

# Remittances and households' livelihood in the context of Covid-19: Evidence from Burkina Faso

Tebkieta Alexandra Tapsoba 

Institut Supérieur des Sciences de la Population (ISSP), Université Joseph Ki-Zerbo, Ouagadougou, Burkina Faso

## Correspondence

Tebkieta Alexandra Tapsoba, Institut Supérieur des Sciences de la Population (ISSP), Université Joseph Ki-Zerbo, Ouagadougou, Burkina Faso.  
Email: [teb\\_kieta@hotmail.com](mailto:teb_kieta@hotmail.com); [atapsoba@issp.bf](mailto:atapsoba@issp.bf)

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## Abstract

Using data from a migration survey conducted in Burkina Faso, this research seeks to understand the Covid-19 pandemic's effects on migrant remittances and households' livelihood. Results suggest that migrant households and those receiving remittances are less likely to report a negative effect of the pandemic on their livelihood. More precisely, we find that if remittances sent by migrants remained the same or increased during the pandemic, households are less likely to report a negative effect on their livelihood. We resort to a recursive bivariate probit model and a two-stage residual inclusion estimator, using variables that capture xenophobia and possession of identity papers as instruments for remittances.

## KEYWORDS

Burkina Faso, Covid-19, households' livelihood, remittances

## 1 | INTRODUCTION

The link between mobility and epidemics goes back millennia. Cases of epidemics started by travellers, merchants and soldiers can be found in religious writings dating back to ancient era (Greenaway & Gushulak, 2017). As early as the fifth century BC, Thucydides described a disease that the Latins referred to as 'pestitis' or 'pestilentia', to describe an epidemic infection in the broadest sense of the term (Gervais, 1972). Before reaching Athens, it was already rampant in Ethiopia, Egypt, Libya and Mesopotamia, underlining the geographically widespread nature of the disease. It would have entered Athens via the port, by a ship coming from the eastern Mediterranean or Egypt (Gervais, 1972). Coincidentally, it is precisely in Egypt that the first cases of Covid-19 were recorded on the African continent (Jeune Afrique, 2020). This new type of coronavirus first appeared in the province of Wuhan in China at the end of 2019 and has slowly spread to all countries in the world.

With the spread of the virus, we quickly assisted to national shutdowns, slowing down economies. As with all exogenous shocks, the main victims of an unexpected economic downturn are the most vulnerable people.

International migrants are usually employed in precarious jobs that are the first to suffer from any adverse economic condition (World Bank, 2020). However, their earnings are a very important source of income for their households of origin who, thanks to their transfers, are able to cope with shocks and unforeseen events.

Remittances amounts can sometimes double public development aid and reach two thirds of Foreign Direct Investment in certain developing countries (Choi & Yang, 2007; Rocher & Pelletier, 2008a, 2008b). The literature has thus shown the major role that remittances play in reducing income inequalities (Koechlin & Leon, 2007; Mesple-Soms & Chauvet, 2007), poverty (Acosta et al., 2008; Adams & Page, 2005; Gupta et al., 2009), food insecurity (Tapsoba et al., 2019) and climatic shocks (Mohapatra & Joseph, 2012). Although sub-Saharan African countries do not rank high in terms of remittance receipts, the amount of remittances more than doubled between 2000 and 2006 in the region (Mohapatra & Joseph, 2012). According to the World Bank's development indicators, they generally increased in the region since 1980, but there were occasional decreases with the advent of global crises such as the financial crisis of 2007–2008 (World Bank Indicators, The World Bank, 2020). With the advent of the Covid-19 pandemic, the World Bank projects a 20% decline in remittances in 2020 due to the economic crisis that the disease will cause (World Bank, 2020). This projection, the largest drop in remittance levels in recent history, is due to the collapse of wages for migrant workers, who tend to be the most vulnerable and exposed to job and wage losses in destination countries (World Bank, 2020). Sub-Saharan Africa (SSA) is thus ranked second among the areas that will experience a sharp decline in remittances, with a projection of minus 23.1%.

The number of studies trying to understand and project the impacts of the coronavirus pandemic in the short, medium and long term has increased since then. Research papers and reports were written to assess the impacts of the pandemic on broad topics such as mortality and poverty (Decerf et al., 2021), tourism industry (Singh et al., 2021), artisanal and small scale mining (Hilson et al., 2021), small scale fishery (Bassett et al., 2021) and food security (Amare et al., 2021). In the case of India, Ceballos et al. (2020) studied the impact of the national lockdown on smallholder farmers' income and food security in two cities of the country. The authors found that these impacts were heterogeneous and depend on regional structural specificities, and state specific policies regarding Covid-19 (Ceballos et al., 2020). Hence, farmers experienced income losses due to labour force prices' increase and limited access to markets, but also challenges on access to diverse food. Also in the context of India and focusing on women, Agarwal (2021) shows that women can disproportionately be affected by the pandemic. In fact, their livelihood can be directly affected by the pandemic through the loss of their jobs, but also indirectly by the loss of male jobs. In Uganda and Kenya, Kansiime et al. (2021) found that more than two-third of the participants to their online survey experienced income shocks due to the crisis of Covid-19. The number of people suffering from food insecurity also rose, as the dietary quality worsened in the two countries (Kansiime et al., 2021). In SSA, the International Growth Center (IGC) projected that 9.1% of the population in this region will fall in extreme poverty because of the virus (Teachout & Zipfel, 2020). According to IGC, the national lockdowns are responsible of 65% of this increase. Regarding specifically migration, Caruso et al. (2021) showed that in Latin America, remittances are expected to decrease by 14%. This drop will cause according to the authors, an increase in poverty in countries such as Guatemala and El Salvador.

