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Migration from Sub-Saharan Africa to the European Union: Does Food Insecurity Play a Role?

Migration aus Subsahara-Afrika in die Europäische Union: Spielt Ernährungsunsicherheit eine Rolle?

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Summary

During the past decade, migration has become a major political issue in the European Union (EU). Yet, migration has not been sufficiently investigated using quantitative approaches. We test the hypothesis whether food insecurity, proxied via average daily caloric supply per person, and other independent variables have a significant effect on human migration from 38 Sub-Saharan African countries to the EU in the years 2008 to 2019. The full panel model shows that caloric supply has a minor but significant effect on migration flows. Other significant variables are population size, unemployment rate and political restrictions.

Keywords: Migration, food insecurity, factors of migration, Sub-Saharan Africa, European Union

Zusammenfassung

Im vergangenen Jahrzehnt ist Migration zu einem bedeutenden politischen Thema innerhalb der Europäischen Union (EU) geworden. Dennoch ist Migration bislang noch nicht ausreichend mittels quantitativer Ansätze untersucht worden. Dieser Artikel überprüft die Hypothese, ob Ernährungsunsicherheit – angenähert durch die durchschnittliche tägliche Kalorienversorgung pro Person - einen signifikanten Einfluss auf Migration aus 38 Ländern Subsahara-Afrikas in die EU in den Jahren 2008 bis 2019 hat. Das entwickelte Paneldatenmodell zeigt, dass die Kalorienversorgung einen signifikanten Einfluss auf Migrationsbewegungen hat. Weitere signifikante Faktoren sind Populationsgröße, Arbeitslosigkeit und politische Regulierungen.

Schlagworte: Migration, Ernährungsunsicherheit, Faktoren für Migration, Subsahara-Afrika, Europäische Union

1 Introduction

In recent years, the EU has been confronted with an increase in the arriving of refugees from the Middle East and Sub-Saharan Africa (SSA). Migration from the African continent via the Mediterranean Sea is dangerous and many migrants die on their journey (International Organization for Migration, 2020). In some European host countries, dissatisfaction with the European and national authorities overwhelmed by the extent of migrants has promoted Eurosceptic political parties (Kansteiner, 2019). Therefore, it is important to better understand the factors of migration from SSA to the EU in order to provide adequate coping strategies for EU countries.

In general, violent conflict (Davenport et al., 2003) and poor economic conditions (Wood, 1994; Naudé, 2008) are well known and important determinants of migration. Specifically in SSA, Naudé (2008) and Flahaux and Haas (2016) suggest that several factors cause migration. The demographic development (Pew Research Center, 2018) and environmental changes caused by the impacts of global warming additionally contribute to the mobilization of people (Marchiori et al., 2012; Jacobson et al., 2019). Furthermore, in no world region is the daily supply of calories as low as in SSA (United States Department of Agriculture, 2018).

This is important to consider in migration studies since low caloric supply levels (LCSLs) and the associated higher risk of food insecurity may become salient factors influencing households' migration propensities (Barret and Bellemare, 2011). The literature (Barret and Bellemare, 2011; Flahaux and Haas, 2016) indicates that poverty is one of the main causes of population movements in SSA, where migration is an adaptation strategy more often than elsewhere. In addition, United Nations High Commissioner for Refugees (2015) expects a substantial growth of migrant flows from and within Africa due to demographic developments. The rapid population growth will exacerbate the difficult living conditions in many SSA regions. Hence, in this part of Africa the causes of migration do not appear to be as obvious and one-dimensional, as for instance, in countries with ongoing wars, which are responsible for strongly negative effects on the human population. This makes SSA a relevant region to examine the focal factor food insecurity while controlling for other important factors of migration.

Empirically analyzing the link between migration and food insecurity has been investigated in several studies before. Nevertheless, given the number of publications, this topic still seems to be somewhat underrepresented in migration studies. To begin with, a household survey by Tegegne and Penker (2016) in rural Ethiopia indicated that food shortages lead primarily to short-term migration to areas where households can find seasonal employment. Also Rademacher-Schulz et al. (2014) found shifting seasonal migration as response to food insecurity in Northern Ghana. Crush and Caesar (2016) point out that food insecurity is not always just a result of a household's inadequate food production, but also stems from insufficient remittances from migrants, on which the household rely to buy sufficient food of good quality.

