The Case for a Global Catastrophic Risks Index

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This proposal briefly outlines several considerations for building a Global Catastrophic Risks Index (GCRI). In particular, it presents some of the advantages of building composite indexes/indicators and discusses the large potential benefits of building an index focused on GCRs. It also provides some examples of the factors that would be captured in the construction of a GCRI and why these are important. Finally, the paper presents possible next steps.

Introduction

As a source of information composite indicators can influence policy making from a variety of perspectives. For instance, composite indicators can be useful for quantifying and outlining numerical goals and benchmarks. International benchmarking as a means of providing incentives for "changing behaviour" has a well-established record. For example, the *Human Development Index* (HDI)[2] rankings emerged as an important alternative measure of human welfare that captures a social dimension not existing in conventional GDP measures and has thus encouraged countries to focus on other aspects of development, beyond the scale of the economy, which is what GDP measures.

The practice of synthesizing large volumes of information into a scoring system which can be translated into an index and an associated set of rankings can provide considerable value added, particularly where efforts have been made to identify the critical factors deemed to affect the variable under consideration (e.g, competitiveness, in the case of the World Economic Forum's *Global Competitiveness Index*, aspects of human welfare in the case of the *Human Development Index*). For instance, the World Bank has published the *Ease of Doing Business Index* since 2004, a very successful set of metrics capturing a number of aspects of the quality of the business environment in 190 countries, such as the time, procedures and cost of setting up a new business, the time and cost of enforcing a contract and the quality of judicial processes. The annual publication of such granular data on a set of 10 indicators has led to a large number of reforms in countries across the world, as the authorities are able to assess the quality of their business environments in relation to that of other countries and the data itself provides insights on best international business practices.

Transparency International (TI) has been associated with the *Corruption Perceptions Index* (CPI) since 1993. That corruption existed everywhere was a well-known fact. What TI showed was that some countries had been more successful than others in curtailing it and that it was possible to build a simple index that would attach a corruption score to each country. The work of TI, including the formulation of anticorruption initiatives in such areas as public procurement, conflict of interest, and freedom of information laws, as well as the formation of an extended network of

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[2] http://www.undp.org

national chapters in more than a hundred countries, helped greatly to focus public attention on the issue of corruption. Many governments disliked the CPI and severely criticized it, a sure sign of its effectiveness. We believe TI contributed to legitimizing public discourse on issues of corruption and thus eased the transition by the World Bank and, to a lesser extent, the IMF into doing the same.

The International Monetary Fund has published the *Trade Restrictiveness Index*, which nicely captures tariff and non-tariff barriers to trade. As noted by the IMF at the time of its release: "the index was constructed to provide a baseline of each country's overall trade policy stance" and "to provide policy handles for discussions with national authorities."[3] Examples from the environmental side include the *Environmental Performance Index*[4] prepared by Yale and Columbia Universities in collaboration with the World Economic Forum that ranks 180 countries on 24 performance indicators across ten issue categories covering environmental health and ecosystem vitality, and the *Environmental Vulnerability Index*[5], which generated policy-relevant country profiles across 50 measures of resilience and vulnerability including exposure to natural and man-made risks such as climate change and conflicts.

Composite indicators can also contribute to developing a common discourse and values when framing a problem in the light of public debate. Indices and the associated rankings are useful benchmarking tools to focus public attention on a particular set of policy issues. When supported by detailed data, they can provide valuable information about underlying strengths and weaknesses, which can then become a catalyst for enhanced policy debate and efforts to improve particular areas of deficiency. The success of many of these indices is linked to the ability of the sponsoring organization (e.g., World Bank, World Economic Forum, UNDP) to update the data and indicators on a regular basis, typically annually. This, in turn, allows stakeholders to track progress over time with respect to the factors captured in the index and to provide a sustainable basis for policy dialogue and reform. Finally, they can also help highlight priority areas for policy reform and existing areas of achievement.