The present paper adds to the growing literature regarding the effect of Covid-19 on households' livelihood, by focusing on Burkina Faso, a landlocked country in SSA. The paper also shed light on an aspect of the pandemic that is not really explored yet in the scientific literature which is remittances and its implications in the context of Covid-19. To the best of our knowledge, this is first work done on the topic of remittances and Covid-19 in Burkina Faso. However, it is worth noticing that a work was done in 2020 on Burkina Faso by the World Bank and the National Institute of Statistics and Demography of the country to assess the general effect of the pandemic. The work was based on a remote survey using telephones to interview nearly 2000 respondents. By using a survey that physically reached population from remote areas who do not necessarily have access to a phone and internet, we believe that the present paper brings a more in depth analysis.

Our paper has two main objectives: firstly, we assess the effect of remittances on the probability of households to report a negative impact of Covid-19 on their livelihood. Second, with a variable that captures the evolution of

remittances during the pandemic, we assess the effect of an increase or stagnation of remittances on households' livelihood. The paper is organized as follows: we first present some specificities of Burkina Faso, the context in which the virus appeared in the country, and measures taken by the government to prevent the virus' spread. Second, we present the data, descriptive statistics and empirical results based on Probit estimations, a recursive bivariate probit model, and a two stage residual inclusion estimator. We finally discuss the results and conclude.

## 2 | COVID-19 IN BURKINA FASO

Burkina Faso is a landlocked SSA country characterized by a very young population, working mainly in agricultural activities. The 2019 national census showed that on a population of 20 million people, 73.7% are living in rural areas, 45.3% are less than 15 years old, and only 3.4% are 65 years old or more (INSD, 2020). According to the 2006 population census, the agricultural sector employs 78.9% of the active population, the industrial sector employs 3.7%, and 16.4% of the active population is employed by the trade and services sector (INSD, 2009).<sup>1</sup> It is important to note that the trade sector is mainly informal, made up of self-employed people, such as street vendors and shopkeepers in markets. The latest survey on employment conducted in the West African Economic and Monetary Union (WAEMU) countries showed that 70.1% of the population in Burkina Faso is employed in the informal sector defined as a sector where enterprises have no unique financial identification, nor a formal unique accounting (INSD, 2019).<sup>2</sup> Within this informal sector, 29% of the businesses are agricultural, 33.5% in the trade sector, 25.5% in the industrial sector, and 11.8% in the service sector. It's within this population marked by the agricultural and informal sector that the first cases of Covid-19 were recorded in March 2020, in the middle of the dry season.<sup>3</sup> When the first cases were diagnosed, the government took immediate measures to contain the propagation of the disease. Hence, on the 20th of March 2020, several measures were announced by the president, encompassing the sectors of health, education, transports, trade, justice, and other cross cutting sectors.

The education system was the first to be targeted, following the confirmation of the first positive cases. Decision was taken to close all primary schools, secondary schools, professional schools and universities (Premier Ministère, 2020a). The ministry of education however opted during this time for the diffusion of classes on certain TV channels and radio stations, with the program available online (MENAPLN, 2021). This decision implied that students had access to the right ICT devices.

Following the cessation of classes, movements have been restricted. Hence, by presidential decree, people were invited to respect a curfew from 7 pm to 5 am in March, and later on, the schedule changed from 9 PM to 4 AM in April.<sup>4</sup> It was also decided the closing of international borders and the interdiction of gatherings (any unjustified gathering of more than 50 people, gatherings in cinemas, stadiums, night clubs, gym clubs and worship places) (Premier Ministère, 2020b, 2020c, 2020d; Présidence du Faso, 2020). By the 1st of April, the quarantining of every region where at least one positive case was recorded was ordered (presidential decree no. 2020-0306/PRES).

Regarding the transport sector, public transportation in urban and inter urban areas, transportation by tricycle, motorbikes and quadricycles, were stopped by the end of March 2020 (Ministère des Transports, 2020b). As a response to the growing dissatisfaction of the sector, the government decided to ease the restriction by asking the reduction of passengers', social distancing, hand sanitization, and masks wearing in public transports (Ministère des Transports, 2020a).

The most contested measure was the closure of markets in the main cities. As stated earlier, a vast majority of self-employed young people work in the informal sector, in the markets, and make a living from day-to-day selling of their products. In Ouagadougou the political capital, the mayor ordered the closure of 36 markets from the 26th of March to the 20th of April (Lefaso.net, 2020a).

A few days later, the economic capital Bobo-Dioulasso also closed its big markets from the 30th of March to the 12th of April (Lefaso.net, 2020a). Following the closures, the government opted for the distribution of food and necessities to those impacted by the decision (minute.bf, 2020). Despite the donations, riots and demonstrations

erupted, urging the government to suspend the decision to close the markets (Lefaso.net, 2020b). Decision was taken to reopen weeks later, with the respect of some measures: disinfection of all markets, reduction of clients' number, installation of hand-washing equipment in every shops, social distancing, mask wearing (Mairie de Ouagadougou, 2020).

