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THE EFFECT OF FOOD CRISES ON INTERNATIONAL
MIGRATION

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ABSTRACT

In the current global setting of rising food prices and growing food insecurity, this article analyses how food crises affect forced international migration. According to the results obtained from a structural gravity model, food crises lead to a significant increase in the number of forced international migrants, although the intensity of the effect depends on the severity of the crisis. Thus, mild crises trigger a higher increase in the number of international migrants, but this effect eases as they become more severe. Further, when faced by more severe crises, international migrants are more likely to head for developing countries. This is because food crises prompt migrants to use more of their resources to cover their basic food needs, limiting their ability to migrate, especially to destinations that entail higher costs such as developed countries.

Keywords: migration, food crises, food.

JEL classification: F22, O15, Q18.

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Introduction¹

Rising conflicts, high levels of inequality in some countries and climate change have gradually increased global food insecurity² over the past decade,³ a situation that has been exacerbated by the COVID-19 pandemic and the food price rises observed since 2020. In that year, 10% of the world population, mostly in developing countries, suffered from malnutrition, and up to 30% faced some type of food insecurity (see Chart 1.1). In some places, these circumstances triggered a food crisis.⁴ According to the latest joint report by the Food and Agriculture Organization of the United Nations (FAO) and the World Food Programme (WFP),⁵ 193 million people, or 2.5% of the world population, faced a food crisis in 2021. Food insecurity has also deteriorated on account of the Russian invasion of Ukraine, which has affected both the supply and the price of basic foods. In this setting, at the start of the war, the FAO Food Price Index reached its highest value in recent decades (see Chart 1.2).

There is broad empirical evidence to show that food insecurity leads to an increase in domestic migratory flows in developing countries. Factors such as land scarcity, low crop yields, inability to feed one's family and food price volatility have frequently been cited as driving forces of such migration.⁶ However, most of the studies available to date have focused on the effect of food insecurity on internal displacements, while its impact on international migratory flows has generally been overlooked.⁷

1 This article follows on from the study by Carril-Caccia, Paniagua and Suárez-Varela (2022). Readers are referred to this paper for a greater level of detail.

2 According to the FAO, a person is understood to be food insecure when they lack access to enough food for normal growth and development and an active and healthy life. Thus, individuals who are uncertain about the ability to obtain food or who have insufficient resources for a healthy diet are considered to be in a situation of moderate food insecurity. If they go an entire day or more without eating several times a year, food insecurity is considered to be severe. Malnutrition occurs when food intake is insufficient to meet the energy consumption needed to carry out sedentary activities.

3 See FAO (2020).

4 A food crisis implies widespread food scarcity. According to the Integrated Phase Classification, a food crisis occurs when a substantial proportion of households experience a food shortage and high levels of malnutrition, such that they have to relinquish even means of livelihood in order to meet their food needs.

5 See FAO and WFP (2022).

6 See, for example, Corbett (1988), O'Rourke (1995), Geest (2011), FAO et al. (2018).

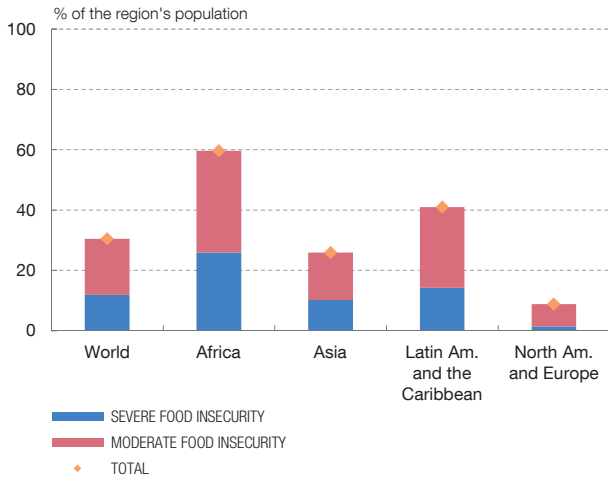
7 Smith and Floro (2020) conduct a microeconomic analysis of international migration intentions and preparations using migrant survey data.