The GCRI

It would be a worthwhile endeavor to develop metrics that would allow the assessment of the magnitude of risks faced by countries across the world, and their relative vulnerability and resilience to different types of risks. Countries' risk profiles will be a function of internal factors, reflecting national characteristics (e.g., the strength of various domestic institutions, prevalence of corruption, levels of education in the population, the quality of health systems, the soundness of macroeconomic management, the extent to which the law discriminates against women, income inequality, the geographic location and topography, the state of natural resources, the quality of infrastructure and urbanization) and a set of global factors (e.g., climate change, biodiversity loss, natural disasters, environmental degradation, water scarcity, uncontrolled migration, vulnerabilities in the global financial system, vulnerability to pandemics, nuclear and conventional weapons proliferation and vulnerability to weapons of mass destruction) which affect all countries

[3] "Review of the IMF's Trade Restrictiveness Index, Background Paper to the Review of Fund Work on Trade," 14 February, 2005, International Monetary Fund, Washington, DC (www.imf.org).
[4] https://epi.envirocenter.yale.edu/
[5] http://www.vulnerabilityindex.net/

but in different ways. Developing an index that ranked a large number of countries in terms of their risk profiles could be a powerful tool to generate a debate across multiple stakeholder groups, raise global awareness of GCRs and provide incentives for policy reform.

Factors, policies, and institutions affecting GCRs

In this section we present a handful of factors which would be incorporated into the design of the GCRI and the reasoning as to why they would belong in such an index. The list below is not intended to be comprehensive; its aim is to provide the reader with an overview of some key factors, some internal and some of an exogenous nature. The GCRI, once fully constructed, would include multiple variables, capturing a range of areas. Vulnerability to catastrophic risks needs to be addressed at two levels as mentioned above: those risks that can be addressed largely within a country by measures within its own control or management, where an index can promote internal policies and actions, and those external to any country's control that must be countered collectively at the planetary level with some form of global governance. In the latter cases, national actions will usually be limited to measures reducing vulnerability and increasing resilience. We have selected here macroeconomic stability, corruption, education and human capital, and gender equity as risks subject to internal management, and nuclear proliferation, climate change and pandemics as external risks for which countries can plan some defensive measures, but which can only be prevented or mitigated globally. It should be emphasised that, in the highly integrated world of today, any significant shock to the system will not be limited to the initial cause, but will propagate through the system creating a complex emergency with many negative consequences. One crisis will probably trigger others, so these examples are not mutually exclusive, and a global risk index must include a systemic perspective.

Internal risk factors

Macroeconomic stability

Having a stable macroeconomic environment has come to be accepted as an essential ingredient for the successful implementation of broad-based reforms aimed at encouraging economic development. There are no known instances of countries that have managed to grow in a sustainable way, while pursuing imprudent fiscal and monetary policies which have fuelled inflation and exchange rate instability and have contributed to the emergence of various macroeconomic imbalances. Prudent fiscal and monetary policies that contribute to low inflation rates and a more stable domestic environment have been shown to contribute strongly to business confidence and the willingness of domestic and foreign investors to undertake investment projects.

The 2008-09 global financial crisis has highlighted the crucial importance of adequate supervision of the financial system and sound public finances. The problem with high public indebtedness is that it creates a terrible dilemma for governments. Scarce public resources which could be allocated to education, public health or to improve countries' infrastructure—all areas that help to improve competitiveness—have to be increasingly dedicated to debt service. The primary aims of economic policy are subverted. Instead of worrying about reforms aimed at boosting productivity, governments increasingly have to worry about keeping the markets happy, making sure that debt rollovers take place smoothly and so on—i.e., day-to-day cash management. In contrast, countries that have managed to sustain prudent levels of debt have typically been able to allocate adequate

resources to productivity-enhancing areas of public expenditure. They have also been more successful in persuading the business community and citizens to pay their taxes on time.