Even more recently, several studies have brought additional attention to food insecurity as a cause of migration (Choithani, 2017; Jacobson et al., 2019; Sadiddin et al., 2019; Smith and Floro, 2020). These studies define food insecurity as "the lack of regular access to nutritious and sufficient food" (FAO, 2019). The studies by Sadiddin et al. (2019) and Smith and Floro (2020) both use qualitative data from the Gallup World Poll (Gallup, 2018) to examine whether the extent of migration is associated with the severity of food insecurity for people in SSA. The integrated Food Insecurity Experience Scale (FIES) survey module employs a set of eight questions about their experiences while struggling meeting their basic food needs over the past 12 months. Answers to these questions are used to determine the level of food insecurity severity.

Sadiddin et al. (2019) investigated empirically the three stages of the migration decision process – desire, planning and acutal decision – and compared the answers with the data from the FIES. In contrast, Smith and Floro (2020) measured the aspiration of migration by splitting it into two variables. First, the migration intentions variable asked only about permanent migration; ignoring temporary migration. Second, the migration preparations variable only referenced those who plan to migrate within the next 12 months. Sadiddin et al. (2019) and Smith and Floro (2020) both indicate that food insecurity significantly influences migration. Sadiddin et al. (2019) conclude that food insecurity is positvely associated with the desire to migrate but negatively associated with the final decision to migrate. Similarly, Smith and Floro (2020) found that international migration intentions become stronger as food insecurity becomes more severe, and that the likelihood of international migration preparations decreases with the severity of food insecurity. However, the net outcome, if and how many people actually migrate, is not quantified. Presumably, the lack of national data bases in SSA host countries listing the immigrants and their respective countries of origin impedes an approach like this.

Unlike the records of most SSA countries, Eurostat (2020a) does provide numbers on first time asylum applicants ($FTAs_i$) from SSA countries (Table 1) - however, this data did not allow for any qualitative distinction among the migrants. Hence, we can adapt a quantitative approach with $FTAs_i$ as outcome variable and a series of migration determinants as explanatory variables. Among the set of explanatory variables, our attention is primarily focused on the role of local food insecurity.

We assume that a country experiences food insecurity when CS_i is on low levels due to shortages, whereby CS_i data measures food available for consumption without accounting for consumption-level food waste. The occurrence of shortages has a number of reasons. Several studies point to shocks related to weather (Zorya 2011; Warner and Afifi, 2014) income (Gilbert, 2010) and policy (Christiaensen, 2009) as most important reasons. Furthermore, violent conflict is also ought to cause food insecurity and vice versa (Hendrix and Brinkman, 2013).

Table 1: Data definitions and sources

Variable name	Definition	Source
$FTAs_i$	Number of first-time asylum applicants in EU per SSA country i	Eurostat
CS_i	Caloric supply per day	FAO
POP_i	Population size [1/million]	WDI
AG_i	Proportion of age group 15 – 24 of a country's total population [%]	CIA World Factbook
$GDPpc_i$	GDP p.c. [constant2010$] as a proxy for relative poverty	WDI
UE_i	Unemployment rate [%]	WDI
C_i	Presence of conflict [dummy: 1 = severe conflict, where yearly fatalities > 25, 0 = otherwise]	ACLED
D_i	Number of people affected by various disasters	EM-DAT
$POLR$	Policy dummy: 0 = mild or no restriction, 1 = more severe restriction	Literature research
$DIST_{ij}$	Minimal population weighted distance by foot between i and j [1/thousand km], j=most frequented ports for SSA-EU migrants (Ceuta, Benghazi or Tripoli)	CEPII GeoDist, Google Maps

Source: Own research

The empirical analysis is designed to test our prime hypothesis that food insecurity - proxied by LCSLs - leads to additional SSA-EU migration as measured by the number of $FTAs_i$ due to more people applying migration as an adaptation strategy. By shedding light on statistically significant variables contributing to migration, our analysis helps policymakers to tackle the numerous problems arising from large and often sudden arrivals of migrants from SSA to the EU.

