Climate is not special or different from other factors in generating migration, but it is still important

An interview with Professor Nicola D. Coniglio
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INTERVIEW

Professor Nicola D. Coniglio
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Debate about the nexus between climatic shocks and migration remains hot in academia, media and politics. The internal displacement monitoring center (IDMC) reports that 17.5 million people were displaced due to disasters related to weather hazards only in 2014 (IDMC, Annual Report 2015). The scientific community increasingly agrees on the existence of short-term climate fluctuations, also called climatic shocks, and their actual impact on migration flows. Nevertheless, reliable data remains scarce, mainly due to the heterogeneous nature of climatic shocks and adaptation dynamics of affected individuals and communities. Migration can be the result of a multitude of causes, however there is mounting evidence that it can to some extent be driven by climatic shocks.

Authors of the article Climate Variability and International Migration: an empirical analysis (2014), Professors Nicola D. Coniglio and Giovanni Pesce offer an innovative approach to the issue, since they base their analysis of climatic shocks and migration on a theoretically-grounded framework. Their work sheds light on the direct and indirect impacts of climatic shocks in developing countries as a cause of out-migration flows towards rich OECD countries in the period of 1990-2001. Moreover, it stands out compared to previous literature because it considers the heterogeneity of climatic shocks (type, size, sign of shocks and seasonal effects).

1. What would you consider the most important finding of your research? What do we learn about the globally increasing migration flows?

First of all, one needs to consider that not only those people that are directly affected by a climatic shock might migrate. In fact, our paper theoretically demonstrates that due to market mechanisms we can expect people who are weakly affected by a climatic shock to migrate. This is because prices of factors of production can adjust as a consequence of climatic shocks, affecting for instance wages throughout a country. Prices might change, which may indirectly induce people to migrate. The indirect impact on migration, based on market mechanisms justifies the macro-level methodological approach in our study.

I believe an innovative aspect of our research is the detailed analysis of climatic shocks. In our study we try to understand whether the type of climatic shock matters in terms of inducing migration. In fact, our study is the first study which looks in detail at the type and timing of climatic shocks. Moreover, we analyze climatic shocks that both reduce and increase rainfall compared to a long term average and identify if they have a significantly different impact on migration.

In addition, we analyze whether extreme climatic shocks matter more than less extreme weather events. Hence, we analyze if there are non-linear interrelationships between the variables.

A major finding of our study is that the type and timing of climatic shocks matter significantly. The effect of climatic shocks can be highly heterogeneous depending on the type and timing. However, the impact of climatic shocks also strongly depends on a set of other factors such as level of development, quality of institutions and level of vulnerability of a country. A vulnerable country is characterized, for instance, by its dependence on the agricultural sector. In fact, a climatic shock of the same magnitude has a greater impact on outmigration in countries with a large agricultural sector.

In our study we find evidence of very strong direct and indirect effects of climatic shocks on migration. Climate is only one among several push factors of migration. It is not special or different when compared to other kinds of shocks in generating migration, but it is still important. Whether it is the most important one, I doubt it.

2. What is a climatic shock and how do you measure it?

We were very critical about other studies that used highly aggregate measures and very simplistic measurements on climatic shocks. In fact, the typical study in economics and other social sciences would simply add to a standard multivariate analysis the level of rainfall in one country. We believe this is not the correct approach, because climatic shocks might be of very different natures.

If you use very simplistic aggregate data, you are very likely to miss the identification of important climatic shocks.

I would like to present an example: in 1998, Bangladesh experienced a very severe flood. Almost 70% of the country was flooded, thousands of people died and the economic system was deeply affected. Now, it could be highly misleading to consider only the annual average rainfall of the country in your empirical analysis. In fact, the yearly average rainfall in 1998 in Bangladesh was only 6,6% higher compared to the long-term average rainfall in the last 100 years. This modest increase would probably not be considered a major climatic shock.

However, if you look at the data in a more detailed manner you can identify that the amount of rainfall in specific months was extremely high, much higher than the average 6,6%. In fact, there was a compensation between months, because the amount of rainfall that fell in the months before the climatic shock was surprisingly lower than the average.

The famous study by Michel Beine and Christopher Parsons (2013), Climate Factors as Determinants of International Migration, for instance, is using a similar approach. However, they are aggregating climatic data over a 10-year period. In the mentioned example, Bangladesh experienced less rainfall compared to the long-term average over the mentioned time period. Therefore, when considering a 10-year span one might completely overlook the major climatic shocks. And this is why we believe that one needs to be extremely careful when identifying the climatic shocks based on type and timing.