In any case, macroeconomic instability has often led not just to increased poverty and the adverse repercussions on the poor due to uncontrolled inflation (because the poor are generally less able to protect themselves from the impact of higher prices), but also to political instability, sudden changes of government and civil unrest, thereby substantially worsening a country's risk profile and, as in the case of corruption, undermining the ability of governments to deal with other risk factors, whether internal or external.

The question of a country's integration with the global economy has also acquired growing importance over the past decade, particularly in the context of discussion about the interactions between the process of globalization and economic development. In an increasingly interdependent world economy, a more outward-looking orientation has become an essential element of successful economic reforms. An open orientation can also attract much needed capital and expertise, thus enhancing the prospects for growth through increased efficiency and productivity. Greater integration with the world economy also serves as an important channel for absorbing technological advances from abroad, including improvements in management practice and positive effects on the buildup of human capital that derive from being able to tap into global systems of knowledge, as is evident from the experience of many outward-oriented economies that have developed strong export sectors based on new manufacturing industries. However, there may be negative sides to greater integration, including increased vulnerability to global economic shocks, damage to employment and the internal economy when subject to dumping of excess produce from subsidized economic activities elsewhere, inability of local sustainable food production to compete with unsustainably mass-produced foodstuffs from elsewhere, and the power of multinational enterprises to stifle local competition, among others.

Corruption

Corruption undermines the investment climate, discourages private sector development and innovation, and encourages various forms of inefficiency; the more widespread, the more damaging its effects. The high incidence of corruption will imply an additional financial burden on businesses, imposing heavy costs on them, thereby undermining their international competitiveness. Unlike a tax, which is known and predictable and can be built into the cost structure of the enterprise in an orderly fashion, bribes are necessarily unpredictable and random, and will undermine cost control, reduce profits and undermine the efficiency of those who must pay them to stay in business. There is ample empirical evidence that corruption lowers investment and, hence, economic growth.

Corruption is particularly devastating for small and medium-sized enterprises—often the engines of economic growth and job creation in the developing world—which may not have the clout of big companies to protect themselves from a proliferation of requests for bribes. Corruption also contributes to a misallocation of human resources. To sustain a system of corruption, officials and those who pay them will have to invest time and effort in the development of certain skills, nurture certain relationships, and build up a range of supporting institutions and opaque systems, such as off-the-books transactions, secret bank accounts, and the like. Surveys have shown that the greater the incidence of corruption in a country, the greater the share of time that management has to allocate to dealing with ensuring compliance with regulations, avoiding penalties, and dealing with

the bribery system that underpins them, activities that draw attention and resources away from production, strategic planning, and so on.

Corruption undermines government revenue and, therefore, limits the ability of the government to invest in productivity-enhancing areas, such as education, infrastructure and health. Not surprisingly, where corruption is endemic, individuals and citizens will view paying taxes as a questionable business proposition, often a way to indulge the government in some of its worst excesses. When government officials allow corruption to flourish they contribute to the creation of an environment in which those who pay taxes are either morally outraged at having to do so or, more likely, feel entirely justified in finding creative ways to avoid paying them or, worse, become bribers themselves. In some cases, lobbying and influence-peddling become relatively attractive alternatives to paying all taxes due, a natural response to the signal sent to the private sector by government bureaucrats or legislators that "we are for sale."

To the extent that corruption undermines revenue, it adversely affects government efforts to reduce poverty. According to the World Bank, today a full 48 percent of the world's population lives on less than $5.50 per day. Monies that leak out of the budget because of corruption are monies that will not be available to lighten the burden of the poor; bribery thus interferes with the fulfilment of basic human needs.