2 Data and methods

The empirical study uses data for 38 of the 49 Sub-Saharan countries and the examination period extends from 2008 to 2019. Time and number of countries were limited by the availability of migration and CS_i data. The data set is balanced. Table 1 describes the data set in our analysis. $FTAs_i$ are given in absolute numbers per country i. Annual average CS_i is measured in daily kilocalories per person. The statistics of the FAO (2017b) only capture values until 2017, therefore, the values for the years 2018 and 2019 were extrapolated.

The examination had to be limited to this one food related indicator as lacking data did not allow for the consideration of any better representation of a household's food situation.

LCSLs should indicate food insecurity and therefore, we expect that a decrease in CS_i leads to an increase in $FTAs_i$, because prevailing food insecurity would force households to migrate.

Similarly, we expect that a decline in GDP per capita ($GDPpc_i$, in constant U.S. dollar 2010) causes $FTAs_i$ to rise as well because residents face worse economic conditions and thus, fewer opportunities to invest in food. An increase of the unemployment rate (UE_i, in %) is also expected to increase $FTAs_i$ for the same reasons. However, the financial situation of the individual might have ambiguous effects because a certain amount of capital is necessary to carry the cost of migration at all (Findlay and Sow, 1998; Hatton and Williamson, 2003). Accordingly, this may discourage those households that are most vulnerable to LCSLs from sending household members to Europe to benefit from their remittances.

Furthermore, the population size (POP_i, absolute numbers) is assumed to be positively related to $FTAs_i$ as the population is the at-risk pool. Moreover, growing populations in a limited area over time will put more pressure on the resources of a country. With respect to the population age, we expect that younger populations (high percentage of 15 to 24-year old residents) are associated with more migration as most migrants are young (FAO, 2017a). The presence of conflict (C_i, dummy variable which is equal to 1 if yearly fatalities are >25) and the number of people affected by disasters (D_i, absolute numbers) is likewise hypothesized to increase $FTAs_i$, since migrants flee from immediate threats to their lives.

In 2015, the EU introduced more severe political measures aimed at restricting migration, such as stricter border controls. Finally, we hypothesize that the restrictions (POLR=1, otherwise 0) reduce $FTAs_i$, as they make crossing the Mediterranean Sea more difficult. The restrictions are largely based on the European agenda on migration 2015-2020 (European Commission, 2015) which includes measures to protect the EU's external borders and deal with return of irregular migrants, addressing migration in cooperation with third countries through political and financial means.

Table 2 shows descriptive statistics for the years 2014 and 2016, that is, before and after the EU implemented the new migration policy. Significant divergence is indicated between the annual means of two variables. $FTAs_i$ and D_i has grown by about 78.6% and 32.7% from 2014 to 2016.

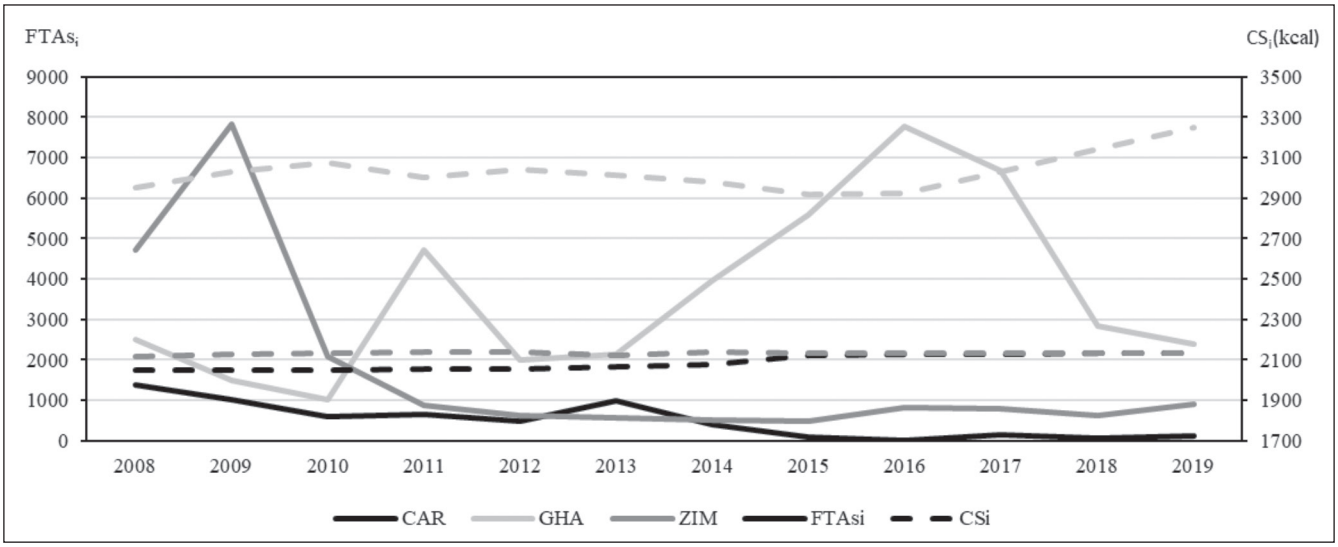
To illustrate exemplarily the relationship of migration and caloric supply as of the data captured, Figure 1 provides the values for $FTAs_i$ and CS_i for three selected countries. We cannot detect specific patterns from the graph though, reinforcing the need for a more detailed multivariate analysis.

