Contribution of Emigration to the Agricultural Growth in Franc Zone of Africa

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Abstract

We analyze emigration effects on agricultural growth in West African Economic and Monetary Union (WAEMU) and Central African Economic and Monetary Community (CEMAC), two regional blocs of Franc zone in Africa. We use LSDVC estimator and World Bank as and OECD emigration databases over the period 1980-2010 for the purpose. The results show the heterogeneity in emigration within WAEMU and CEMAC regional blocs. The results reveal that emigration contributes negatively to agricultural growth in general and CEMAC, in particular. However, emigration and human capital contribute to agricultural growth in WAEMU and CEMAC, respectively. Promoting safe, orderly and regular migration in African countries, especially those positively affected by emigration, should be encouraged. However, the authorities of the Franc zone in general and CEMAC in particular, should encourage policies in combatting emigration and strengthen human capital through education for agricultural development of the region. In addition, the development of pricing policies in favor of producers can contribute in improving agricultural development within the Franc zone.

Keywords: Agricultural growth; Emigration; LSDVC estimator; WAEMU, CEMAC

JEL Classification Codes: O11, O15, Q18, R58

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1. Introduction

Migration is an integral part of human history and accompanies the progress of societies (Davadoss et al., 2020; Mwesigye and Matsumoto, 2016; Cai et al., 2016; Braun and Kvasnicka, 2014; Bhattacharyya and Parker, 1999; Stark, 1984). The issue of migration is a current concern that is driving many debates within international organizations. The challenges it presents as well as the opportunities it offers are clearly recognized by the African Union's Agenda 2063 and the Sustainable Development Goals (SDGs) as being of paramount importance. These migrations have several effects on both departure and arrival zones. Thus, in the economic literature, there is no unanimity as to the question of the consequences of migratory phenomena on the economic development of departure zones (Massey, 2015; Braun and Kvasnicka, 2014; Lewis, 1954; Taylor and Wyatt, 1996). Two major blocs can be identified in relation to this divergence: on the one hand the optimistic view of the migratory effects (Lipton, 1980; Lewis, 1954; Taylor and Wyatt, 1996; Lucas, 2007) and on the other hand the pessimistic view (Stark and Bloom, 1985; Rozelle et al., 1999; Lucas, 2007, Davadoss et al., 2020).

According to the first school of thought, migration has a positive impact on agricultural productivity in departure zone through several channels, including remittances from migrants, transfer of knowledge, skills, know-how and technologies, and investment in agricultural and rural development, including employment opportunities in rural areas of origin (Nguyen et al., 2015; FAO, 2018; Nguyen et al., 2017). According to the United Nations Conference on Trade and Development (UNCTAD, 2018), emigration flows could significantly increase Africa's per capita Gross Domestic Product (GDP) by 2030 through remittances, which account for about half of the private capital entering the continent. The value of remittances to Africa increased from an average of $38.4 billion, between 2005-2007 to $64.9 billion, between 2014-2016. In the WAEMU zone, Senegal is the largest recipient of these funds. Senegal received almost half of the migrant remittance flows on average over the period 2000-2011 (47.4%), followed by Mali (13.9%), Togo (11.1%) and Côte d'Ivoire (10.8%). Optimists of the migration effects estimate that labour of one traditional sector generally moves to a more modern one through migration (Lewis, 1954; Adams, 1991; Taylor and Wyatt, 1996).

The second line of thought considers that emigration generally leads to a decrease in income in the migrants' areas of origin, since they take away the productive capital, including human capital that remittances cannot fill (Lucas, 1987; Taylor, 1992; Rozelle et al., 1999). Migration affects various skills and demographic composition of the remaining population (FAO, 2016). Like, as remittances from migrants can generate positive income multipliers in the home economies, migrant remittances can have negative effects or even a considerable decline in local economic activity (Taylor and Martin, 2001). Indeed, households receiving remittances may not spend them on goods or services offered by poor populations, which does not contribute to poverty alleviation (Taylor and Martin, 2001).

In the different regions of the world, several groupings have been formed, giving companies in these areas a larger local market. Thus, Africa is made up of regional blocs including the West African Economic and Monetary Union (WAEMU) and the Economic and Monetary Community of Central Africa (CEMAC) which group together French-speaking countries that share a common language (French) and a single currency with a fixed parity with the Euro (the CFA franc). One of the objectives of the effective implementation of these zones is the creation of a solid economic base enabling them to better integrate into the African and then world economy. The economy of the Franc zone countries is essentially based on the agricultural sector. According to the World Development Indicator (WDI, 2019), the average share of agricultural value added in GDP was 26.66% in 2000 and 27.41% in 2017. At WAEMU level,

this indicator rose from 30.64% in 2000 to 31.82% in 2017. In CEMAC, the contribution of the agricultural sector to total output was 18.72% in 2000 and 18.59% in 2017. The importance of the share of this sector in the economy of the Franc zone remains considerable and is of great economic interest.