Regarding our methodology, we tested our hypothesis by measuring the impact of alternative climatic shocks. We scrutinized very simple aggregate climatic shocks. We looked in a distinct way at anomalies, such as floods and droughts, which exceeded or were inferior to the average long-term rainfall. In fact, we identified these anomalies by considering only the climatic shocks that were above or below the standard deviation compared to the long-term average of a specific country. Therefore, our analysis is country specific. We actually analyzed 128 countries based on historical data on rainfall and temperature. We built the long-term monthly average in time intervals longer than 78 years and a long-term standard deviation. We also considered the events that are particularly severe, above or below the standard deviation. Furthermore, we considered other aggregated data, for instance data where the total rainfall is more or less than the average.

A further measure which is particularly interesting is that we compute for each country an index of rainfall variability. We calculate the absolute average deviation of rainfall in each country, which measures how unstable the rainfall is over a year or several years. Hence, this index is capturing the abnormal variability of rainfall in a specific country and provides important information. Summarizing, the more unstable the rainfall, the more likely it is to have disruptive effects on the agricultural systems of a country.

We receive tremendous amount of information through the detailed climatic data, compared to aggregated long-term data.

3. Since 2008, close to 175 million people who live in developing countries have been displaced by disasters, accounting for 95 % of the global total of migration flows (IDMC 2015). What are the main reasons for the vulnerability of developing countries compared to developed countries?

Well, first of all you have to consider the UNDP data on the percentage of people that live in rural areas, which are definitely more vulnerable to climatic shocks. The higher number of people at risk of being displaced by climatic shocks is clearly a distinctive element of developing countries, which contributes to higher vulnerability.

Moreover, the biggest challenge in terms of vulnerability is probably the high number of people that depend on rain-fed agriculture. In terms of employment and GDP, economic dependence on the agricultural sector puts entire communities at risk when climatic shocks occur. The level of diversification of an economy is clearly an indicator of the vulnerability of a country. Climatic shocks have a very heterogeneous impact across different sectors of an economy and hence the more diversified the economy, the less vulnerable the country is to climatic shocks. If you have a shock in one economic sector it is easier to absorb the shock if you have various other sectors to fall back on.

Lastly, institutions are an important mediating factor which differentiates developing from developed countries. Good institutions and efficient policy making can mitigate the effect of climate-induced shocks. One example is using fiscal policy to redistribute income to the affected areas from urban areas which were not affected by the climatic shocks. Countries with solid institutions have moreover an efficient welfare state that would certainly mitigate the impact of climate shocks and the consequent migration.

4. The IDMC reports that disaster displacement since the 1970s is on the rise (IDMC 2015). Do you agree with this assumption?

Well, if you look at the historical trend, I believe the evidence is quite robust in demonstrating an increase in so called extreme weather events in recent decades. Any database you use is pointing towards an increase in their frequency. I cannot say, due to a lack of instruments, if this is a global and long term trend or even a shift in the weather dynamics. Certainly, international debate on this topic will continue.

5. These days we are overwhelmed with information about the relocation strategies of refugees. According to your research, the relocation strategies can be highly different according to which individual is at risk and by what kind of climatic shock he/she is affected. Which climatic shocks have the strongest impact? And why?

Our study does not investigate the coping strategies of individuals that are directly affected by the shock, because it is based on a macro analysis. Our hypothesis is that climatic shocks can impact everyone through market mechanisms. Simply put, if prices change and if the value of resources float, everybody is affected and it does not really matter whether someone is affected directly or indirectly by the climatic shock.

The set of coping strategies that an individual or communities have at their disposal strongly depends on the social and economic characteristics of the area they live in. For instance, our study demonstrates that climate-induced migration is quite strong in countries which are below a certain threshold of income per capita. Therefore, the poorest countries in our sample are those where the effects of climatic shocks are much stronger. I would say all African countries are below this threshold level, since we identified a positive impact of climatic shocks on all African countries.

As explained before, we find evidence of non linear effects of climatic shocks, based on the type and timing of the shock. Hence, the persistence of climatic shocks is also an important element to consider. In fact, a shock with the same intensity will produce a much stronger impact if it is persistent over time. If a climatic shock hits the same region repeatedly over a few consecutive years, it will probably have a stronger impact on the social and economic system and trigger a change in people's expectations. They might assume that this trend is a structural change in the weather dynamics of the country. Hence, they will expect that income and quality of life will be continuously reduced and may decide to migrate.

In addition, we found out that on average climatic shocks that induce droughts have a stronger impact than those inducing floods. My intuition is that, in poor countries, droughts are more likely to have a long term impact, because they destroy the capital stock employed in the agricultural sector. For instance, a prolonged drought is likely to kill non seasonal crops and most of the cattle. This will trigger a long-term negative social and economic impact. A flood, on the other hand, may destroy a seasonal crop, such as a rice crop, which has a severe but temporary impact. There is a big difference between these two climatic shocks regarding how

they affect the agricultural system of a country. However, more research is fundamental to find answers concerning the heterogeneous impacts of droughts and floods and the consequent relocation strategies of affected people.