Table 2: Descriptive statistics for the years 2014 (POLR=0) and 2016 (POLR=1)

	2014							2016						
Variables	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
FTASi	38	2,080	4,022	5	175	1,040	18,895	38	3,714	8,199	3	186	1,741	46,245
CSi	38	2,453	297	1,820	2,246	2,637	3,003	38	2,439	316	1,755	2,179	2,680	2,986
POPi	38	2.3E+07	3.3E+07	5.2E+05	4.0E+06	2.6E+07	1.8E+08	38	2.5E+07	3.5E+07	5.3E+05	4.3E+06	2.7E+07	1.9E+08
AGi	38	20.2	1.3	15.9	19.6	20.8	23.4	38	20.0	1.0	17.4	19.5	20.5	23.0
GDPpci	38	1,862	2,373	334	561	1,610	9,477	38	2,170	2,918	360	567	1,695	12,029
UEi	38	7.2	6.7	0.5	2.6	8.9	24.9	38	7.3	7.0	0.5	2.6	8.8	26.6
Ci	38	0.4	0.5	0.0	0.0	1.0	1.0	38	0.4	0.5	0.0	0.0	1.0	1.0
Di	38	181,649	694,110	0	0	18,531	4,000,000	38	241,122	653,777	0	0	25,182	3,011,000

Source: Own research

Figure 1: Values of $FTAs_i$, CS_i for three selected countries: Central African Republic, Ghana and Zimbabwe



Source: Own illustration

At first, we estimate a basic panel model of the form $\log(FTAs_i) = f(\log(CS_i)$, including country effects. Subsequently, we enhance the model to control for the influence of other salient covariates.

Some variables, including the key variables $FTAs_i$, CS_i and $GDPpc_i$, enter the model in logarithmic form.

The final estimated full model is specified as:

$$\log(FTAs)_i = \beta_0 + \beta_1 \log(CS_i) + \beta_2 POP_i + \beta_3 AG_i + \beta_4 \log(GDPpc_i) + \beta_5 UE_i + \beta_6 C_i + \beta_7 D_i + \beta_8 POLR + \alpha_i + v_i$$

, where α_i is the fixed effects term per country and v_i is the error term.

3 Results

We begin our analysis with the important bivariate correlations between migration and caloric supply. We expect significant positive correlations, especially during the years prior to the EU imposing restrictions in 2015. Table 3 shows the correlation coefficients for CS_i for each year. In none of the years any correlation could be found with $FTAs_i$ and CS_i. Neither did the values significantly differ when considered jointly for the time before and after 2015.

Table 3: Yearly bivariate coefficients between $FTAs_i$ and CS_i with the two values of POLR

		CS_i	
	Year	Estimate	p-value
POLR = 0	2008	0.002	0.150
	2009	0.001	0.528
	2010	0.001	0.394
	2011	0.002	0.127
	2012	0.001	0.157
	2013	0.001	0.226
	2014	0.001	0.170
POLR = 1	2015	0.002	0.137
	2016	0.002	0.042
	2017	0.002	0.111
	2018	0.001	0.389
	2019	0.000	0.778

Conversely, the created panel model for $FTAs_i$ and CS_i, shows clear significance for CS_i, so that a 1% increase in CS_i leads to a 93.6% decline in $FTAs_i$ (Table 4).

