacement" group; the 22 countries with zero displacements to the "low-displacement" group. For disaster-related displacement, we choose the following criterium (that divides countries almost in half): a country belongs to the high-displacement group if the number of displacements is > 10,000 or the relative number is > 1‰.

Then, for each indicator, we compared the distribution of values of that indicator in the two groups: we expect that, when indicator and displacement are related, the two distributions are significantly different. To assess the similarity of two distributions we use the two-sample Kolmogorov-Smirnov test (KS test). This test checks whether two independent samples are drawn from the same distribution, providing the probability that the null hypothesis (i.e., the same parent distribution) is true. We used as reference the probability threshold of 0.1‰: below this value<sup>11</sup> we assume the indicator to be related to displacement. This approach has the advantage to be independent of using the absolute or the relative number of displacements. It can be used therefore as a cross check for cases in which correlation is found only with the absolute value but not with the relative one (or vice versa).

Cover photo: An internally displaced person reveals some beans ready for harvest in the Mpati area of the North Kivu province of DRC. Photo: NRC/Christian Jepsen, March 2017

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