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"From Fields to Frontiers: Cash Crop Price Shocks and Migration Intentions in Sub-Saharan Africa"

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"From fields to frontiers"

Cash crop price shocks and migration intentions in rural Africa

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Abstract

How do cash crop price shocks shape migration intentions in rural, agriculturally intensive regions of sub-Saharan Africa? Focusing on communities heavily reliant on cash crop income, we examine migration intentions following negative cash crop price shocks. Using a difference-in-differences approach with continuous treatment, we analyze data from 278,898 rural individuals across 432 regions in 41 sub-Saharan African countries. The results indicate that a negative cash crop price shock increases the likelihood of international migration intentions, an effect that is particularly pronounced in regions with higher cropland intensity. These findings are confirmed by several additional analyses and contribute to a better understanding of the relationship between agricultural livelihood instability and migration intentions in sub-Saharan Africa.

Keywords: migration, cash crops, agriculture, economic and price shocks, sub-Saharan Africa

JEL classifications: F22; R23; Q10; E30

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Introduction

In recent years, the study of migration from developing countries has generated a vast academic literature, driven by increasing global migration flows, and the growing recognition of environmental and agricultural shocks as key factors influencing migration decisions. Understanding the factors that motivate individuals to consider migration is crucial for policymakers and researchers alike. One of the first indicators of potential migration is the intention to migrate, which can provide early insights into future migration trends. International surveys such as the Gallup World Poll, Afrobarometer, and Arab Barometer have increasingly begun to capture this information, offering a valuable resource for analyzing the determinants of migration intentions. According to the 2021 Gallup World Poll, 37 percent of African adults expressed a desire to leave their country permanently if given the opportunity. The intention to migrate, even in the absence of a concrete plan, represents a critical initial step in the migration decision-making process, eventually leading to actual migration, as documented empirically (e.g. Docquier et al. 2014; Tjaden 2019).

Understanding the factors that influence migration intentions is particularly important in sub-Saharan Africa (SSA), where economic instability and agricultural dependence are prevalent. Agriculture plays a crucial role in the economies of most sub-Saharan African countries, contributing significantly to their income, often accounting for 30 to 40 percent of GDP. The structure of agricultural economies varies widely across the region, with agriculture contributing as little as 3 percent to GDP in Botswana and South Africa, but over 50 percent in Chad. Just above half of sub-Saharan Africa's total labor force (52 percent) is employed in the agricultural sector (ILO 2024). Smallholder farms dominate the agricultural landscape of sub-Saharan Africa, accounting for 80 percent of all farms and directly providing employment to approximately 175 million people (Alliance for a Green Revolution in Africa 2014). Cash crop production is the mainstay of agriculture in many African countries. For instance, in Benin, cotton accounts for 80 percent of the country's export earnings and 13 percent of its GDP (AFDB 2019). In 2023, cocoa beans and products accounted for almost 70% of Côte d'Ivoire's total agricultural export earnings, almost 60% of Ghana's agricultural export earnings (IFPRI, 2024). Particularly in rural areas, the additional income from cash crops supports large segments of the population. In Senegal, for example, groundnut cultivation remains a key source of income for family farms, employing two-

thirds of the rural population, many of whom live below the poverty line. It is grown by 27 percent of all households and 52 percent of households in extreme poverty (World Bank 2017). While the income of cash crops is substantial, especially in rural areas, the heavy reliance on agriculture makes economies highly sensitive to global market fluctuations and potential shocks in cash crop prices.

This paper investigates the impact of exogenous agricultural price shocks on the intention to migrate from rural areas in SSA. Utilizing individual-level data from a sample of 278,898 individuals across 41 SSA countries, collected through the Gallup World Poll from 2009 to 2022, our study analyzes the impact of international price fluctuations for 11 key agricultural commodities on migration intentions. The exogenous nature of these price shocks, determined by global market dynamics, allows us to isolate their effects on rural populations who depend heavily on agriculture (Anderson and Bruckner 2012). Focusing on rural areas offers several advantages. First, as discussed above, rural regions in SSA are economically very reliant on agriculture, particularly on cash crop cultivation. Second, although poorer, less mobile, and more attached to their land, rural residents may use migration as a strategy to cope with negative economic shocks (Bryan et al 2014). Third, rural areas, in particular, play a critical role in migration patterns, as they often serve as starting points for both internal migration and, subsequently, international migration (Cirillo et al. 2022). Lastly, focusing solely on rural populations ensures a more homogenous sample with shared socioeconomic and infrastructural characteristics, reducing variability unrelated to our research question; it also avoids noise from non-agricultural contexts and urban-specific dynamics, while aligning with policies aimed at managing migration and supporting rural livelihoods.

Our study employs a difference-in-differences approach with continuous treatment to compare migration intentions across individuals in rural areas, varying by their level of agricultural dependency. This methodological choice allows us to robustly test the hypothesis that agricultural price shocks influence migration intentions by affecting the incomes of those reliant on cash crop production. By analyzing the impact of cash crop price shocks on migration intentions, we aim to contribute to the broader literature on the determinants of migration and the specific role that economic shocks play in shaping these intentions. Previous studies, for instance, have investigated the roles of deprivation, poverty, and well-being indicators as key determinants of migration

intentions and decisions. While the link between absolute income and migration is well established, with higher absolute income shown to encourage regular migration planning and reduce irregular migration considerations (Restelli, 2023), Shamsuddin et al. (2022) and Kafle et al. (2020) provide evidence that relative well-being also plays a role. Shamsuddin et al. (2022), analyzing data from 129 countries, focus on migration intentions and find a significant association with subjective perceptions of lower financial well-being. Similarly, Kafle et al. (2020) examine the effect of relative deprivation on migration decisions in sub-Saharan Africa and observe that relative deprivation compared to other households in the community drives migration decisions, particularly among rural and agricultural households. Diallo (2022) utilizes Afrobarometer data to construct a subjective poverty index, highlighting its significant impact on migration intentions in Senegal. Similarly, Smith and Floro (2020), analyzing data from the Gallup World Poll across 94 low- and middle-income countries, find that the likelihood of migration intentions increases with the severity of household food insecurity.