We have also learned that the higher the level of corruption in a country, the larger the share of its economic activity that will go underground, and, hence, will be beyond the reach of the tax authorities. Because corruption is a betrayal of trust it diminishes the legitimacy of the state and moral stature of the bureaucracy in the eyes of the population. While efforts will be made to shroud such corrupt transactions in secrecy, often, particularly when the opportunities for bribery are linked to some government-inspired initiative, the relevant details will be leaked and will tarnish the reputation of the government, damaging its credibility and limiting its ability to become a constructive agent of change across all policy areas. Corrupt governments will have a tougher time to continue to be credible enforcers of contracts and protectors of property rights, for example.

Bribery and corruption lead to other forms of crime. Because corruption breeds corruption, it tends soon enough to lead to the creation of mafias and organized criminal groups who use their financial power to infiltrate legal businesses, to intimidate, to create protection rackets and a climate of fear and uncertainty. In states with weak institutions, the police may be overwhelmed, reducing the probability that criminals will be caught. This, in turn, encourages more people to become corrupt, further impairing the efficiency of law enforcement—a vicious cycle that will affect the investment climate in noxious ways, further undermining economic growth. In many countries, as corruption gives rise to mafias and organized crime, the police and other organs of the state may themselves become criminalized. By then, businesses will not have to deal only with corruption-ridden bureaucracies, but they will also be vulnerable to attacks from competitors who will pay the police or tax inspectors to harass and intimidate.

In fact, there is really no limit to the extent to which corruption, once it is unleashed, can undermine the stability of the state and organized society. Tax inspectors will extort businesses; the police will kidnap innocents and demand ransom; the prime minister will demand payoffs to be available for meetings; aid money will disappear into the private offshore bank accounts of senior officials; the head of state will demand that particular taxes be credited directly to a personal account.

Investment will come to a standstill, or, worse, capital flight will lead to disinvestment. In countries where corruption becomes intertwined with domestic politics, separate centers of power will emerge to rival the power of the state. Alternatively, the state, to preserve its power, may opt for warfare, engulfing the country in a cycle of violence. In any case, corrupt failed or failing states become a security threat for the whole international community, "because they are incubators of terrorism, the narcotics trade, money laundering, human trafficking, and other global crime—raising issues far beyond corruption itself" (Heineman and Heineman, 2006, p. 79). Thus, the prevalence of corruption will sharply worsen the risk profile of a country (as well as of the international community) and will significantly undermine a country's ability to confront and mitigate other risks coming from the outside (see below).

Education and human capital

According to Amartya Sen (1999), education and good public health allow for more effective participation in the economic and political life of the nation. Illiteracy, for instance, can be a major barrier to participation in economic activities and the use of, and access to, technological innovations. Lack of such basic skills severely limits the possibilities of citizens to participate in the development process, to be gainfully employed, to be well-informed judges of government policies and politicians, and to avoid falling prey to the manipulations of demagogues.

Education and training are indeed emerging as key drivers of productivity growth. As the global economy has become more complex, it is now evident that in order to compete and maintain a presence in global markets, it is essential to boost human capital endowments of the labor force, whose members must have access to new knowledge, and be continually trained in new processes and in the operation of the latest technologies. Education can also contribute to an upgrading of an economy's productive apparatus and may typically require some form of state involvement in the setting of norms—as well as the need for students to receive education and training that has a strong practical orientation. When teaching is perceived to be a prestigious job—hence, adequately compensated—it can have a measurable impact on the quality of the teaching staff and, more generally, the excellence of the education system. The literature also recognizes the role of technical and vocational education, highlighting the benefits of inward migration policies that allow the movement of workers with specialized skills.

Higher education, in particular, would appear to be particularly important, given the gains made in recent decades in expanding the coverage of primary and secondary education. Countries which have invested heavily in creating a well-developed infrastructure for tertiary education have reaped enormous benefits in terms of growth. Education has been a particularly important driver in the development of the capacity for technological innovation, as the experience of Japan, Finland, Sweden, Korea, Taiwan, and Israel clearly shows. Weaknesses in the area of education, not channeling adequate resources to literacy, training and boosting the skills of the labor force will become an important risk factor, contributing to poverty, political and social instability and reduced administrative capacities on the part of the government and civil service. These shortcomings will greatly undermine a country's ability to prevent and manage shocks of inter-related GCRs.