Table 4: Results of the linear regression model including $FTAs_i$, CS_i and country effects

	Estimate	SE	t-value	p-value
CS_i	-0.936	1-314	-0.712	0.477

Source: Own calculations

The $FTAs_i$ - CS_i model is then transferred into a full model which contains all the remaining variables as indicated in Table 1. We approach the question whether CS_i will still show up significantly among the other variables which might be powerful predictors and absorb the influence of CS_i. Table 5 shows the estimation results for the full model stated in the previous equation.

Table 5: Results of the full model

	Estimate	SE	t-value	p-value
CS_log_i	0.003	0.000	10.267	0.000*
POP_i	0.016	0.003	6.371	0.000*
AG_i	-0.080	0.073	-1.093	0.275
$GDPpc_i$	0.067	0.122	0.548	0.584
UE_i	-0.154	0.016	-9.689	0.021*
C_i	0.097	0.171	0.571	0.569
D_i	0.000	0.000	-0.747	0.456
$POLR_i$	0.472	0.151	3.136	0.002*

Source: Own calculations

It is indicated that CS_i is still significant, but the estimate is substantially smaller and a change of sign occurs. Other significant variables are POP_i, UE_i and $POLR_i$. The correlation is positive for all variables except UE_i. Statistical significance is very high for each of the four variables as indicated by p-values of 0.021 and smaller. While an increase of 1% of CS_i leads to an increase in $FTAs_i$ by 0.3%, the same growth in POP_i makes increase it by 1.6%, ceteri paribus. An 1% higher UE_i increases $FTAs_i$, ceteris paribus, by 9.7%. And when additional political restrictions are in force (i.e. when POLR=1), $FTAs_i$ is 47.2% higher compared to the previous condition.

Eventually, the variable $DIST_i$ which has been left out of the modeling for statistical reasons so far is analyzed with a correlation test between the variable and the country specific effects. $DIST_i$ shows a negative correlation of the effect with $FTAs_i$ (-0.58). That is, examined SSA countries which are further away from the EU borders have fewer $FTAs_i$ than countries which are closer, more northern, located. As another influential circumstance in this context, it should be considered that the EU is arguably less attractive for certain SSA migrants when closer locations could be promising destinations as well, for instance, the relatively prosperous South Africa.

Figure 2 provides the country specific effects for $FTAs_i$ compared to the average (0). More precisely, the baseline for the country effects is a country with the means of the numerical variables and dummies in their primary conditions.

From the location of the intervals, we see that the distribution is quite balanced since about half of the countries is either in the positive or negative area of the diagram. Countries far above the average are Angola, Cameroon, Ghana and Guinea while countries far below the average are Cabo Verde, Mozambique, Senegal and Swaziland.

4 Discussion and conclusion

Low caloric supply levels (LCSLs) were expected to contribute to the migration from SSA to the EU. The analysis of the basic model only including caloric supply (CS_i) as independent variable, indicated significance for LCSLs with a negative effect on migration figures ($FTAs_i$). In the full model, CS_i was still significant, but showed now a substantially smaller but positive effect on $FTAs_i$.

There might be several reasons for this inconclusive outcome. On the one hand, a poor food situation can trigger migration as said adaptation strategy of affected households. On the other hand, additional factors, for instance, factors related to finances can keep vulnerable households to food insecurity from migrating as this action involves high costs (Hatton and Williamson, 2003).