Other studies have analyzed the influence of climate shocks on migration. For instance, Beine et Parsons (2016) find that natural disasters and other long-run climatic factors have no direct impact on international migration, rather their effects are indirect, operating through wages. In another study, Beine et al. (2021) conclude, contrary to common predictions that climate change will increase international migration, that discourse on climate change, as measured by media reports, is correlated with greater exposure to climate risks but with lower emigration rates. Bertoli et al. (2022) conduct a meta-analysis to explore how weather anomalies influence internal and international migration intentions across 13 Western African countries. While they identify significant effects in a few cases, the overall robustness of their findings is deemed insufficient by the authors. Similarly, Bekaert et al. (2021), using individual data from the Gallup World Poll, examine the impact of self-reported environmental stress on migration intentions. Their analysis reveals that exposure to environmental stress increases the likelihood of migration intentions, with the strongest effects observed for domestic migration in absolute terms and intra-regional migration in relative terms, rather than international migration.

Our paper is most closely related to the studies by Narciso (2020) and Bazzi (2017), which examine the impact of cash crop prices on migration decisions in Vietnam and Indonesia, respectively. Narciso (2020) provides evidence that drops in coffee prices act as a push factor for

internal migration, suggesting that migration serves as a shock-coping strategy. Interestingly, no evidence is found in relation to rice, which is mainly produced for household consumption. For Indonesia, Bazzi (2017) finds that positive rainfall and rising rice prices significantly increase international migration, particularly in communities with a high proportion of small landowners. Conversely, in more developed rural villages, rising rice prices reduce international migration, as the higher opportunity costs make staying more attractive. However, our study differs in key aspects: (i) we focus on migration intentions rather than decisions; this distinction is crucial because the intentions to migrate and positive income shock are less affected by simultaneity issues, given that migration intentions remain largely unaffected by the lack of financial means that would turn migration into reality; (ii) we cover a broader geographical scope, including 432 regions across 41 SSA countries, and (iii) we analyze a wider range of 11 agricultural products (iv) over a longer period, from 2009 to 2022, thanks to our reliance on Gallup's annual survey waves. This approach enables us to more effectively assess the impact of price shocks on migration intentions in a region where agriculture remains a vital, yet vulnerable, economic sector.

Our main results show that in rural areas with high cash crop intensity, a decrease in international agricultural price index raises the probability of migration intentions. This result remains stable across various specifications and after additional analyses including robustness and placebo tests. Section 2 briefly discusses the transmission of international agricultural prices to incomes in rural Africa. The data and empirical methodology are presented in Section 3. Results are discussed in Section 4, and Section 5 offers some concluding remarks.

Transmission of international agricultural prices to rural Africa

Cash crops are generally defined as farm outputs that are sold on formal agricultural markets. Some of these agricultural products are not only exported but also sold on local markets or used as subsistence crops, as is the case for rice, maize, wheat and sorghum. Others, such as tea, coffee and cocoa, essentially supply the international market. In both cases, however, their prices are closely linked to the international market. The international prices of cash crops can be considered exogenous, and our hypothesis is that a shock in international cash crop prices primarily affects the income levels of farmers and rural households of sub-Saharan African regions.

The varying impact of fluctuations in international agricultural commodity prices on rural incomes across Africa is well documented in the contemporary literature. Minot and Daniels (2005) estimate the direct and indirect effects of a negative shock in cotton prices on rural income and poverty in Benin. Their results indicate that a $1 reduction in income for cotton farmers leads to a $2.96 decrease in overall income. Additionally, they find that a 40 percent decline in cotton prices increases rural poverty by 8 percentage points in the short run and by 6 to 7 percentage points in the long run. In a study on cash crop liberalization in Malawi, evidence shows that households which decide to grow cash crops benefit from higher incomes compared to those who do not (Masanjala 2006). Maertens and Swinnen (2009) find that increasing standards in Senegal's fruit and vegetable export chain positively impacts rural household income and reduces poverty. Nakelse et al. (2018) examine the impact of a global cereal price shock on the welfare of rural households in Burkina Faso, focusing on the transmission of international prices to local producers and consumers. They find that increases in international prices lead to an improvement in rural household welfare, as the positive impact on producers outweighs the negative effect on consumers.

On the other hand, there is significant heterogeneity observed in the transmission of international agricultural prices to the incomes of small farmers in Africa. Fafchamps and Hill (2008) investigate the discrepancy between the prices received by small farmers in Uganda and international market coffee prices. The research finds that while changes in international prices are quickly reflected in the prices at the export and wholesale levels, the prices paid to coffee growers rise much less proportionally. This result is in line with a FAO study, Conforti (2004). The author explains this imperfect transmission by the presence of many small traders and the lack of information among farmers. Radchenko et al. (2018) focus on farmers' cash crop specializations, rather than international prices, to highlight the heterogeneity of commercialization gains within the rural economy of Malawi.