Gender equity

There is also substantial empirical evidence that the political empowerment of women leads to more government spending in education, public health, and infrastructures that contribute to improve the quality of life for the community. On the other hand, discriminating against women, curtailing their possibilities for gainful employment, undermining their property rights, restricting their mobility and imposing other legal barriers—widely prevalent, specially in the developing world—worsen income inequality and the latter adds to political instability. So, again, as in the cases noted above, gender inequality is an important risk and security factor.

A number of studies have shown that there is a close connection between national economic performance and the degree to which societies have succeeded in integrating women into the economy and have allowed them to increasingly participate in decision-making, particularly in the case of representation in parliaments, cabinets, and other executive bodies, and have made it possible for them to avail themselves of opportunities for education and building up of human capital.

International competitiveness and productivity have much to do with the efficient allocation of resources, including, of course, human resources. The efficient operation of our increasingly knowledge-based economy is not only a function of adequate levels of available finance, a reasonably open trade regime for goods and services, but is also more and more dependent on our ability to tap into a society's reservoir of talents and skills. When, because of tradition, a misunderstanding of the purpose of religion, social taboos or outright prejudice, half of the world's population is prevented from making its contribution to the life of a nation, the economy will suffer. The skill set which the private sector can tap will be necessarily narrower and shallower, and productivity, the engine of sustainable growth, will be impaired. Indeed, it is no surprise that the most competitive countries in the world, those that have been better able to operate on the boundaries of the technology frontier, are also those in which women have been given the greatest opportunities to be equal partners with men. Thus, gender equality has not only an ethical or moral dimension, but is, in fact, an issue of economic efficiency and, thus, may be at the very basis of creating a more prosperous world.

External risk factors

Nuclear proliferation

The ultimate modern catastrophic risk is arguably that of a nuclear war so contaminating the atmosphere with particulate matter that sunlight would be blocked and photosynthesis fail, precipitating a nuclear winter for several years. Even beyond those directly affected by radiation, there would be few survivors and little remaining of civilisation as we know it. Short of a full nuclear exchange, recent research into low-yield autonomous nuclear weapons and cyberwarfare aims to make limited nuclear war possible, wiping out an enemy country before it has a chance to retaliate, while not destroying the attacker's own future. Alongside this new arms race, an increasing number of countries are trying to join the nuclear club as the ultimate protection against any attempt at invasion or regime change. Together, these are increasing the risks of nuclear weapons falling into the hands of non-state actors like terrorist groups or criminal syndicates

hoping to hold the world to ransom. The classic indicator of this risk is the clock of the *Bulletin of the Atomic Scientists*, presently set at two minutes to midnight.

While there is a recent Convention on the prohibition of nuclear weapons, nuclear armed states have not joined the treaty. Other agreements to limit the further development or proliferation of nuclear arms are being abandoned. The risks of the use of nuclear weapons, whether intentional or accidental, are increasing and there are presently no effective control measures. Nuclear disarmament will likely only become possible when stronger mechanisms of global governance and the peaceful settlement of disputes are in place, facilitating sufficiently embedded behavioural patterns among the community of states such that the ultimate deterrent that nuclear arms provide would no longer be necessary.

An index of the global risk represented by nuclear weapons would need to include several components. Some would be technical, such as the countries possessing them or with the capacity to development them quickly; the number, form and state of readiness of nuclear arms; the reach of their delivery systems; their protection against pre-emptive strikes; the decision systems for their deployment and use; and safeguards against accidental triggering of a nuclear exchange. Others would look at the enabling environment for their use, such as the state of tension between nuclear-armed states and possible triggering events, the political calculations that might push a state to first use, and the mental stability of political leaders with their finger on the button. Obviously, the more countries have such weapons, the greater the chance that they might be used. It will also be necessary to estimate the risk of such weapons being bought, stolen or seized by non-state actors.