Chart 1

FOOD INSECURITY AND FOOD PRICES

In 2020, 30% of the world population, mostly in developing countries, faced some type of food insecurity. This was attributable to a confluence of climate factors, conflicts and high levels of inequality, which have been accentuated by the pandemic and the war in Ukraine. Prices began to rise in 2020 and reached their highest value in recent decades following the Russian invasion of Ukraine.

1 FOOD INSECURITY BY GEOGRAPHICAL AREA (2020) (a)



2 FOOD PRICE INDEX IN REAL TERMS (b)



SOURCE: FAO.

- a** A person is understood to be food insecure when they lack access to enough food for normal growth and development and an active and healthy life. Thus, individuals who are uncertain about the ability to obtain food or who have insufficient resources for a healthy diet are considered to be in a situation of moderate food insecurity. If they go an entire day or more without eating several times a year, food insecurity is considered to be severe.
- b** This index measures the change in international prices of a basket of food commodities. It is determined on the basis of the price indices of five food commodity groups (sugar, vegetable oils, cereals, dairy and meat) weighted with average export shares of each group.



This article describes the links between food crises and migration and quantifies their impact on forced international migration.⁸ Using structural gravity models, it concludes that food crises lead to significant increases in the number of forced international migrants, the impact of which depends on the severity of the crisis. Milder food crises prompt higher increases in the number of international migrants, but as the severity of the crises intensifies, the increases become more moderate. Further, when faced by more severe crises, more international migrants tend to head towards developing countries. These dynamics may be explained by the resources available to migrants. In food crises, migrants tend to use more of their resources to meet their more immediate food needs, limiting the funds available for migrating, especially to destinations that entail higher costs such as developed countries.

⁸ In contrast to voluntary migration, forced migration refers to those displacements that arise owing to human or natural adversity (such as wars and political or religious persecution, or natural disasters and climate change). Forced migrants are, therefore, considered to be those who cannot return safely to their place of origin.

The decision to migrate and food crises

Individuals will decide to migrate if they expect to enjoy greater well-being in their destination than in their country, region or locality of origin. However, migration entails not only economic but also psychological costs, so not all those who wish to migrate will finally do so. Many will not have the resources needed to meet these costs and will lack access to funding. In addition, according to Smith and Floro (2020), food insecurity also affects individuals' capacity to meet these costs, as in that situation they generally have to devote a larger part of their resources to satisfying basic food needs, which reduces their economic capacity to migrate. Accordingly, some studies indicate that policies that ease agents' financial constraints encourage migratory flows, especially for individuals with fewer resources or in the case of migration to destinations that generally entail higher migration costs.⁹

The impact of food crises on – domestic or international – migratory flows can be estimated using a structural gravity model.¹⁰ This article uses a sample that includes migratory flows from 114 developing countries, and 155 destination countries (including developed and developing countries) for the period 2009-2017. For international migrations, the number of asylum applications from the United Nations Refugee Agency is used, and for internal migrations the Global Internal Displacement Database. We also control for other factors traditionally used in the literature on gravity models, such as geographical distance, shared borders, language or legal origin, colonial ties between countries, religious affinity, GDP per capita and population. In respect of food crises, the FAO's Global Information and Early Warning System quarterly reports identify countries that are facing a crisis and need food aid, and also the causes of the crises.¹¹ In addition, the FAO classifies the crises into three levels of intensity, according to whether there is a one-off shortage in production

9 On the role played by “liquidity constraints” on migration, see also Mendola (2008), Chernina, Castañeda Dower and Markevich (2014), McKenzie and Rapoport (2007), Dustmann and Okatenko (2014), Angelucci (2015), Bazzi (2017) or Cai (2020).