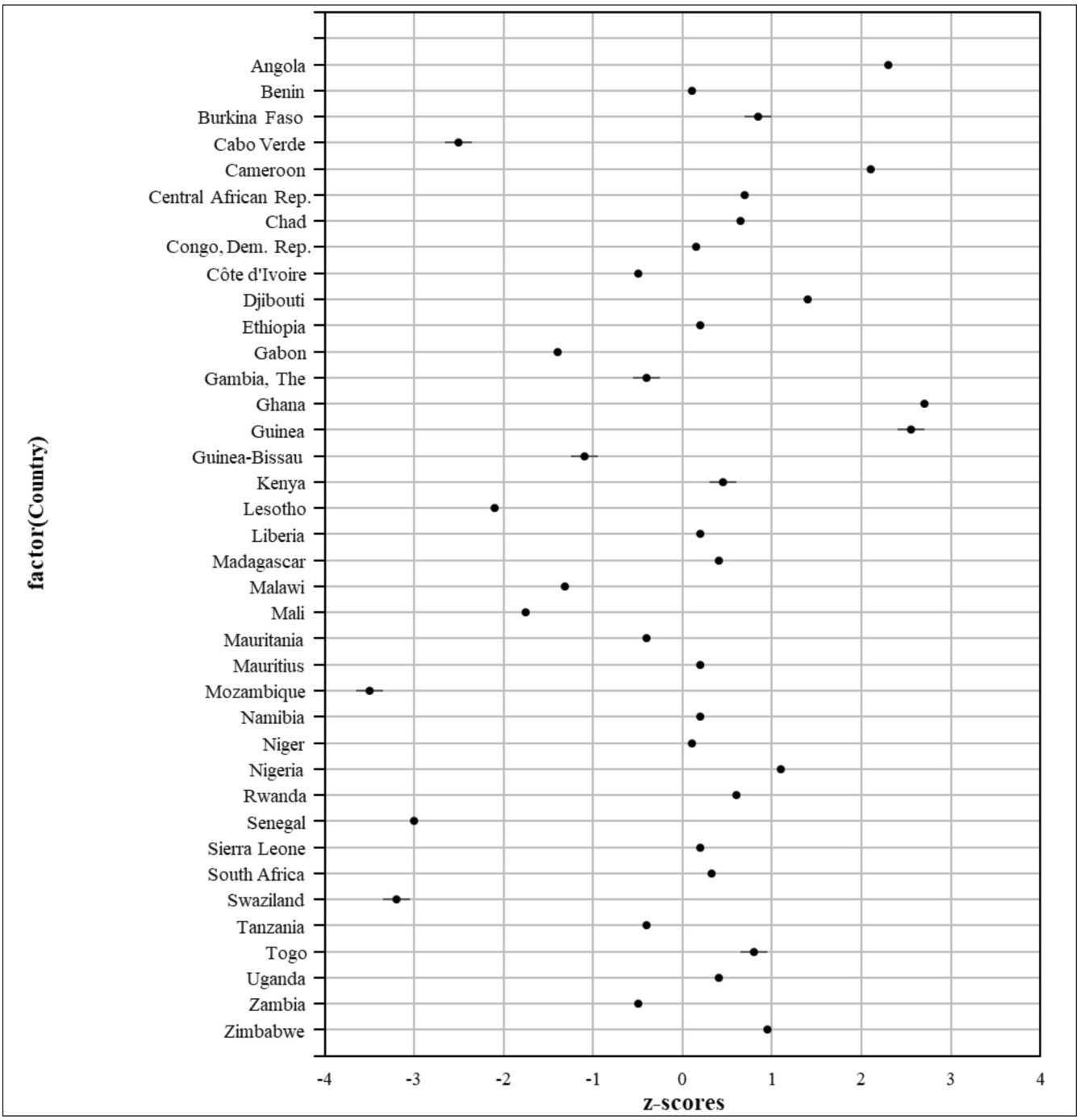
Furthermore, also if LCSLs contribute to out-migration of SSA, affected people might even more migrate on a rather local level, i.e. between African countries, or from rural to urban regions, as indicated by Choithani (2017) and Sadiddin et al. (2019). Likewise, this might be related to especially high financial costs of migration to the EU.

The presented analysis faces some limitations. At first, one needs to consider that CS_i can only be a quantitative proxy for food (in)security as the latter is a complex phenomenon and not always related to the actual local food supply. Furthermore, the choice of only one indicator related to food supply due to lacking data, could be too inefficient to illustrate the food situation in each of the countries under study.

In this study, variables that did show statistical significance, were caloric supply (CS_i), population size (POP_i), unemployment rate (UE_i) and political restrictions (POLR). As mentioned in the beginning, an increasing POP_i translates into a larger pool of potential migrants. Moreover, one might be inclined to attribute more migration to resource pressures induced by a large population size. However, in this context, the real population density would probably have a greater significance, because this measure relates population to available arable land.

The results for the economic variable UE_i show effects on $FTAs_i$ and do confirm what has been supposed in the data methods section: economic effects are having ambiguous effects on $FTAs_i$. An 1% in UE_i leads to a 15.4% decrease in

Figure 2: Individual effects of the examined countries



Source: Own calculations

$FTAs_i$. Economic conditions can affect the financial situation of an individual and thus, its capability to buy a sufficient food quantity or to bear the previously stated high cost of migration.