Fortunately, data to develop the technical indicators should not be too difficult to assemble, as the field is well studied even though clouded in secrecy. The political dimension of the risk will be more controversial to estimate but equally necessary. A clear set of risk indicators could help to push the international community to increase efforts at arms control, and to educate the general public. Only the nuclear-armed states have the power at present to address this risk, but seem least inclined to do so.

Climate change

Climate change is the other existential global risk of our time, although it represents an ever-increasing frequency and severity of environmental and human disasters with variable impacts, making it harder for people to conceptualise and evaluate the risks. The dangers and impact are also highly variable between countries. The increase in extreme storms, floods, droughts, and heatwaves resulting from global heating are already impacting human settlements and infrastructure and affecting food production, while biodiversity is at great risk from rapidly changing environmental conditions, threatening perhaps half of all species. Sea level rise is accelerating, although the speed will depend on unpredictable melting in polar regions were the temperature rise is most extreme. The resulting population displacements will dwarf the present migration crisis, as hundreds of millions will need to be resettled, and some small island states losing their entire national territory. Indonesia is already planning to move its capital from sinking Djakarta. The poor are least able to cope and will suffer the most.

Scientist have been warning of the risks for decades, and the Framework Convention on Climate Change was adopted in 1992, with the 2015 Paris Agreement the latest step in its implementation. However, the commitments to reductions in carbon emissions are both inadequate and voluntary, and some major emitters are in denial if not actively increasing their emissions for short term gain, out of political ideology and in defence of national sovereignty. The challenge, of course, is that preventing further catastrophic climate change requires the rapid and fundamental transformation in the present industrial society powered by fossil fuels, with powerful vested interests, both public and private, doing everything possible to protect their present advantages, including widespread campaigns of disinformation. It would be hard enough to make the transition if everyone was contributing to the effort; faced with the headwind of resistance and denial, we are still going in the wrong direction with rising emissions, development of new fossil fuel resources, and extensive forest destruction.

Fortunately, efforts to reduce climate change can be made at many levels, by national, regional and city governments, businesses, civil society organizations and individuals. Science has determined the planetary boundary for greenhouse gas concentrations in the atmosphere, so it should be possible to calculate the emission reductions necessary, the possible measures to return concentrations to a safer level, and the potential of each country to contribute to the global effort. An index of climate change risk and response measures could motivate many actors to respond to the challenge, bypassing resistance to some extent.

Pandemics

The Spanish Flu of 1918 killed at least 50 million, mostly young healthy people, by provoking an extreme immune reaction. Experts say it is not "if", but "when" mutations produce the next pandemic influenza virus that could kill up to a third of the world population. In today's world of rapid and extensive travel, a contagious disease can spread quickly around the world. Also, there are many other emerging diseases with potential to become pandemic. An uncontrolled pandemic would overwhelm health services, destabilise societies and lead to chaos and collapse, requiring many years to recover as a whole generation might be lost.

The response to pandemic risks includes research on potential vaccines and treatments, but it takes time to identify potential preventative and curative treatments, to run them through the necessary trials for safety and efficacy, to scale up their manufacture, and to deliver them where needed. Adequate medical infrastructure needs to be available at all levels, and any weakness in the system could allow the disease to escape and become pandemic, as the present Ebola outbreaks illustrate. The World Health Organization has done everything possible to prepare for and respond to potential outbreaks, but its resources are limited, and many factors are outside its control.

The other response to a developing pandemic would be to take every measure to prevent its spread. All unessential travel would be prohibited. Trade and commerce would come to a halt after an initial panic and run on essential supplies. Everyone would be ordered to stay at home and avoid all contact with others, perhaps for weeks. World society would grind to a halt. Limited vaccines or treatments would be rationed or reserved for essential personnel in the health system and basic utilities. Such a response would itself be a global catastrophic risk.