10 By analogy with Newton's law of gravity, the gravity model predicts that trade flows between two countries are directly proportional to their size and inversely proportional to the frictions between the two countries. The model originates in the literature on international trade, although its sound theoretical foundations and high predictive capacity, among other factors, have made it an essential analytical tool in other fields that also deal with bilateral flows (between two countries), such as migration and foreign direct investment. Here, a structural gravity model is estimated using a Poisson maximum likelihood estimator (Santos-Silva and Tenreyro (2006)) and bilateral forced migration flows. In this context, it is not possible to estimate the effect of food crises and at the same time control for the factors needed to prevent estimation bias. To overcome this constraint, we use a methodological approach, recently developed by Heid, Larch and Yotov (2021), which uses international migration flows and internal displacement flows to estimate the effect. This methodology alters the interpretation of the estimated coefficient, reflecting the impact of food crises on forced international migrants compared with internally displaced persons. In this model the dependent variable is the number of forced international migrants and internally displaced persons. The variables of interest relating to food crises are expressed as binary variables that reflect whether or not a country has undergone a crisis of a certain level during the year in question.

11 The main difficulty when using these data is that they are not published as structured data. In consequence, to process and categorise the data, web scraping techniques and a taxonomy were used to identify the cause of the food crisis from the description provided by the FAO in each case.

or total food supply (mild insecurity), severe but localised food insecurity, or a widespread lack of access to food (severe food insecurity).¹²

According to the model estimates, food crises lead to a much higher increase in the number of forced international migrants than in the number of internally displaced persons (75% more; see Chart 2.1). Thus, food crises act as a “driving force”, prompting migrants to leave their country of origin. An analysis of their intensity shows that milder crises have more impact on forced international migratory flows than on internal displacement flows, while as the level and intensity of crises increase, the relative impact lessens or even disappears. As Chart 2.1 shows, in mild crises, the increase in the number of forced international migrants is almost five times the increase in the number of internally displaced persons. By contrast, in moderate crises the relative increase is just 72%, while in severe crises the impact would be almost zero and would not, in any case, be statistically significant. These findings confirm the survey-based findings of Smith and Floro (2020) and Sadiddin et al. (2019), which indicate that greater food insecurity increases individuals’ intention to migrate internationally, but reduces the likelihood of their actually doing so.

Chart 2.2 illustrates the effect of crises by cause. It shows that multidimensional crises – which have more than one cause and could therefore have a more systemic and permanent component – prompt larger forced international migratory flows (compared with internal displacement flows). By contrast, crises relating to adverse weather events and disease trigger greater internal displacement flows, as migrants could understand these to be more temporary crises.

Lastly, the uneven impact of food crises on migration to developed and developing countries is analysed. Migration to a developed country entails a higher cost, both in terms of geographical distance and the bureaucracy associated with obtaining refugee status and with subsistence in the country of destination during the time needed to settle asylum applications, although it also offers migrants greater returns. The findings show that milder crises have a similar impact on forced migratory flows towards developing and developed countries, while in the face of more severe crises, forced international migrants tend to be less likely to move to developed countries (see Chart 2.3). One possible reason for this is that more severe food crises require migrants to use more resources to satisfy their basic food needs, thus reducing their capacity to meet the higher costs associated with migration to a developed country.

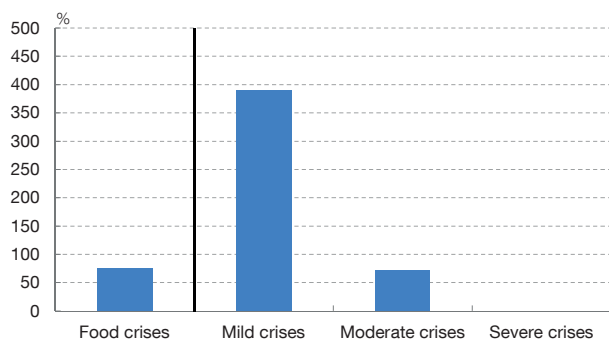
12 For instance, in 2011, during the last global food crisis, Zimbabwe needed external food aid in March on account of a one-off food shortage that had a moderate temporary impact on a small part of its population, despite the general improvement in food conditions in the country. Pakistan faced severe localised food insecurity, as flooding caused by monsoon rains had destroyed crops and killed livestock, leaving the people of Sindh province without food. Meanwhile, in Sierra Leone, households were severely impacted by war and high inflation rates, leading to a widespread lack of access to food.