The stricter regulations introduced in 2015 by the EU to face illegal migration might have considerably reduced the overall number of migrants coming to the EU subsequently (Eurostat, 2020b). Yet, the total number of $FTAs_i$ from SSA countries considered in this study was still increasing by 47.2% thereafter – despite the presence of those additional political restrictions (POLR). Apparently, POLR did not keep more people from the examined countries from crossing the borders to the EU as the bivariate coefficients from Table 3 confirm. Looking at its coefficients only, there is no large divergence between the years before and after the EU regulations detectable (from 0.250 to 0.291). However, the overall increase in immigration can be attributed to several significant increases in $FTAs_i$ in certain countries after the year 2015. They could especially be detected for Cameroon, the Democratic Republic of the Congo, Nigeria, Mozam-

bique and Guinea. In all five countries severe conflicts (compare C_i variable in Table 2) had arisen during this period.

The findings from this work do not yield a definitive answer, but there is some evidence that food insecurity reflected by LCSLs induces additional migration from SSA countries to the EU. Moreover, our results suggest that large migration arrivals will be associated with large populations and high unemployment in the origin countries. Also, restrictive policies as designed by the EU and introduced in 2015 might bring about the intended reducing effect.

In the future, more studies are needed that are devoted to the context of food insecurity and migration from Sub-Saharan Africa (SSA) to the EU. For the application of a quantitative approach accounting for the local food situation like in this article, respective research requires additional annual statistics on food related measures like the prices of those food commodities most relevant for local diets per examined SSA country. Since this data basis is currently still incomplete in many SSA countries, as a prior step, the broad establishment of data collections is key. The EU could assist in establishing the bureaucracy needed for this process by providing its expertise and other necessary means. A better understanding of the relevance of food (in)security to migration in SSA may require an adaptation of the European migration policy towards a greater attention to food and agriculture specific issues in the countries of origin.

References

Barret, C. B. and Bellemare, M. F. (2011) Why Food Price Volatility Doesn't Matter. URL: https://researchgate.net/publication/251350786_Why_Food_Price_Volatility_Doesn%27t_Matter/ (26.09.2020).

Choithani, C. (2017) Understanding the linkages between migration and household food security in India. Geographical Research, 55, 2, 192-205. DOI: 10.1111/1745-5871.12223.

Christiaensen, L. J. (2009) Revisiting the global food architecture. Lessons from the 2008 food crisis. WIDER Discussion paper, 2009, 4. URL: http://hdl.handle.net/10419/84664/ (05.09.2020).

Crush, J. and Caesar, M. (2016) Food Remittances: Migration and Food Security in Africa. Waterloo, ON: Southern African Migration Programme, 1-51.

Davenport, C., Moore, W. and Poe, S. (2003) Sometimes You Just Have to Leave: Domestic Threats and Forced Migration, 1964-1989. International Interactions 29, 1, 27–55. DOI: 10.1080/03050620304597.

European Commission (2015) A European Agenda on Migration. Brussels.

Eurostat (2020a) Asylum and First-time asylum applicants by citizenship, age and sex Annual aggregated data. URL: https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do/ (10.02.2020).

Eurostat (2020b) Asylum statistics - Statistics Explained. URL: https://ec.europa.eu/eurostat/statistics-explained/index.php/Asylum_statistics/ (23.09.2020).

Findlay, S. and Sow, S. (1998) From Season to Season: Agriculture, Poverty and Migration in the Senegal River Valley, Mali, in R. Appleyard. Emigration Dynamics in Developing Countries, 1.

Flahaux, M.-L. and Haas, H. de (2016) African migration: trends, patterns, drivers. In: Comparative Migrations Studies, 4, 1. DOI: 10.1186/s40878-015-0015-6.

FAO (Food and Agriculture Organization of the United Nations) (2017a) Evidence on internal and international migration patterns in selected African countries. URL: http://fao.org/3/i7468en/i7468en.pdf/ (20.09.2020).

FAO (Food and Agriculture Organization of the United Nations) (2017b) New Food Balances - Food supply (kcal/capita/day). URL: http://fao.org/faostat/en/#data/FBS/ (23.09.2020).