These limitations mentioned above are also present in our study: (i) international price indices do not necessarily capture the regional income generated from these crops with high accuracy; (ii) income earned directly by cash crop workers in rural areas may be overestimated due to the varying number of intermediaries involved in the commercialization chain; and (iii) rural individuals who do not work within the agricultural sector may be shielded from income

variations resulting from cash crop price shocks. While we acknowledge these limitations, which could induce potential measurement errors, our methodological approach partially addresses them as follows: (i) we use international cash crop prices weighted by the agricultural share of regional output. This weighting reflects the relative importance of agriculture in the local economy and helps to smooth out individual-level heterogeneity in income effects, thereby mitigating measurement errors; (ii) our use of a continuous treatment allows us to model variations in exposure to international price changes across regions, implicitly accounting for the fact that not all regions are equally affected by these changes; and lastly, (iii) residual measurement errors may still arise from unobserved heterogeneity (e.g., differences in intermediary roles, local market conditions, or non-agricultural income sources). However, we partially address these through the inclusion of individual-level control variables.[4]

Data and Methodology

To construct our database, we combine data from several sources. Data for our dependent variable, which proxies international migration intentions, are sourced from the Gallup database, covering the years 2009 to 2022. We aggregate data from multiple waves of Gallup surveys conducted across various sub-Saharan African countries during this period. *Table 1* provides an overview of all Gallup surveys included in our sample. The unit of analysis is the individual respondent. To measure our binary outcome, indicating whether respondents express a preference for permanent relocation to another country, or prefer to remain in their resident country, we utilize the following survey question: "Ideally, if you had the opportunity, would you like to move permanently to another country, or would you prefer to continue living in this country?" Data for the control factors are likewise retrieved from the Gallup database.

To build our primary determinant, a regional-level aggregated cash crop price index, we rely on Fjelde (2015), by merging spatial time-invariant data providing information on the distribution and harvested area of various agricultural crops with data on exogenous, time-variant

[4] Related to intermediaries, it is also important to mention the existence of marketing boards in African countries, which were first established during the colonial period in the 1940s. Marketing boards initially aimed to stabilize cash crop prices (e.g., cocoa, coffee, cotton) and shield producers from market volatility. Most were dissolved or restructured during economic liberalization in the 1980s and 1990s, shifting their focus to quality control, export regulation, and farmer support. This transition has exposed cash crop producers more directly to global price volatility, resulting in asymmetric price adjustments that often disadvantage farmers (Subervie 2011).

international prices of these crops. International price data are provided by the World Bank (WB 2023) and the International Monetary Fund (IMF 2023), while data on the spatial distribution patterns of cash crops are drawn from the Spatially-Disaggregated Crop "Production Statistics Data in Africa South of the Sahara for 2017", provided by the International Food Policy Research Institute (IFPRI 2020).

IFPRI's Spatial Production Allocation Model (SPAM) utilizes a comprehensive set of spatially explicit input data, including crop production statistics, cropland information, assessments of biophysical crop suitability, population density data, and information on the spatial distribution of crops or crop systems. The input data are derived from various sources such as Agro-MAPS provided by FAOSTAT as well as other sub-national data sources including surveys from the World Food Programme (WFP), national statistical bureaus, regional centers, governmental ministries, NGO's, household surveys, environmental and water resource groups, and agricultural assessments. These data collection efforts primarily focus on developing regions such as Africa, Latin America, and Asia.

The SPAM data come in grid files with a 5-minute resolution, where each grid cell represents a geographic area of approximately 10 x 10 kilometers, detailing production and output patterns for a wide range of cash crops. Specifically, data on six different technology systems and 42 various crops are available, covering information on the physical area, harvested area, production, the value of production, and yield. Considering all technology systems, we focus on eleven cash crops, representing major African export commodities, for which we can retrieve international price data from the World Bank and the International Monetary Fund. These crops include wheat, rice, maize, sorghum, cocoa, cotton, groundnuts, coffee, tobacco, palm oil and tea. We rely on international price data since local cash crop prices are influenced by various internal factors within the local economy and agricultural systems (production levels, market demand, government policies, conflicts i.a.) making them endogenous to the local context.

For each crop we construct an international price index using 2010 as the base year and consequently weight these indices according to the harvested area of each crop. Given that the SPAM data is time-invariant, we opt to use data on harvested area of crops instead of production, value of production or yield data. We argue that harvested areas remain more stable over time and

are less subject to yearly fluctuations compared to actual crop production, which can be significantly affected by weather conditions and therefore vary strongly from year to year. We acknowledge that over time, the cultivation and harvested areas of crops will change, due to factors such as shifts in demand for cash crop commodities, physical conditions including climate change and soil depletion, as well as traditions and expertise (Fjelde, 2015). The SPAM data does not account for these changes, which presents a constraint to our analysis. However, we believe that the temporal scope of our analysis, which ranges from 2009 to 2022, is sufficiently short to minimize the impact to major changes in harvested crop areas.

We overlay the grid-cell SPAM data onto geographic maps depicting African regions at the first administrative level (ADM1) and calculate the harvested area of each crop in hectares within each region. Regions with no harvested crop area are assigned a value of zero. Subsequently, we determine the proportion of each of the eleven cash crops relative to the total cropland area within a region. Using the time-invariant share of the regional harvested area for each crop as a weighting factor, we adjust the respective cash crop price index, varying over time. Finally, we aggregate the weighted exogenous price indices of the eleven cash crops to create a composite cash crop price index. We compute our main variable of interest for region *r* crop *i* and time *t* as follows:

$$CropPIx_{rt} = \sum_{i=1}^{11} (w_{ir} P_{it})$$

where w_{ir} denotes the time-invariant share of the harvested area of the respective crop *i* in region *r,* and P_{it} represents the annual international price index of each cash crop. *Figure 1* presents the price evolution of each cash crop during the period 2009 to 2022. Prices tend to be quite volatile and only partially synchronized, but three booms seem to be clearly separated by periods of low prices. The 2007/2008 shock caused by drought and the international financial crisis was followed by a brief downturn, and prices rose again in 2010/2011 following poor harvests in the northern hemisphere. After a period of low prices, the Covid crisis (2021/2022) led to a surge in prices.