In order to assess the governmental measures' effects on the population, the World Bank, in collaboration with the National Institute of Statistics and Demography conducted three rounds of telephone surveys in the country. The objective was to assess their impact on households' access to food, basic services, employment, income, social protection and agriculture. According to the reports, there were an increase between the first and the third round, of employed respondents. Hence, 75.1% of respondent were working in round 1 (June–July 2020) (The World Bank & INSD, 2020a) against 89.4% in round 3 (September–October 2020) (The World Bank & INSD, 2020b). This result suggests that if the pandemic caused job losses in round 1, this effect was reduced with time. This telephone survey gives an idea of how Covid-19 affected people's livelihood, however, its nature excluded a large part of the population who do not have access to ICT items. Moreover, no questions have been asked regarding migration and remittances. With this article, we aim to participate to the discussion of the Covid-19 implications for Burkina Faso by using a survey conducted on the field nearly at the same time as the round 3 of the World Bank telephone survey. In this paper, we focus on migration and remittances between Burkina Faso and Côte d'Ivoire in order to understand how this phenomenon may have affected households' livelihood.

### 3 | DATA AND DESCRIPTIVE STATISTICS

The present work takes advantage of the latest migration survey conducted in Burkina Faso. The survey exclusively concerns international migration from Burkina Faso to Côte d'Ivoire and aimed to address migration through the lens of inequalities and development. From the 24th of October to the end of November 2020, a quantitative fieldwork was conducted in six regions of the country, namely, the Centre-Ouest, Centre Est, Plateau Central, Sud Ouest, Centre (city of Ouagadougou) and Hauts Bassins (city of Bobo Dioulasso). These regions were chosen for their concentration in international migration, but also for security reasons. In fact, Burkina Faso has been battling with an unprecedented number of terrorist attacks since 2016. This growing insecurity made some regions inaccessible without military protection. The sample is therefore not representative at the national level, but only at the level of the six regions covered.

The mentioned geographical area was stratified as follows:

- Strata 1: the city capital Ouagadougou and the economic capital Bobo Dioulasso;
- Strata 2: the capitals of the Sud-Ouest, Centre-Ouest, Plateau-Central and Centre-Est, which are respectively Gaoua, Koudougou, Ziniaré, Tenkodogo;
- Strata 3: the rural areas.

This stratification is explained by the fact that the area of residence (urban or rural) is very structuring for migration in Burkina Faso. The targeted population were households without an international migration history (no migration history with Ivory Coast or any other country), households with an international migration history with Ivory Coast (households with a former member living in Ivory Coast for a duration between 3 months and 20 years, or a returned migrant for less than 5 years). The sampling method used was a two-stage sampling. In the first stage, enumeration zones were drawn from each stratum and in the second stage households were drawn (systematically with equal probability) from the enumeration zones. The sampling frame generally used for surveys in Burkina Faso is the enumeration zones list. This is a geographical database that consisted of a partition of the country into small geographical areas of about 2000 settlements each, or an average of 400 households. At the last census in 2019, Burkina Faso had 24,000 enumeration zones. It is this file of 24,000 enumeration zones that served as the sampling frame.

We ended up with 6044 enumerated households, but only 3841 fitted the criteria of the targeted population. The survey questionnaire first consisted of socio-demographic and economic questions about households. Then, questions about the migrant's profile and living conditions were asked. Given the exceptional conditions we were in, some questions regarding Covid-19 and its implications on households' livelihood were included in the questionnaire.

Regarding the aim of our study, our dependent variable stems from the following question:

'Did Covid-19 negatively affect (a little or a lot) your livelihood?'

Answers to this question were recoded into a variable that take the value 1 if the household reports that its livelihood was negatively affected and 0 otherwise. Our explanatory variable of interest regarding remittances is a variable that takes 1 if at least one migrant in the household has ever sent money back home before Covid-19. In the same way, the migration variable takes 1 if the household has at least one migrant in Ivory Coast, and 0 otherwise.

Descriptive statistics in Table 1 present other explanatory variables mainly inspired by the literature on Covid-19 and its effects (Kansiime et al., 2021). For our dependent variable, we can notice that only 41.67% of the respondents stated that their livelihood was negatively impacted by the pandemic. Regarding our interest variable, descriptive statistics show that 25% of the households are remittances recipients. These remittances are solely sent from Ivory Coast by former household members. Regarding these former members, descriptive analysis show that 57% of the households have at least one migrant in Ivory Coast. We can note here that even though more than half of the households surveyed here have at least one migrant in Ivory Coast, only a quarter of them receive remittances. Other explanatory variables presented in Table 1 also shows, not surprisingly and given the characteristics of Burkina Faso, that 87% of the respondents work in the agricultural sector as farmers. They are followed by the trade sector (street vendors, shops in markets), and the informal sector (tailors, hairdressers, craftsmen, etc.), both at approximately 4%. Only 3% of the respondents is working as salaried employee in the formal private and public

**TABLE 1** Descriptive statistics

Variables	Mean/frequency	SD
Covid-19 affected negatively households' livelihood	41,67%	-
Household Head's (HHH) Occupation is agriculture (1 = Yes; 0 = Other occupation)	87.4%	-
Household Head's Occupation is Trade (1 = Yes; 0 = Other occupation)	4.1%	-
Household Head's Occupation is in the informal sector (1 = Yes; 0 = Other Occupation)	4.5%	-
Household Head's Occupation is in the public or private service (1 = Yes; 0 = Other occupation)	3%	-
Respondent's gender = Female	31%	-
Household's monthly income <40.000 FCFA	61.4%	-
Household has a migrant in Ivory Coast	57%	-
Household size	8.07	5.46
Household receive remittances from migrant in Ivory Coast (Yes = 1, No = 0)	25%	-
Respondent is HHH	47.2%	-
Strata 1	6.8%	-
Strata 2	3.5%	-
Strata 3	89.6%	-
Household is in a rural area	89.6%	-

Note: Sampling weights included.