FAO (Food and Agriculture Organization of the United Nations (2019) The State of Food Security and Nutrition in the World 2019. URL: http://fao.org/3/ca5162en/ca5162en.pdf/ (17.09.2020).

Gallup (2018) Worldwide research: methodology and codebook. Gallup World Poll, 81.

Gilbert, C. L. (2010) Speculative Influences on Commodity Futures Prices 2006-2008. United Nations Conference On Trade And Development, 197.

Hatton, T. J. and Williamson, J. G. (2003) Demographic and Economic Pressure on Emigration out of Africa. Scandinavian Journal of Economics 105, 3, 465–486. DOI: 10.1111/1467-9442.t01-2-00008

Hendrix, C. S. and Brinkman, H.-J. (2013) Food Insecurity and Conflict Dynamics: Causal Linkages and Complex Feedbacks. Stability: International Journal of Security & Development 2, 2, 26. DOI: 10.5334/sta.bm.

International Organization for Migration (2020) Missing Migrants Project. URL: https://missingmigrants.iom.int/ (15.09.2020).

Jacobson, C., Crevello, S., Chea, C. and Jarihani, B. (2019) When is migration a maladaptive response to climate change? Regional Environmental Change 19, 1, 101–112. DOI: 10.1007/s10113-018-1387-6.

Kansteiner, W. (2019) Migration, racism, and memory. Memory Studies 12, 6, 611–616. DOI: 10.1177/1750698019886712.

Marchiori, L., Maystadt, J.-F. and Schumacher, I. (2012) The impact of weather anomalies on migration in sub-Saharan Africa. Journal of Environmental Economics and Management 63, 3, 355–374. DOI: 10.1016/j.jeem.2012.02.001.

Naudé, W. (2008) Conflict, disasters and no jobs: Reasons for international migration from Sub-Saharan Africa. WIDER Research paper, 85. URL: http://hdl.handle.net/10419/45125/ (28.09.2020).

Pew Research Center (2018) Migration From Sub-Saharan Africa to Europe Has Grown Since 2010. URL: https://pewresearch.org/global/2018/03/22/at-least-a-million-sub-saharan-africans-moved-to-europe-since-2010/ (07.02.2019).

Rademacher-Schulz, C., Schraven, B. and Mahama, E. S. (2014) Time matters: shifting seasonal migration in Northern Ghana in response to rainfall variability and food insecurity. Climate and Development 6, 1, 46–52. DOI: 10.1080/17565529.2013.830955.

Sadiddin, A., Cattaneo, A., Cirillo, M. and Miller, M. (2019) Food insecurity as a determinant of international migration: evidence from Sub-Saharan Africa. The international Society for Plant Pathology, 11. 3, 515–530. DOI: 10.1007/s12571-019-00927-w.

Schmeidl, S. (1997) Exploring the Causes of Forced Migration: A Pooled Time-Series Analysis, 1971-1990*. Social Science Quarterly 78, 2, 281–308.

Smith, M. D. and Floro, M. S. (2020) Food insecurity, gender, and international migration in low- and middle-income countries. Food Policy 91, 101837. DOI: 10.1016/j.foodpol.2020.101837.

Tegegne, A. D. and Penker, M. (2016) Determinants of rural out-migration in Ethiopia: Who stays and who goes? Demographic Research 35, 34, 1011–1044. DOI: 10.4054/DemRes.2016.35.34.

United Nations High Commissioner for Refugees (2015) The sea route to Europe: The Mediterranean passage in the age of refugees. Geneva.

United States Department of Agriculture (2018) International Food Consumption Patterns. USDA calculations based on data from Euromonitor International. URL: https://ers.usda.gov/data-products/international-food-consumption-patterns/ (12.10.2020).

Warner, K. and Afifi, T. (2014) Where the rain falls: Evidence from 8 countries on how vulnerable households use migration to manage the risk of rainfall variability and food insecurity. Climate and Development 6, 1, 1–17. DOI: 10.1080/17565529.2013.835707.

Wood, W. B. (1994) Forced Migration: Local Conflicts and International Dilemmas. Office of the Geographer and Global Issues, U.S. Department of State.

Zorya, S. (2011) Missing Food: The Case of Postharvest Grain Losses in Sub-Saharan Africa. Annals of the Association of American Geographers, 84, 4, 607-634.