Our hypothesis is that a shock in cash crop prices primarily affects the income levels and wages of farmers and agricultural workers in the rural sectors of sub-Saharan African regions. Our final sample consists of 278,898 rural individuals across 453 regions in sub-Saharan Africa,

spanning 41 countries. While rural areas are sufficiently homogenous, there is still enough variation to divide them into intervention and baseline groups based on the cropland intensity. *Figure 2* illustrates the cropland intensity across sub-Saharan African regions as a percentage of the regional surface area. We categorize regions with cropland intensity[5] above the median into the treatment group, while those below the median constitute the control group. *Table 2* provides an overview of the number of treatment and control regions per country, while *Figure 3* geographically depicts these regions on the map. To estimate our regression model, we employ a difference-in-differences approach with our international price index as a continuous treatment. This method has the advantage of avoiding the need to define a boom period in a discrete and arbitrary manner (Black et al 2005). Moreover, in this case, several agricultural commodities are involved, for which the shocks are not completely synchronous. The logit model is specified as follows:

$$logit(P(Y_{i,r,c(r),t} = 1 \mid \mathrm{X}) = \beta_0 + \beta_1 CropPIx_{r(t-1)} + \beta_2 CropInt_r + \beta_3 (CropPIx_{r(t-1)} * CropInt_r) + \beta_4 X_{irt} + \delta_{c(r),t} + \varepsilon_{irt}$$

where the binary outcome variable $Y_{i,r,c(r),t}$ represents the emigration intentions of individual *i,* living in region *r* located within country *c* during year *t*. Specifically, it indicates whether the respondent would like to emigrate permanently or prefers to continue living in his/her current country of residence. β_1 and β_2 measure the effect of the cash crop price index and cropland intensity, respectively, on international migration intentions.

To account for the delayed impact of the price changes, we include a lagged term for the price index, using its value at time *t-1*, as shifts in cash crop prices are unlikely to influence migration intentions contemporaneously. Our main variable of interest, captured by β_3, measures the interaction effect between the aggregated cash crop price index and cropland intensity, which is a binary variable. A region is classified as having high cash crop intensity if the proportion of harvested crop area to the total regional area exceeds the median (~ 7.5 %); otherwise, it is classified as having low cash crop intensity. As mentioned above, we hypothesize that a negative

[5] We calculate cropland intensity as the ratio of the total crop area harvested in a region to the regional surface area.

shock in cash crop prices primarily affects individuals in rural areas, leading to increased migration intentions. This effect is expected to be more pronounced in highly cash crop-intensive areas, where the population relies heavily on income from cash crops. The interaction term aims to capture this additional effect on migration intentions resulting from fluctuations in cash crop prices, particularly affecting individuals residing in regions with high cash crop intensity. X_{irt} is a vector that includes all time-variant and time-invariant individual and household characteristics that might influence an individual's intention to migrate (i.e., gender, age, education, household size, income, networks). *Table 3* provides an overview and summary statistics of all variables included in the analysis.

While cash crop returns constitute a major source of income for rural populations in agriculturally intensive regions, we also control for overall income. This is a commonly used control factor in migration studies and accounts for other potential sources of income. Specifically, we create a binary income variable that takes the value 1 if per capita income is above the median, and 0 otherwise.[6] It is important to note that the cash crop price variable, which varies by year, primarily addresses the time-series aspect of the analysis. In contrast, the income variable, which varies across respondents and Gallup surveys, captures the cross-sectional variation.

The term $\delta_{c(r),t}$ represents country-year fixed effects that control for observed and unobserved characteristics, including environmental changes such as agricultural productivity and natural resource management policies, political stability and governance quality, social and demographic trends, as well as any other country-specific, time-varying factors that may influence individuals' migration intentions. It also captures any country-specific (time-invariant) and year-specific (country-invariant) effect. ε_{irt} denotes the conventional error term, with robust standard errors applied to account for potential heteroscedasticity.

Results

Table 4 presents the baseline specifications. We conduct a stepwise regression analysis to explore the effects of various factors on international migration intentions. *Column 1* focuses on the effect of our main variable of interest, the aggregated cash crop price index, on peoples' intentions to

[6] To address the issue of "bad control," we use a dummy variable in place of a continuous income variable, as income may partially incorporate revenue from agriculture.

move permanently to another country. We find that in rural sub-Saharan African regions, a negative shock in cash crop prices increases the likelihood of the intention to migrate abroad. This increase can be attributed to the fact that cash crop revenues are a major source of income in these areas, with declining cash crop prices failing to provide livelihood stability (e.g., Achterbosch et al. 2014, Ochieng et al. 2020). The coefficient of the interaction term between the cash crop price index and cropland intensity indicates that the effect is more pronounced in regions with higher cropland intensity. *Figure 4* illustrates this effect: the probability of migration intention abroad increases in cash crop intensive regions, conditional on a decline in crop prices. The results indicate that the treatment effect on migration intentions becomes statistically significant for cash crop price index values above 80[7].

Our findings remain robust as we progressively add control variables in columns 2 to 4. The results for the control variables are consistent with existing literature: being male as well as having an education level beyond primary school increases the probability of the intention to migrate, while older age decreases it. Additionally, having a network outside the country is positively associated with the likelihood of migration intentions. All specifications account for robust country-year fixed effects.