Source: Burkina Faso's migration survey and author's calculations.

sector. Regarding income, we construct a variable that takes 1 if the monthly income of the household is less than 40,000 CFA (\$59 in March 2021) which is a little above the minimum wage in the country<sup>5</sup> (Présidence du Faso, 2006). Other important characteristics are to be noted; 89.6% of the households are living in rural areas, the same percentage as in the strata 3 which accounts for the rural environment. 6.8% of the households live in the main cities (Ouagadougou, the political capital, and Bobo Dioulasso the economic capital), and 3.5% in other towns. This differentiation between the strata can be interesting in seeing the heterogeneity between the two main cities given that they were and still are the epicentre of the pandemic. However, we do not include these variables as explanatory variables in our estimations for collinearity reasons.<sup>6</sup> Lastly, variables regarding demographic traits are looked at. As stated earlier, the survey started at the end of October, during the harvest season. Therefore, a lot of household heads were on their farms harvesting.<sup>7</sup> We then construct a variable that takes the value 1 if the respondent is the household's head, and 0 otherwise. We also include a gender variable that takes the value 1 if the respondent is a female, and 0 otherwise. Not surprisingly, only 47.2% of the respondent are in fact the household's head, and 31% of the respondent are female. Finally, descriptive analysis show that households are constituted by eight members in average.

We go further into the descriptive analysis by testing the link between the dependent variable and our explanatory variables, using the Pearson  $\chi^2$  test, Cramer V test and mean differences according to the variables properties. The Pearson  $\chi^2$  tests the relation between two categorical variables, by comparing the observed frequencies to frequencies that we would have if there were no relation between the variables<sup>8</sup> (Fox, 1999). If the test is significant, we can conclude that there is in fact a relation between our two variables. We also test the power of this relation by using the Cramer V which is based on the  $\chi^2$  and measures the symmetric association between the two variables. The Cramer V varies between 0 and 1, and the more the coefficient approaches 1, the more powerful the relation is. According to Fox (1999), association measures based on the  $\chi^2$  like the Cramer's V are usually low in social sciences, even if the relation between the two variables is strong. Finally, we use the mean differences to test the relation between our binary dependent variable and our continuous variable. The significance of the test means that there is a difference in mean between respondents who stated that they have been negatively affected by the Covid-19 and others in terms of the household's size, our continuous explanatory variable.

In Table 2, we can see that migration and remittances are significantly correlated to the answers given by households. Furthermore, the Cramer V test is significant for the two variables, with a coefficient of 0.107 for remittances and 0.131 for migration. The respondents' answers also seem to strongly depend on their occupation and whether their income is higher than the minimum wage or not. The Cramer V test appears to be high for the respondents' occupation with a coefficient of 0.207. Earning an income lower than the minimum wage also has a high coefficient of 0.115. The household's head status variable is significant but gender seems to not have an influence. For households, residing in a rural area has a strong link to its experience with Covid-19. We can see that the scores are high for the rural variable with 0.169. The Cramer V test goes in the same way for the strata variable, which is obvious given their construction. Lastly, there seems to be no difference in terms of household size.

## 4 | METHODS AND RESULTS

### 4.1 | Probit models

To answer the first objective of the paper we resort to a Probit regression, to estimate if remittances and other factors are relevant in determining the effects of Covid-19 on households' livelihood. We estimate the following equation:

$$Y_i = \alpha_i + \beta_1 Rem_i + \beta_2 X_i + \varepsilon_i, \quad (1)$$

**TABLE 2**  $\chi^2$ , Cramer V test and t test results

	Household's livelihood has been negatively affected by Covid-19 (1 = Yes)
<b>Occupation</b>	
Agriculture	37.5%
Trade	74%
Informal sector	61.8%
Public/private sector employee	72.4%
Pearson $\chi^2$	0.000***
Cramer V	0.207***
<b>Respondent is HHH</b>	38.5%
Pearson $\chi^2$	$p = 0.000$ ***
Cramer V	0.063**
<b>HH monthly income &lt;40,000 FCFA</b>	36.5%
Pearson $\chi^2$	0.000***
Cramer V	0.115***
<b>Migrant Household</b>	36.0%
Pearson $\chi^2$	0.000***
Cramer V	0.131***
<b>Household size</b>	8.07
t test: mean difference	0.202
<b>Remittances</b>	32.7%
Pearson $\chi^2$	0.000***
Cramer V	0.107***
<b>Respondent in Female</b>	42.5%
Pearson $\chi^2$	0.149
Cramer V	0.012
<b>Rural area</b>	39%
Pearson $\chi^2$	0.000***
Cramer V	0.169***
<b>Strata</b>	
Strata 1	78.9%
Strata 2	50.0%
Strata 3	39.0%
Pearson $\chi^2$	0.000***
Cramer V	0.190***

Source: Burkina Faso's migration survey and author's calculations.

\*\*\* $p < 0.01$ , 1% significance level. \*\* $p < 0.05$ , 5% significance level.

where  $Y_i$  is a binary outcome for household  $i$  that takes the value of 1 if the household responded that its livelihood was negatively affected by Covid-19 and 0 otherwise.  $Rem_i$  is our variable of interest and  $\beta_1$  is the parameter to be estimated for remittances. The term  $X_i$  is a vector of other explanatory variables presented previously, and  $\beta_2$  is the associated vector of parameters to be estimated. Finally,  $\varepsilon$  is the error term. Table 3 presents the results for Equation 1 estimations.