An index of pandemic risk would need to include the strength of preparatory and preventive measures at the global level, the capacities for rapid response, and the secondary impacts of response measures. At the national level, the strength of the health care system and its capacity to respond to major emergencies would be critical, as would contingency plans already in place to respond rapidly to an incipient pandemic if necessary. Reserve stocks of food, medicines and other necessities that could be mobilised in the event of the shutdown of the normal economy would also be advantageous.

Other factors

The list of other factors which contribute to shape a country's risk profile is long. Among them:

- What is the legal basis for secure property (including intellectual) and contract rights?
- What are the patterns of income distribution in the country? Are levels of inequality so high that they feed political instability?
- Is the trade regime unduly restrictive, or it is reasonably open, encouraging competition and gains in efficiency? Does the legal framework encourage foreign direct investment?
- Is there an adequate safety net to provide workers with a degree of financial security in times of economic stress?
- Is regulation of the labor market appropriate, or does it provide perverse incentives for both employers and workers?
- What is level of expenditure in information and communication technologies? Does the government take a leadership role in the adoption of the latest technologies?
- How effective is the government in providing information and public services for the people through electronic platforms?
- Are public procurement policies and systems open and transparent, and do they encourage the adoption of new technologies and reward innovation? Or are public procurement systems a vehicle for rent-seeking and corruption?

Building the GCRI

The first part of the work program to build a GCRI would entail an extensive data collection effort. It is proposed that in the first instance we would cover the 120 largest economies in the world, as measured by GDP at PPP exchange rates for 2018. Appendix Table 1 lists the countries. Smaller countries may in fact be more vulnerable to global risks, but inadequate data availability would make it difficult to include them in the initial effort. An annex might include these smaller countries and identify their data gaps so as to motivate states to complete them. Two types of data would be collected: hard data mostly on economic factors, social parameters and environmental resources, and soft data from a survey designed specifically for this purpose.

Hard data indicators are available from public and reliable sources, and could be compiled on an internationally comparable basis. For instance, since the quality of national macroeconomic management would be seen as an important factor for a country's risk profile, one would need to collect data on such variables as public debt in relation to GDP, the size of the fiscal deficit for a suitably recent year, price dynamics as captured in the consumer price index, and so on. In the case of corruption there are a number of data sources that can be tapped into, from the survey data collected by Transparency International that goes into the formulation of the Corruption Perceptions Index, to data collected at the World Bank for a large number of countries as part of the Worldwide Governance Indicators which capture different dimensions of corruption, to other datasets that assess aspects of the quality of public institutions, to name a few.

However, there will be variables for which no hard data is likely to be available and it may be necessary to undertake something like an Expert Opinion Survey in the 120 countries covered. This soft data will be complementary to some of the hard data described above and it will play an important role in supplementing key insights about countries' risk profiles on the basis of expert opinions in the countries covered. One key element of the work program in this area will then be the design of the Survey and its implementation on the ground, perhaps through some professional outfit such as Gallup.

The hard data and the soft data, once collected, will be aggregated to construct the GCRI, using well established methodologies with which we have full familiarity, having built indexes and worked with them extensively over the past 15 years.

While the data collection and the construction of the index are the heart of this project, the success of the GCRI will be ensured by a dissemination campaign that will involve publication of a Report presenting the results of the index and the main insights that are delivered by the data about country-specific risks. We will also need to build a website to put the GCRI online and make it available to a broad global audience. A dynamic Internet version of the Index could permit exploring scenarios of alternative policy measures in a country to see their impact on the index, which would engage decision-makers more directly. We will also have to present the GCRI at an official launch in some appropriate location and engage in a campaign of international dissemination. We estimate that a fully built GCRI could be ready within 12 months.