We conduct several additional analyses[8] to support our results. *Table 5* provides an overview of our robustness checks. In the first column, we drop Ghana and the Côte d'Ivoire from our sample, as these countries are considered price makers for coffee and cocoa. The Côte d'Ivoire produces approximately 38 percent of the world's cocoa beans, while Ghana produces 19 percent, together accounting for nearly 60 percent of the global market share (FAO 2023). This exclusion does not affect our results. In a second specification, we exclude all rural-mining regions[9] from

[7] Since it is incorrect to calculate the marginal effects of an interaction term, we focus instead on estimating the marginal effect of the cash crop price index alone. To isolate this effect, we regress this index on the migration intentions of individuals living in highly agriculture-intensive regions (treatment group), excluding all other regions. Our results indicate that a 30-unit decrease in the cash crop price index (approximately one standard deviation of this variable) leads to a 5.7 percentage point increase in the probability of intending to migrate, calculated as 0.0019×100×30. According to our sample, approximately 30 percent of the rural population, on average, expresses intentions to migrate. However, following a negative price shock of 30 units, the probability of intending to migrate rises to 35.7 percent.

[8] We do not control for network in the robustness checks due to its high number of missing observations, which would have reduced our sample size by nearly half (from 200,594 to 106,485 observations).

[9] To identify the mining regions, we construct a dummy variable that takes the value 1 if there is at least one mine located in the region, 0 otherwise. Data are provided by the SNL Metals & Mining Data (S&P) and the Mining Intelligence Database.

the sample. Mining productivity may reduce agricultural land and crop production, as well as divert productive resources from agriculture to mining (e.g., Lechner et al. 2016). Competition naturally arises in numerous ways between the mining and agricultural sectors, particularly regarding access to land, scales of production, deforestation, and environmental pollution (Pijpers 2014). In Ghana, for instance, large-scale, capital-intensive gold mining is located near agricultural areas and releases environmental pollutants. Using a consumer-producer household framework, Aragón and Rud (2016) estimate an agricultural production function and find a 40 percent relative loss in total factor productivity for farmers living near mines between 1997 and 2005, which they attribute to pollution. Another example illustrating the competition between mining and agriculture is Sierra Leone, where abandoned mining pits are commonly converted into small-scale farms, with rice cultivation frequently found along the boundaries of operating mining sites. This is particularly true in regions where land is scarce or underutilized due to mining activities. On the other hand, when extraction begins, small farms are often converted into mining sites. Such land-use changes reflect the tension between the mining and agricultural sectors. However, there is also evidence that agriculture and mining, two key livelihood activities that provide important sources of income to many people in sub-Saharan Africa, can be mutually beneficial and treated as coexisting activities (Pijpers 2014), which aligns with our robustness analysis. Our results hold, indicating that the presence of mines does not interfere with the observed increase in the probability of migration intentions due to a decrease in cash crop prices. The third specification presents the result of a placebo analysis conducted on individuals living in urban areas of sub-Saharan Africa, where the cultivation and income from cash crops do not play a pivotal role. Evidence indeed indicates that it is the rural economy that benefits significantly from the wage and employment opportunities provided by the cash crop sector. Dimova and Gbakou (2013), for instance, examine the welfare implications of the rapid rise in rice prices in Côte d'Ivoire between 2007 and 2008 and show that relatively poor, rural households involved in the production of cash crops and local food benefited, in contrast to the middle-income, urban population. As expected, we do not find any significant effect showing that a decline in cash crop prices would affect the probability of intending to migrate among the urban population. In the fourth specification, we focus on the younger population in the sample (aged 18 to 35), since the literature shows that this group is primarily concerned with migration. For instance, McKenzie (2008) uses individual-level census and household survey data to examine the age distribution of young international migrants

from developing countries, finding that it peaks in the late teens and early twenties. Additionally, multiple studies highlight the outmigration of young people from rural areas, particularly from agricultural regions (e.g., Bezu and Holden 2014, Min-Harris 2010). Our results remain consistent, showing that a drop in income due to a negative shock in cash crop prices undermines livelihood security also among the young population and increases the likelihood of their intentions to migrate abroad. In the last two columns of *Table 5*, we replace our dependent binary variable (indicating whether a respondent intends to move permanently to another country) with two other binary dependent variables on migration intentions. In column 5, the binary dependent variable captures whether the respondents are likely or unlikely to move away from their current area within the next 12 months.[10] In column 6, the outcome variable measures internal migration intentions.[11] Our findings are consistent with the baseline regression results: a decrease in cash crop prices enhances both the probability of internal migration intentions and the likelihood of intending to move away within the next 12 months.

Conclusion

This study examines the impact of exogenous cash crop price shocks on migration intentions in rural sub-Saharan Africa, utilizing extensive individual-level data from the Gallup World Poll, spanning from 2009 to 2022. We find that negative shocks in cash crop prices increase the likelihood of migration intentions among the rural sub-Saharan African population. This effect is particularly pronounced in regions where the cultivation of cash crops is a major economic activity. Our results highlight how decreased agricultural income can destabilize rural economies and exacerbate migration pressures. As cash crop prices fall, individuals in areas with high crop intensities experience lower economic security, which intensifies their desire to migrate. This finding deepens our understanding of how economic factors, particularly price shocks, influence migration intentions and underscores the role of instability in agricultural income.

[10] This variable does not differentiate between internal and international migration intentions.