Chart 2

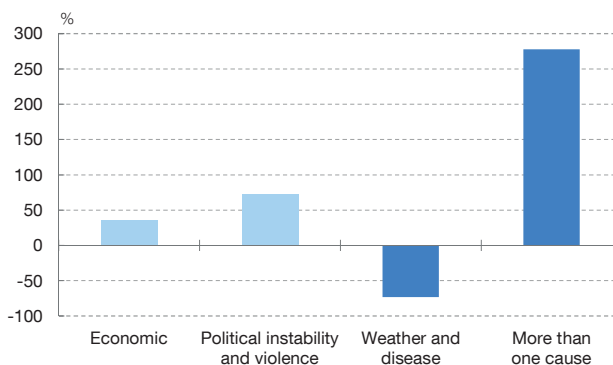
ESTIMATED EFFECTS OF FOOD CRISES ON FORCED INTERNATIONAL MIGRATION

Crises lead to significant increases in the number of forced international migrants compared with internally displaced persons, although this depends on the intensity of the crisis. Mild crises have a greater relative impact on forced international migration flows but, as the severity of the crises increases, this effect tends to disappear. Similarly, when faced by more severe crises, more international migrants tend to head towards developing countries.

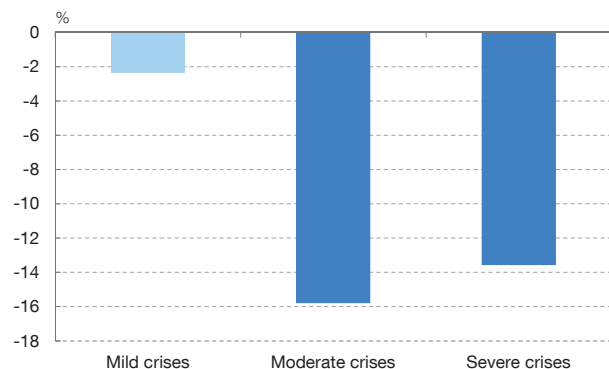
1 EFFECT OF FOOD CRISES BY INTENSITY (a)
(compared with internal displacements)



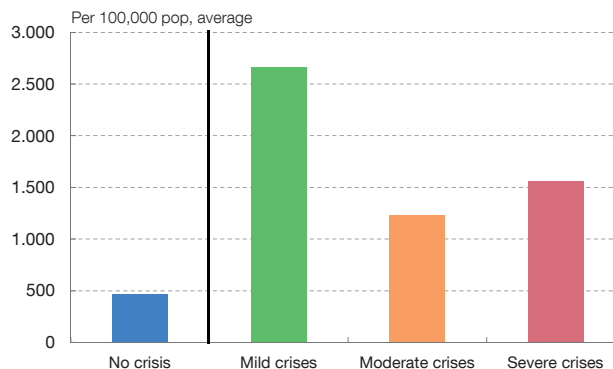
2 EFFECT OF FOOD CRISES BY CAUSE (a)
(compared with internal displacements)



3 EFFECT ON FLOWS TO DEVELOPED COUNTRIES (a)
(compared with developing countries)



4 NUMBER OF INTERNALLY DISPLACED PERSONS BY LEVEL OF FOOD CRISIS



SOURCES: Banco de España calculations, drawing on data from the FAO's Global Information and Early Warning System.

a The bars depict the marginal effects calculated drawing on the coefficients of the gravity models' estimates. When the coefficient is not significant, the bar appears in a lighter blue shade. Food crises are classified as: i) a one-off food shortage (mild crisis); ii) severe but localised food insecurity (moderate crisis); and iii) a widespread lack of access (severe crisis).



In accordance with these results, the impact on the absolute flow of international migrants will depend on the effect of food crises on the number of internally displaced persons. Although the limitations of structural gravity models do not allow us to obtain an estimate of this impact in this context (see footnote 10), it can be inferred from Chart 2.4 that internal displacement numbers and international migrant numbers have similar dynamics. Thus, countries facing food crises, be they mild or severe, have on average more internally displaced persons than those facing no crises of any kind. Likewise, countries facing mild food crises have on average more internally displaced persons than those facing more severe crises. Accordingly, drawing on the estimates shown in Chart 2.2, it is possible to extrapolate that mild crises could

lead to a higher number of forced international migrants, while moderate and severe crises will trigger more moderate increases in migrant flows in absolute terms.