Global Catastrophic Risks Index: Country Coverage*
GDP in 2018 at PPP exchange rates (in billions of US dollars)

Country	GDP based on PPP
1. China	23208.22
2. United States	19485.40
3. India	9473.76
4. Japan	5442.76
5. Germany	4199.41
6. Russia	4016.25
7. Indonesia	3249.65
8. Brazil	3247.50
9. United Kingdom	2925.06
10. France	2856.48
11. Mexico	2462.76
12. Italy	2316.55
13. Turkey	2185.86
14. Korea	2034.91
15. Spain	1778.31
16. Saudi Arabia	1775.14
17. Canada	1773.83
18. Iran	1639.56
19. Australia	1248.22
20. Thailand	1236.35
21. Egypt	1203.74
22. Taiwan	1189.21
23. Poland	1125.60
24. Nigeria	1121.03
25. Pakistan	1060.79
26. Malaysia	933.28
27. Netherlands	924.41
28. Argentina	922.12
29. Philippines	877.17
30. South Africa	767.17
31. Colombia	711.62
32. United Arab Emirates	696.01
33. Bangladesh	690.27
34. Iraq	649.30
35. Vietnam	648.74
36. Algeria	629.99
37. Belgium	529.23
38. Singapore	528.14
39. Switzerland	523.09
40. Sweden	518.01
41. Romania	483.36
42. Kazakhstan	478.57

Country	GDP based on PPP
43. Hong Kong SAR	455.85
44. Chile	452.08
45. Austria	441.01
46. Peru	430.33
47. Venezuela	381.55
48. Norway	381.21
49. Czech Republic	375.94
50. Ukraine	369.57
51. Ireland	353.28
52. Qatar	339.53
53. Myanmar	329.85
54. Israel	317.05
55. Portugal	314.12
56. Greece	299.31
57. Morocco	298.62
58. Kuwait	289.68
59. Hungary	289.60
60. Denmark	287.85
61. Sri Lanka	275.83
62. Finland	244.85
63. Uzbekistan	223.03
64. Ethiopia	200.64
65. Angola	193.63
66. Ecuador	193.05
67. Oman	190.14
68. New Zealand	188.99
69. Slovak Republic	179.75
70. Belarus	179.37
71. Sudan	177.36
72. Dominican Republic	172.96
73. Azerbaijan	172.18
74. Kenya	163.65
75. Tanzania	162.51
76. Bulgaria	153.46
77. Guatemala	138.14
78. Tunisia	137.65
79. Ghana	134.03
80. Serbia	105.73
81. Panama	104.11
82. Turkmenistan	103.71
83. Croatia	102.11
84. Côte d'Ivoire	97.16
85. Lithuania	91.47
86. Cameroon	89.54

Country	GDP based on PPP
87. Uganda	89.19
88. Jordan	89.00
89. Paraguay	88.91
90. Lebanon	88.25
91. Costa Rica	83.94
92. Bolivia	83.72
93. Nepal	79.19
94. Uruguay	78.16
95. Yemen	73.63
96. Slovenia	71.23
97. Bahrain	71.17
98. Afghanistan	69.45
99. Zambia	68.93
100. DR of Congo	68.60
101. Cambodia	64.21
102. Luxembourg	62.11
103. Senegal	54.80
104. Latvia	54.02
105. El Salvador	51.17
106. Lao PDR	49.34
107. Honduras	46.30
108. Bosnia and Herzegovina	44.83
109. Trinidad and Tobago	42.85
110. Estonia	41.65
111. Mali	41.22
112. Georgia	39.85
113. Madagascar	39.85
114. Mongolia	39.73
115. Botswana	39.01
116. Mozambique	37.09
117. Gabon	36.66
118. Nicaragua	36.40
119. Albania	36.01
120. Burkina Faso	35.85

* These 120 countries account for 99% of total world GDP and 97% of total world population.