[11] This dummy variable is based on our own calculations, derived from two other dummy variables: one measuring whether respondents would like to move permanently to another country (WP1325) and another measuring whether it is likely that the respondent would like to move away within the next 12 months (WP85). Based on these two binary variables, we create an internal migration dummy, which equals 1 if WP85 equals 1 and WP1325 equals 0, and 0 if WP85 and WP1325 equal 0.

We contribute to the broader literature on the determinants of migration intentions, with a particular focus on how economic shocks shape these intentions. Focusing on rural areas dependent on cash crop income allows us to capture key regions where such shocks have significant impacts. Our findings indicate that, in addition to international migration, these areas may also serve as starting points for internal migration towards urban centers in the event of negative economic shocks.

While our research offers valuable insights, we must acknowledge that reliance on international price indices may not fully reflect the income received by rural workers, as intermediaries often play a role in income distribution. Moreover, while migration intentions are a strong predictor of migration, they do not always translate into actual migration flows due to potential financial or other barriers that may prevent individuals from following through on their intentions.

The insights gained from this study highlight several areas for future research. First, extending this work to examine the direct impact of agricultural price shocks on actual migration flows, rather than intentions, could refine our understanding of migration dynamics. While intentions are a valuable indicator, actual migration flows are influenced by a wider range of factors, including monetary restrictions and bureaucratic hurdles. Longitudinal studies tracking migration flows over time could help bridge this gap. Second, incorporating more granular data on local crop-specific revenue, household-level agricultural practices, and professions could provide deeper insights into the economic impacts of cash crop price shocks in rural areas, illustrating how price changes affect different segments of rural populations. Lastly, comparative studies, involving other regions beyond sub-Saharan Africa could validate the generalizability of our findings. Understanding how agricultural price shocks influence migration intentions in different geographical and economic settings would enhance the robustness of the results and contribute to a global understanding of the interplay between agriculture and migration.

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Table 1: Gallup data availability per wave

Waves 1 – 5	**Waves 6 – 10**	**Waves 11 – 18**
Benin	Angola	Benin
Burkina Faso	Benin	Botswana
Burundi	Botswana	Burkina Faso
Cameroon	Burkina Faso	Burundi
Central African Republic	Burundi	Cameroon
Chad	Cameroon	Central African Republic
Congo Kinshasa	Central African Republic	Chad
Djibouti	Chad	Congo Brazzaville
Ghana	Congo Brazzaville	Congo Kinshasa
Côte d'Ivoire	Congo Kinshasa	Eswatini
Kenya	Djibouti	Ethiopia
Liberia	Eswatini	Gabon
Madagascar	Ethiopia	Gambia
Malawi	Gabon	Ghana
Mali	Ghana	Guinea
Mauritania	Guinea	Côte d'Ivoire
Mozambique	Côte d'Ivoire	Kenya
Niger	Kenya	Lesotho
Nigeria	Lesotho	Liberia
Rwanda	Liberia	Madagascar
Senegal	Madagascar	Malawi
Sierra Leone	Malawi	Mali
South Africa	Mali	Mauritania
Tanzania	Mauritania	Mauritius
Togo	Mauritius	Mozambique
Uganda	Mozambique	Namibia
Zambia	Namibia	Niger
Zimbabwe	Niger	Nigeria
	Nigeria	Rwanda
	Rwanda	Senegal
	Senegal	Sierra Leone
	Sierra Leone	Somalia
	Somalia	South Africa
	South Africa	South Sudan
	South Sudan	Togo
	Tanzania	Uganda
	Togo	Zambia
	Uganda	Zimbabwe
	Zambia	
	Zimbabwe	

Table 2: Sample overview (rural regions)

Country	Regions with cropland intensity > median	Regions with cropland intensity < median	Total number of regions
Angola	4	14	18
Benin	10	2	12
Botswana	0	9	9
Burkina Faso	12	1	13
Burundi	12	4	16
Cameroon	3	7	10
Central African Republic	0	10	10
Chad	5	8	13
Congo	0	10	10
Côte d'Ivoire	11	2	13
Democratic Republic of Congo	0	11	11
Djibouti	0	4	4
Eswatini	1	3	4
Ethiopia	5	6	11
Gabon	0	9	9
Gambia	5	1	6
Ghana	8	2	10
Guinea	7	1	8
Kenya	3	5	8
Lesotho	3	7	10
Liberia	3	12	15
Madagascar	0	22	22
Malawi	3	0	3
Mali	3	6	9
Mauritania	0	13	13
Mauritius	0	9	9
Mozambique	0	10	10
Namibia	0	13	13
Niger	3	5	8
Nigeria	37	0	37
Rwanda	5	0	5
Senegal	7	7	14
Sierra Leone	4	0	4
Somalia	0	14	14
South Africa	1	8	9
South Sudan	0	10	10
Togo	5	0	5
Uganda	3	1	4
Tanzania	16	9	25
Zambia	0	9	9
Zimbabwe	1	9	10
Total	180	273	453

Table 3: Descriptive statistics

Variable	Variable type	Obs.	Mean	SD	Min.	Max.
Move permanently to another country	dummy	233,844	.304	.460	0	1
Move away or stay	dummy	267,918	.304	.460	0	1
Within migration (WP85, WP1325)	dummy	160,574	.207	.405	0	1
Crop price Index (t-1)	continuous	278,898	110.898	28.188	0	203.450
Agricultural Int.	dummy	278,898	.495	.4999	0	1
Crop price Index x Agricultural Int.	continuous	278,898	54.853	57.847	0	198.167
Male	dummy	278,898	.504	.499	0	1
Age (log)	continuous	278,897	3.446	.424	2.708	4.605
Primary Education	dummy	278,898	.543	.498	0	1
Secondary Education	dummy	278,898	.414	.492	0	1
Tertiary Education	dummy	278,898	.036	.186	0	1
Household size	discrete	267,847	5.881	3.677	1	43
Above median income	dummy	239,744	.491	.499	0	1
Network	dummy	131,652	.321	.467	0	1