TABLE 3 Probability of households' livelihood to be negatively affected by Covid-19

Variables	Household's livelihood	Household's livelihood	Household's livelihood	Household's livelihood	Household's livelihood	Household's livelihood	Household's livelihood
Remittances	-0.3436 <sup>***</sup> (0.0681)	-0.3708 <sup>**</sup> (0.0825)	-0.3707 <sup>**</sup> (0.0824)	-0.3642 <sup>**</sup> (0.0876)	-0.3646 <sup>**</sup> (0.0882)	-0.3661 <sup>*</sup> (0.0938)	-0.3656 <sup>*</sup> (0.0946)
Migrant HH	-0.3888 <sup>**</sup> (0.0688)	-0.3866 <sup>***</sup> (0.0694)	-0.3776 <sup>*</sup> (0.0771)	-0.3938 (0.0729)	-0.3930 <sup>*</sup> (0.0727)	-0.3771 <sup>**</sup> (0.0791)	-0.3784 <sup>**</sup> (0.0820)
Female		-0.3841 <sup>*</sup> (0.0754)			-0.3680 <sup>**</sup> (0.0764)	-0.3678 <sup>**</sup> (0.0816)	-0.3669 <sup>**</sup> (0.0816)
Trade (base agriculture)			0.6823 <sup>***</sup> (0.213)	0.6817 <sup>**</sup> (0.215)	0.6660 <sup>***</sup> (0.231)	0.6648 <sup>***</sup> (0.231)	0.6648 <sup>***</sup> (0.231)
Informal sector (base agriculture)			0.5629 <sup>***</sup> (0.149)	0.5614 <sup>**</sup> (0.151)	0.5429 <sup>**</sup> (0.156)	0.5413 <sup>***</sup> (0.156)	0.5413 <sup>***</sup> (0.156)
Private/public sector (base agriculture)			0.6551 <sup>***</sup> (0.210)	0.6644 <sup>**</sup> (0.218)	0.6075 <sup>***</sup> (0.223)	0.6047 <sup>***</sup> (0.222)	0.6047 <sup>***</sup> (0.222)
Respondent is HHH				-0.3899 (0.0830)	-0.3994 (0.0801)	-0.3990 (0.0802)	-0.3990 (0.0802)
HH income					-0.3852 <sup>***</sup> (0.0660)	-0.3846 <sup>**</sup> (0.0688)	-0.3846 <sup>**</sup> (0.0688)
HH size							-0.00239 (0.00605)
Observations	3452	3452	3452	3077	3077	2838	2838
Sampling weights	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: Standard errors in parentheses. Marginal effects presented. Source: Burkina Faso's migration survey and author's calculations.

\*\*\* $p < 0.01$ . \*\* $p < 0.05$ . \* $p < 0.1$ .

Results in Table 3 show that households that were receiving remittances before Covid-19 are less likely to report that the pandemic negatively affected their livelihood. The same result is noticeable for households that have at least one former member abroad. In Kenya and Uganda, Kansiime et al. (2021) found that workers who depend on transfer payments as their main source of income are 17% less likely to report an impact of Covid-19 on their income. Remittances being some sort of transfers, we can say that the results are going in the same way. Results in Burkina Faso are however different regarding the households' main source of income. In fact, if the primary source of households' income is from another sector than agriculture, they are more likely to report a disruptive effect of Covid-19 on their livelihood. In the context of Kenya and Uganda, the results are opposite (Kansiime et al., 2021). This interesting result can find an explanation in the fact that during the government restrictions period, farmers did not have a lot to do as it was the dry season. During the survey, some of the respondent stated that they were not doing much during that period and did not really felt the incidence of the measures on their work. However, for other sectors especially trade and the informal sector, the restrictions really had an impact, as people were not allowed to travel within or out the country. Female respondents are less likely to report a disruptive effect of Covid-19 on their livelihood, which is a results also found in the literature (Béland et al., 2020; Kansiime et al., 2021). Households that have a monthly income lower than the minimum wage are less likely to say that Covid-19 negatively affected their livelihood. Certainly, this result is surprising, however, as we saw in descriptive statistics, the majority of our sample is made out of farmers who were not directly affected by Covid-19. Also, this population, living from subsistence agriculture, simply did not felt a direct effect of the pandemic like people living in cities and working from trade and the informal sector.

Regarding the second objective of the paper, we recall the projected 23.1% decline in remittances projected by the World Bank for SSA that may exacerbate the vulnerability of households already dealing with the effects of Covid-19. The survey used in this study has a question regarding the pattern of remittances during the pandemic. Households were asked if the remittances sent by the former member stayed the same, increased, reduced or even stopped during the pandemic. We used this question to construct a new variable that takes the value 1 if the amount of remittances sent by the migrant stayed the same or increased, and 0 if the amount diminished or stopped during the pandemic.

Given that a household can have more than one migrant, and that each of them could have had a different behaviour during the pandemic, we did not resume the information to the household level, but rather looked at all the migrants in the context of their origin household. Hence, 56.4% of the migrants sent an equal or superior amount during the pandemic, and 43.6% sent less or did not even send remittances.