Conclusions

In the current setting of increased food insecurity and sharp food price rises, our findings suggest that a potential global food crisis could trigger large-scale international migratory processes, the extent of which will depend on the severity of the crisis. Milder crises appear to have a greater impact on forced international migration, but as crises become more severe, the increase in the number of international migrants moderates and tends to equal the increase in the number of internally displaced persons. Likewise, as crises become more severe, international migratory flows appear to shift more towards developing countries. These findings highlight the need for an appropriate response to the effects of growing food insecurity, and the importance of multilateral arrangements that provide for adequate funding of the fight against the emerging global food crisis, such as the economic commitments recently agreed by the G7 and the negotiations currently ongoing within the G20.

4.8.2022.

REFERENCES

- Angelucci, M. (2015). "Migration and Financial Constraints: Evidence from Mexico", *The Review of Economics and Statistics*, Vol. 97(1), pp. 224-228.
- Bazzi, S. (2017). "Wealth heterogeneity and the income elasticity of migration", *American Economic Journal: Applied Economics*, Vol. 9(2), pp. 219-55.
- Cai, S. (2020). "Migration under liquidity constraints: Evidence from randomized credit access in China", *Journal of Development Economics*, Vol. 142, pp. 102-247.
- Carril-Caccia, F., J. Paniagua and M. Suárez-Varela (2022). "Forced migration and food crises", *Working Paper No 2227*, Banco de España.
- Chernina, E., P. Castañeda Dower and A. Markevich (2014). "Property rights, land liquidity, and internal migration", *Journal of Development Economics*, Vol. 110, pp. 191-215, Land and Property Rights.
- Corbett, J. (1988). "Famine and household coping strategies", *World Development*, Vol. 16(9), pp. 1099-1112.
- Dustmann, C. and A. Okatenko (2014). "Out-migration, wealth constraints, and the quality of local amenities", *Journal of Development Economics*, Vol. 110, pp. 52-63.
- FAO (2020). *The State of Food Security and Nutrition in the World 2020*.
- FAO, IFAD, IOM and WFP (2018). *The Linkages between Migration, Agriculture, Food Security and Rural Development*, Technical report.
- FAO and WFP (2022). *Hunger Hotspots FAO-WFP early warnings on acute food insecurity. February to May 2022 Outlook*.
- Geest, K. van der (2011). "North-South Migration in Ghana: What Role for the Environment?", *International Migration*, Vol. 49, pp. 69-94.
- Heid, B., M. Larch and Y. V. Yotov (2021). "Estimating the effects of non-discriminatory trade policies within structural gravity models", *Canadian Journal of Economics/Revue canadienne d'économique*, Vol. 54(1), pp. 376-409.
- Mckenzie, D. and H. Rapoport (2007). "Network effects and the dynamics of migration and inequality: Theory and evidence from Mexico", *Journal of Development Economics*, Vol. 84(1), pp. 1-24.
- Mendola, M. (2008). "Migration and technological change in rural households: Complements or substitutes?", *Journal of Development Economics*, Vol. 85(1-2), pp. 150-175.
- O'Rourke, K. (1995). "Emigration and living standards in Ireland since the famine", *Journal of Population Economics*, Vol. 8(4), pp. 407-421.
- Sadiddin, A., A. Cattaneo, M. Cirillo and M. Miller (2019). "Food insecurity as a determinant of international migration: evidence from Sub-Saharan Africa", *Food Security*, Vol. 11(3), pp. 515-530.
- Santos Silva, J. M. C. and S. Tenreyro (2006). "The log of gravity", *The Review of Economics and Statistics*, Vol. 88(4), pp. 641-658.
- Smith, M. D. and M. S. Floro (2020). "Food insecurity, gender, and international migration in low- and middle-income countries", *Food Policy*, Vol. 91, February, pp. 101-837.