6. What are the factors that influence refugees' relocation strategy? Where do people suffering from climatic shocks migrate to?

I believe there is no difference whether the push effect for migrants is caused by climatic shocks or not. The decision of people to migrate and the destination are disconnected from the push effect. Till date, there is no social economic mechanism that demonstrates that in case of climatic shocks there is a defined path in which people migrate.

I believe climatic shocks are an obvious push factor and certainly influence migration. However, 'where' an individual migrates to depends more on standard pull factors of the receiving countries. These pull factors include economic opportunities and favorable liberal policies towards migration. Moreover, migrants move to places where there is a dense diaspora of migrants and which are geographically closer and economically or culturally similar to their country of origin. For instance, former colonial ties have an impact on the choice of destinations, since the similarities in culture and structure may facilitate the integration of the migrants in the new surroundings. Generally, migrants move to the places where the cost of migration is low.

7. People fleeing from climatic shocks have various names in academia and media, including climate refugee, environmental migrant etc. Why do we still ponder over a definition for migrants possibly fleeing from climatic shocks? And do we need a specific term?

My straight forward answer is that we should not care too much about this highly debated juridical status, naming or concept. I do not see a major interest or advantage in labelling migrants that flee from a climatic shock. Moreover, I believe it is simply impossible to label migrants based on the climatic, economic or social shock they suffered. A migrant is a migrant, typically pushed away from their country of origin by a complex set of factors. The only label that is useful for people fleeing their country of origin would be the label "refugee", due to the international convention on human rights, which grants them the possibility of asylum.

8. The multi-causal nature of the relation between climatic shocks and migration is probably one of the biggest challenges within this research field. How did you consider and justify the multi-causality within your research?

The approach we used to investigate the multi-causality is by looking at the direct effect a climatic shock might have and then evaluating it with different control variables, such as GDP per capita. In our study we seek to understand whether the magnitude of the impact of climatic shocks on migration is altered in countries with different characteristics.

From a methodological point of view, we combine the climatic shock variable with the usual factors that might boost or hamper migration, which include for instance the relative level of development of a country. We test the association between climatic shocks and migration in countries with different levels of development, for example. And, we found evidence of the association between climatic shocks and migration in the relatively poorest countries of our sample. This demonstrates that there are clearly multi-causal reasons for the nexus between climatic shocks and migration.

9. In the 1960s Brazil experienced some migration flows from the north-east to the south. Do you expect migration flows within Brazil due to future climatic shocks?

I think it is very likely that the climatic shocks will continue and I do not see any reason why Brazil would escape from this trend or risk. Extreme weather events seem to become more frequent. For instance, due to El Niño over the last year, we experienced a climatic shock and it is affecting populations and countries, including Brazil.

Nevertheless, one needs to consider that Brazil has significantly changed over the last 70 years. The evolution of Brazilian economy, the investment in building a welfare state has significantly altered the country compared to the 1960s. Based on our study, I assume that a climatic shock of the same magnitude as in the 1960s, today would have a much weaker impact on Brazil. Consequently, I would predict that climatic shocks in Brazil would induce quite less migration flows than in the past.

10. Forecasts on climate-induced migration are extremely difficult with the current methodological tools and available data. Could you provide a forecast based on your study about climate-induced migration? Do you believe available forecasts are critical and representative?

The art of forecasting in this area of study is more related to witchcraft than to science. I believe that we should not pursue forecasts. The tools that we would require to do forecast on complex weather events are simply not available.

For example, the most forecasted economic data is GDP growth. However, if you compare the GDP forecasts with the actual data, you already realize there is significant divergence. Now, the extremely specific nature of climatic shocks and the heterogeneous impacts that these weather events demonstrate are complex and difficult to predict.

It is a difficult and imprecise exercise and at the moment I see no tools that would give us reliable data to make forecasts. I am aware that politicians love forecasts and as an economist I know that where there is a demand there will be a supply. However, honestly, I would not believe too much in the supply of these forecasts on climatic shocks and its effects on migration flows in the future.

Professor Nicola D. Coniglio holds a PhD in Economics from the University of Glasgow, Scotland. He teaches microeconomics, international economics, trade theory and economics of migration at the University of Bari "Aldo Moro", department of Economics. Also, he is the Italian director of the Erasmus Mundus Master Programme in 'Economics of Globalisation and European Integration' (EGEI). He is consultant to the United Nation Industrial Development Organization (UNIDO). Since 2007 he has been a researcher in the CIRCE Project on the impact of climate change on migration flows at the Fondazione ENI Enrico Mattei in Milan, Italy.