We first estimate the following Probit model:

$$Y_{ij} = \alpha_{ij} + \alpha_1 \text{Rem\_Cov}_{ij} + \alpha_2 X_{ij} + \varepsilon_{ij}. \quad (2)$$

Equation 2 has the same elements as Equation 1 except for the interest variable which is  $\text{Rem\_Cov}_{ij}$  standing for the change in remittances sent by migrant  $j$  in the household  $i$ .

Results in Table 4 suggest that compared to households that receive less or no remittances during the pandemic, households where migrants sent an amount equal or greater than the amounts sent before the Covid-19 are less likely to report a negative effect of the pandemic on their livelihood. Other explanatory variables seem to go in the same direction as previous results, except that only the effect of gender and trade sector are significant.

## 4.2 | Discussion of the remittances potential endogeneity

The previous Probit model showed that when controlling for other observable characteristics, receiving the same amount or more remittances during the pandemic is associated with a lower probability for the household to be negatively affected by Covid-19. This correlation does not imply a causality given the high suspicion of endogeneity of

TABLE 4 Probability of Covid-19 affecting negatively households' livelihood

Variables	Household's livelihood	Household's livelihood	Household's livelihood	Household's livelihood	Household's livelihood	Household's livelihood	Household's livelihood
Rem_Cov	-0.2613*** (0.135)	-0.2665*** (0.141)	-0.2642*** (0.143)	-0.2642*** (0.143)	-0.2642*** (0.143)	-0.2668** (0.144)	-0.2620*** (0.144)
Trade	0.5557* (0.408)	0.5852* (0.408)	0.5852* (0.401)	0.5847* (0.397)	0.5886** (0.400)	0.6150** (0.422)	0.3862 (0.525)
Informal sector	0.4078 (0.478)	0.3947 (0.486)	0.3947 (0.486)	0.3886 (0.489)	0.3800 (0.503)	-0.2083 (0.550)	-0.2384 (0.556)
Private/public sector	-0.2429 (0.523)	-0.2191 (0.545)	-0.2191 (0.545)	-0.2208 (0.549)	-0.2208** (0.179)	-0.2340* (0.185)	-0.3149 (0.230)
Female		-0.2468** (0.150)	-0.2371* (0.188)	-0.3160 (0.226)	-0.3111 (0.135)	0.0159** (0.00676)	
Respondent is HHH							
HH income							
HH size							
Observations	1254	1178	1178	1178	1142	1142	1142
Sampling weights	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: Standard errors in parentheses. Marginal effects presented. Source: Burkina Faso's migration survey and author's calculations.

\*\*\* $p < 0.01$ . \*\* $p < 0.05$ . \* $p < 0.1$ .

the variable of interest. Endogeneity issues can stem from omitted variables, measurement errors and reverse causality. In our case, reverse causality has a higher probability. In fact, being negatively affected by Covid-19 may lead to an increase in remittances, as the literature showed that remittances can serve to mitigate the effect of shocks. Conversely, an increase or decrease in remittances may have a non-negligible effect on the ability of households to cope with a shock. Also, factors that affect migrants' ability to send remittances might also explain the ability of households to cope with the pandemic. In the face of this strong suspicion of endogeneity, we resort first to a recursive bivariate probit model and second a two-stage residual inclusion estimation.

#### 4.2.1 | A recursive bivariate probit model

Recursive probit models were developed and implemented to treat endogenous covariates in nonlinear models such as probit and logit models (Greene, 1998; Maddala & Lee, 1976). In a recursive bivariate probit model, the probability for the household to be negatively affected by Covid-19 and the probability for the amount of remittances to stay the same or increase are simultaneously determined. The recursive structure is based on a first reduced form equation for the variable suspected to be endogenous, and a second equation which is structural and determine our dependent variable (Fabri et al., 2004). The probability  $Rem\_Cov_{ij}$  of the remittances amounts to change depends on the value of a latent variable  $Rem\_Cov_{ij}^*$  where

$$Rem\_Cov_{ij}^* = \beta_1 X_{ij} + \beta_2 Z_{ij} + \varepsilon_{ij}. \quad (3)$$

The error term  $\varepsilon_{ij}$  is assumed to be independently and identically distributed. In Equation 3,  $Rem\_Cov_{ij}^*$  is a function of  $X_{ij}$  a vector of households characteristics presented earlier. Some literature suggests that the parameters of the endogenous equation are not identified unless an exogenous variable is included (Maddala, 1983). For Wilde (2000), the identification in such models is obtained if the two equations contain at least one different exogenous variable. For Maddala and Lee (1976), at least one exogenous variable in Equation 3 here should not appear in Equation 2 to guarantee the identification of the parameters. Given the availability of data and the special context of the Burkina Faso-Ivory Coast migration, we chose two instruments: the fact that the migrant does not have its identity documents, and the fact that the migrant ever suffered from Ivorian's xenophobia.<sup>9</sup> These two variables crystallize some of the issues that stems from the late 2000s crisis in Ivory Coast and the colonial past of the countries. In fact, in addition of sharing borders, Burkina Faso and Ivory Coast are both former French colonies. During the colonial times, the former was perceived by the French colonial power as a labour tank. The country was considered too populated in view of its precarious environmental conditions (Gervais & Mandé, 2010). With an area of nearly 300,000 km<sup>2</sup> representing 6% of French West Africa (AOF), its population was estimated at nearly three million inhabitants, or 25% of the population of AOF (Sarraut, 1923). As early as 1921, with the adoption the colonies' development law, each colony was required to participate in the construction effort according to its natural potential. The Upper Volta (current Burkina Faso) was naturally designated as a supplier of labour at the time. Massive departures of Voltaic people followed, to participate in great construction sites, particularly in Ivory Coast, where the climatic conditions were ideal for agriculture. A major date in this colonial era was 5 September 1932, when the dismantling and distribution of the Voltaic territory among neighbouring countries was ordered by decree. The purpose of this new division was to meet the labour needs of the large agricultural and industrial operations in Ivory Coast (Yao, 2003). Even though the country's borders were re-established in 1947, this territorial division resulted in an intermingling of ethnic groups that did not necessarily recognize themselves in the administrative boundaries established by the colonists. Independences came about in this context where administrative boundaries did not reflect ethnic realities. After economic issues during the 80s (David, 1986), the death of Houphouet Boigny in 1993 and succession disputes, the concept of 'Ivoirité' emerged, denoting the fact that a person is entirely Ivorian, that is, of Ivorian father and mother born on the Ivorian soil (Ogunmola & Badmus, 2005). All these elements contributed to