Table 4: Baseline specifications

	(1) Logit	(2) Logit	(3) Logit	(4) Logit
Crop price index (t-1)	-0.002***	-0.002***	-0.002***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.001)
Agricultural intensity dummy	0.353***	0.348***	0.336***	0.060
	(0.063)	(0.065)	(0.069)	(0.104)
Crop price index (t-1) x Agricultural intensity dummy	-0.003***	-0.003***	-0.003***	-0.001*
	(0.001)	(0.001)	(0.001)	(0.001)
Male dummy		0.273***	0.284***	0.348***
		(0.010)	(0.011)	(0.015)
Age (log)		-1.161***	-1.179***	-1.320***
		(0.012)	(0.014)	(0.019)
Education: primary (ref. cat.)				
Education: tertiary		0.531***	0.520***	0.394***
		(0.028)	(0.030)	(0.046)
Education: secondary		0.475***	0.466***	0.426***
		(0.011)	(0.012)	(0.018)
Household size			-0.002	0.003
			(0.002)	(0.003)
Above median income dummy			-0.001	-0.078***
			(0.011)	(0.016)
Network outside the country				0.514***
				(0.017)
Constant	-0.300***	3.128***	2.397***	3.125***
	(0.086)	(0.103)	(0.112)	(0.131)
Observations	233,844	233,843	200,594	106,485
Country-Year FE	YES	YES	YES	YES
Pseudo R2	0.0693	0.118	0.114	0.114
Marginal effect Crop price index (t-1)	-0.0019	-0.0018	-0.0017	-0.0013

Notes: The dependent variable captures individuals' international emigration intentions. Robust standard errors in parentheses. Significance level is denoted by *** (1%), ** (5%) and * (10%).

Table 5: Additional analyses

	(1) Logit	(2) Logit	(3) Logit	(4) Logit	(5) Logit	(6) Logit
Crop price index (t-1)	-0.002***	-0.002***	-0.001	-0.003***	-0.001***	-0.003***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
Agricultural intensity dummy	0.318***	0.336***		0.365***	0.252***	0.250***
	(0.073)	(0.115)		(0.088)	(0.062)	(0.096)
Crop price index (t-1) x Agricultural intensity dummy	-0.003***	-0.003***		-0.004***	-0.003***	-0.003***
	(0.001)	(0.001)		(0.001)	(0.001)	(0.001)
Share urban population in cities			0.148			
			(0.160)			
Crop price index (t-1) x Share urban population in cities			-0.000			
			(0.001)			
Male dummy	0.287***	0.283***	0.124***	0.327***	0.177***	0.237***
	(0.011)	(0.019)	(0.018)	(0.014)	(0.010)	(0.015)
Age (log)	-1.177***	-1.136***	-1.114***	-0.892***	-1.013***	-1.105***
	(0.014)	(0.024)	(0.023)	(0.034)	(0.012)	(0.018)
Education: primary (ref. cat.)						
Education: tertiary	0.527***	0.634***	0.272***	0.505***	0.678***	0.458***
	(0.031)	(0.055)	(0.034)	(0.038)	(0.026)	(0.043)
Education: secondary	0.471***	0.539***	0.303***	0.461***	0.465***	0.458***
	(0.013)	(0.022)	(0.021)	(0.016)	(0.011)	(0.017)
Household size	-0.001	-0.001	-0.008***	0.001	-0.020***	0.002
	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
Above median pc income dummy	-0.003	0.007	-0.089***	-0.014	0.005	-0.001
	(0.012)	(0.020)	(0.019)	(0.015)	(0.011)	(0.015)
Constant	2.349***	3.921***	2.682***	1.495***	2.418***	1.922***
	(0.113)	(0.302)	(0.169)	(0.173)	(0.101)	(0.153)
Observations	190,123	64,033	66,421	108,343	230,748	138,103
Country-Year FE	YES	YES	YES	YES	YES	YES
Pseudo R2	0.113	0.113	0.110	0.0853	0.0976	0.102

Notes: The dependent variable in columns 1 to 4 represents individuals' international emigration intentions. In column 6 the dependent variable indicates whether individuals prefer to move away or stay, while in column 7 it measures intentions to migrate within the country. Robust standard errors in parentheses. Significance level is denoted by *** (1%), ** (5%) and * (10%).

Specifications: (1) We drop Ghana and Côte d'Ivoire, two countries that can be considered as price takers. (2) We only consider non-mining regions and drop the mining regions. (3) We consider the urban sample: interaction btw. crop price and the share of urban individuals living in cities. (4) We consider the age group 18-35. (5) We replace our dependent variable with a more general one, asking whether individuals would like to stay or move away, along with a variable that proxies internal migration intentions (6).