the birth of a civil war in the 2000s in Ivory Coast, where millions of Burkinabe had to flee Ivory Coast to save their lives. Since then, relations between Ivory Coast and Burkina Faso have been tainted by a certain contempt for Burkinabe by Ivoirians, which can translate into xenophobia.

Nowadays, the two countries are linked by agreements on free movement of goods and people within the WAEMU (West African Economic and Monetary Union) area. However, for prolonged residence, nationals of the area must obtain a residence permit, which is often difficult to obtain depending on the country. Given the ambiguous history shared by Ivory Coast and Burkina Faso, we believe that not having the required identity documents to stay in Ivory Coast can exacerbate an already precarious situation of the migrant.

We therefore use these two variables accounting for xenophobia and possession of identity documents as instruments for the effect of the pandemic on the amount of remittances sent by migrants. Given that when shocks occur in a given country, the first to bear the consequences are the most vulnerable such as migrants, we believe that in our context, migrants that do not have their identity documents, and also suffered from xenophobia in the past in Ivory Coast are also those who will be more prone to lose their jobs, and not be able to send or send lower amounts of money to their families back home. Our two instruments are derived from asking migrant households whether the migrant tells them about the difficulties they are experiencing in Ivory Coast. A percentage of 35.68% do talk about their difficulties to their origin households. Among them, 28.03% reported xenophobia and 12.63% reported that they have issues of identity papers. These two instruments should respect the exclusion restriction assumption, meaning that they should have an effect of the outcome variable only through their effect on the suspected endogenous variable. Experiencing difficulties related to xenophobia, and not being in possession of identity papers inevitably has an effect on the migrant's living conditions in the destination country. In turn, these difficulties may have an effect on the migrant's ability to transfer money to their family of origin. In the event of an exogenous shock such as the Covid pandemic, the exacerbation of these difficulties may further affect the migrant's ability to send money. Families of origin may, in turn, see their living conditions impacted. However, it is difficult to believe that variables related to the local living conditions of migrants at their destination country have an impact on the living conditions of households of origin, except through the transfers made by the migrant. The exogeneity hypothesis in settings such as recursive bivariate probit models is stated in terms of the correlation coefficient  $\rho$  (Monfardini & Radice, 2006). The null hypothesis of  $\rho = 0$  stands for exogeneity, when the alternative hypothesis of  $\rho \neq 0$  stands for endogeneity. We present the estimates of the recursive bivariate probit model using alternatively the variables of xenophobia and possession of identity papers in Table 5.

Results in Table 5 show that when remittances stayed the same or increased during the pandemic, households are less likely to report a negative effect of Covid-19 on their livelihood. In the first specification, we notice that experiencing xenophobia in the destination country decreases the probability of sending the same or more amount of money during the pandemic. This same result holds when adding the second instrument of possession of identity papers. Not having identity papers in the destination country also decreases the probability of sending the same amount or more during the pandemic. The Wald test applied to the correlation coefficient  $\rho$  is significantly different from zero, indicating the rejection of the null hypothesis that the error in both equations are independent. We can also notice that the coefficient  $\rho$  is positive for all specifications, which implies that unobserved factors that increase the probability of sending the same amount or more money during the pandemic also increases the probability for households to be negatively affected by the pandemic.

#### 4.2.2 | Two-stage residual inclusion estimation

We also rely on the two-stage residual inclusion (2SRI) estimator to address the endogeneity of remittances. We first of all obtain the generalized residuals from the first stage probit model (remittances on xenophobia, possession of identity papers, other control variables and fixed effects), and then estimate a second stage probit that includes the residuals as an explanatory variable. A *t* test is then performed, based on the null hypothesis that remittances are

**TABLE 5** Probability of Covid-19 affecting negatively households' livelihood, recursive bivariate probit model

Variables	1		2	
	HH Livelihood	Rem_Cov	HH Livelihood	Rem_Cov
Rem_Cov	-1.157** (0.457)		-0.917** (0.412)	
Respondent is HHH	-0.0878 (0.227)	0.368** (0.142)	-0.133 (0.223)	0.381*** (0.143)
HH income	0.0343 (0.128)	0.363*** (0.117)	-0.00249 (0.118)	0.401*** (0.116)
Trade	0.824** (0.403)	-0.292 (0.258)	0.888** (0.396)	-0.286 (0.259)
Informal Sector	0.333 (0.503)	-0.485 (0.383)	0.407 (0.487)	-0.514 (0.375)
Private/public sector	0.0885 (0.441)	0.725 (0.590)	0.0304 (0.448)	1.052 (0.736)
HH size	0.0267*** (0.00728)	0.0196** (0.00968)	0.0255*** (0.00731)	0.0203** (0.00965)
Female	-0.319* (0.166)		-0.338** (0.170)	
Xenophobia		-0.684*** (0.147)		-0.513*** (0.128)
Id. papers				-0.769*** (0.191)
Observations	1,142	1,142	1,142	1,142
$\rho$	0.4362		0.2751	
Wald test H0: $\rho = 0$	5.83***		5.11***	
Sampling Weights	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes

Note: Standard errors in parentheses. Source: Burkina Faso's migration survey and author's calculations.

\*\*\* $p < 0.01$ . \*\* $p < 0.05$ . \* $p < 0.1$ .

**TABLE 6** 2SRI estimations, first and second stage

Variables	1 Instrument		2 Instruments	
	Rem_Cov	HH livelihood	Rem_Cov	HH livelihood
Respondent is HHH	0.0588 (0.165)	-0.318 (0.019)	0.324* (0.168)	0.320 (0.253)
HH income	0.0904 (0.136)	0.336 (0.022)	0.398*** (0.115)	0.346* (0.024)
Trade	-0.356 (0.293)	0.566* (0.146)	-0.280 (0.254)	0.589* (0.142)
Informal sector	-0.297 (0.420)	0.347 (0.169)	-0.527 (0.379)	0.331 (0.168)
Private/public sector	1.019** (0.510)	0.361 (0.177)	1.029 (0.735)	0.319 (0.151)
HH size	0.0210** (0.00947)	0.0304*** (0.00756)	0.0196** (0.00990)	0.0276*** (0.00731)
Female	-0.119 (0.113)	-0.231** (0.038)	-0.0688 (0.133)	-0.235* (0.038)
Xenophobia	-0.694*** (0.137)	-	-0.507*** (0.132)	-
Id. papers	-	-	-0.788*** (0.187)	-
Rem_Cov	-	-0.169*** (0.0284)	-	-0.189** (0.032)
Generalized residual	-	1.218** (0.546)	-	0.870* (0.466)
Sampling weight	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes
Observations	1142	1142	1142	1142

Note: Standard errors in parentheses. Marginal effects presented. Source: Burkina Faso's migration survey and author's calculations.

\*\*\* $p < 0.01$ . \*\* $p < 0.05$ . \* $p < 0.1$ .

exogenous. The generalized residual obtain in the first stage are correlated with the unobservables that influence the endogenous explanatory variable and the dependent variable in the first equation (Marchetta, 2012). This means that the coefficient associated to the remittances variable in our second stage equation is their causal effect on the probability of households' livelihood being negatively affected by Covid-19. This method produces according to Tezra et al. (2008) consistent estimates in the case of non-linear models. They also argue that this method is better than the methods using a two-stage predictor substitution where the endogenous variable is replaced by its predicted value (Tezra et al., 2008). Table 6 presents the results with the 2SRI using successively one and two instruments. We found that the instruments are still statistically significant and negative. Our estimates are also still consistent with the recursive probit model. Receiving the same amount or more remittances during the pandemic decreases significantly the probability for households to report a negative effect of Covid on their livelihood. The generalized residuals from the first stage equation enter significantly and with a positive sign on the livelihood equation. This further confirms that there are unobservables characteristics linked to migrant remittances that increases the likelihood of households to report a negative effect of Covid-19 on their livelihood.

## 5 | CONCLUSION

This paper analysed the relationship between remittances and households' livelihood in the context of Covid-19. The econometric analysis showed that households that receive remittances are less likely to report a negative effect of the pandemic on their livelihood. Furthermore, using a recursive bivariate probit model, and instruments such as xenophobia and id. documents, we found that when the remittances stayed the same or increased during the pandemic, households are less likely to report a negative effect of Covid-19 on their livelihood.

These results in the case of Burkina Faso emphasizes the important role that remittances play in supporting households when they face shocks. The results also suggest that ensuring an efficient and secure way of sending these precious spin-offs especially during a crisis is vital, as it has been highlighted in the 2030 sustainable development goal 10.

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## DATA AVAILABILITY STATEMENT

Data available on request from the authors

## ORCID

Tebkieta Alexandra Tapsoba  <https://orcid.org/0000-0001-9238-853X>

## ENDNOTES

- <sup>1</sup> Regarding people's occupation, we rely on the statistics of the 2006 census because the 2019 census full results are not available. For now, only preliminary results of this census have been published.
- <sup>2</sup> The formal sector which represents 29.9% have the public sector as their main employer.
- <sup>3</sup> The climate in Burkina Faso is characterized by a dry and a wet season which alternate during the year.
- <sup>4</sup> This period was marked by the beginning of Ramadan, but also the resentment of people in the cities who were not able to work properly.
- <sup>5</sup> The exact amount is 30,684 CFA, but our data are categorized into certain amount. In order to make sure we account for the minimum wage, we use the category of less than 40,000 and down.
- <sup>6</sup> People who practice agriculture are more likely to live in rural areas rather than urban areas and cities.

- <sup>7</sup> When it was possible, the interviewers meet the household's head in their farms, or wait in the evening for them to come back home. If it was not possible to talk to them, they talked to their wives, children or relative with respect to them being adults and from the same household.
- <sup>8</sup> H0: There is no relation between the two variables; H1: There is a relation between the two variables.
- <sup>9</sup> 4.49% of the migrants stated that they have identity documents issues, and 9.97% stated that they have once faced xenophobia.

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