Figure 1: Cash crop price indices from 2009 to 2022

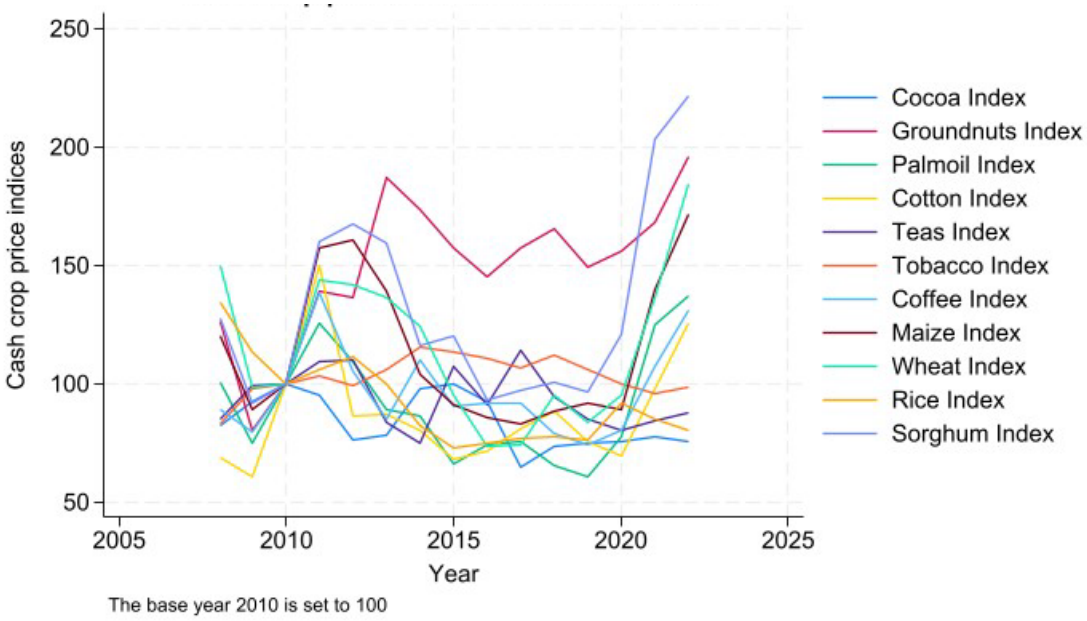

Figure 2: Cropland intensity across African regions

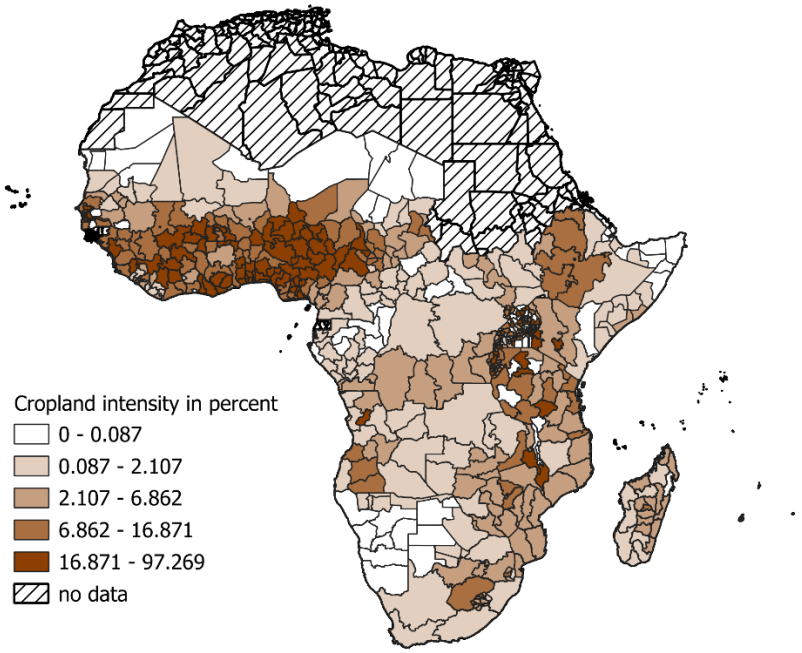

Figure 3: High and low crop-intensity regions

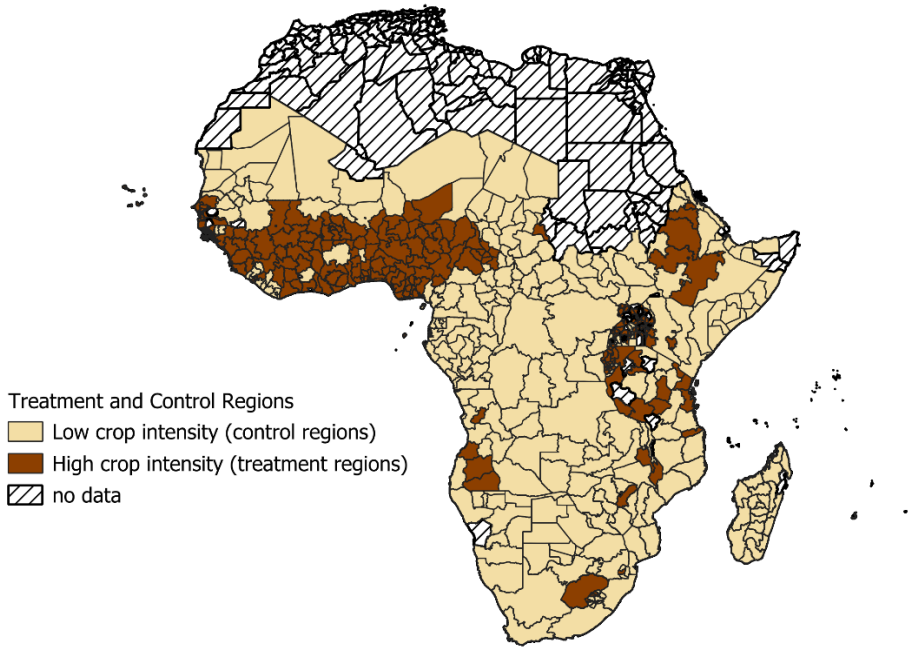

Figure 4: Average marginal effect of Treatment with 95% Cis