Despite this significant importance, this sector is confronted with several problems that hamper its growth, notably post-electoral conflicts, land tenure difficulties affecting access to agricultural land, overexploitation of soils, soil erosion, under-equipment in agricultural equipment, insufficient agricultural financing and improved seeds, product disposal and above all climatic challenges (Tran, 2019; Tebboth, 2019; OECD and FAO, 2016). All these difficulties contribute in part to the emigration of populations, which in turn leads to the decline of an active and experienced labor force in the areas of origin and the overcrowding of the informal sector in the host zones. Several other factors contribute to the spatial mobility of populations, including political, economic and socio-cultural factors (Bhandari and Ghimire, 2016).

According to UNCTAD (2018), the number of African migrants living outside Africa increased from 10.9 million in 1990 to 16.9 million in 2017. The same source indicates that the main areas of origin of migrants from the Franc zone were Burkina Faso, the Republic of Congo and Mali, which are generally characterized by political instability. The total number of migrants in West and Central Africa were 8871156 and 4099426, respectively (UNCTAD, 2018). In recent years, images of young Africans trying to reach Europe via the Mediterranean have been widely broadcasted by television channels and have helped to shed light on the international and clandestine aspect of migratory movements. Emigration to Europe has been at the center of political debates (UNCTAD, 2018). The International Organization for Migration estimated that about 1,500 migrants from sub-Saharan Africa died in the Mediterranean Sea on their way to Europe (IOM, 2017). Looking more closely, beyond the negative consequences of irregular migration, can regular migration create many opportunities for countries of origin? The various debates on this issue remain contradictory in the literature and are still relevant today.

However, very few studies have examined the nature of the relationship between migration and the economic development of the areas of origin, focusing on the effect of emigration on agricultural growth in the Franc zone, which comprises two regional blocs, namely WAEMU and CEMAC. The general objective of this study is to analyze the effects of emigration from Franc zone countries to OECD countries on agricultural growth. Specifically, the aim is to analyze the effect of emigration to OECD countries on the agricultural growth of the Franc zone on one hand, and analyze the contribution of emigration to OECD countries to the agricultural growth of the different regional blocs of the franc zone (WAEMU and CEMAC), on the other hand.

In fact, knowledge of the link between migration and agricultural growth will enable decision-makers to develop specific agricultural policies by integrating migrants as potential actors of development through the transmission of new ideas, knowledge and technological progress, and to implement incentive mechanisms to encourage diaspora investments in order to boost the agricultural sector. A comparison between WAEMU and CEMAC would make it possible to highlight the heterogeneity in terms of emigration in the two regional blocs of the Franc zone and to propose economic policies that are best suited to both blocs.

The rest of the article is as follows: the second section, which is about literature, presents the theoretical and empirical framework. The methodology is presented in the third section while

the results and discussions are presented in the fourth section. Finally, the fifth section concludes the article with economic policy implications.

1. Literature review

1.1. Theoretical framework of the link between emigration and agricultural production

The literature on the effect of emigration on agricultural productivity in countries of origin remains ambiguous and presents two trends: the developmentalist and the pessimistic trends. The developmentalist trend perceives emigration as an opportunity for development while the pessimistic one emphasizes the adverse effects of emigration on the development of countries of origin. One of the models used to explain the effect of migration on agricultural productivity is the dualist model developed firstly by Lewis (1954) and formalized by Fei and Ranis (1961), which distinguishes between a low-productivity agricultural sector and a high-productivity industrial sector. According to these authors, migration allows for an efficient allocation of labour from the agricultural sector to the industrial sector to equalize marginal labour productivities in rural and urban areas. This has a positive effect on the place of departure since migration helps to reduce unemployment there and equalizes wage differentials.

Todaro (1969), for his part, holds the assumption that the migrant is a rational individual who decides whether to migrate or not according to the wage differential between the departure and arrival areas, but also according to the possibility of finding a job in the arrival area. Criticizing Lewis' model, Todaro (1969) argues that migration is a response to the expected and not observed wage differential. He suggests that the reduction of the expected net gain by those who leave is the only way for political authorities to curb population movements between regions and countries. Overall, econometric studies of rural emigration flow in less developed countries confirm both neoclassical theory and the Todaro's model of migration based on income prospects (Taylor and Martin, 2001). Despite its important contribution to explaining the motives and effects of rural emigration, the Todaro model has limitations, and income differentials are not sufficient to explain regional differences in migration. Arguably, the main limitation of the Todaro models is that they ignore some factors in addition to income that influence emigrants' decisions, as well as their potential effects on rural economies (Williamson et al., 1988). These factors are taken into account in the more recent literature on the causes and consequences of migration: the new economics of labor migration.

Contrary to neo-classical theory, the new economics of migration views the departure of individuals as the result of a family decision, not as a personal one. Human capital theory views migration as an individual investment decision based on people's level of education. They choose to migrate if the returns to human capital minus the costs of moving are higher in the places of arrival than in the places of origin. The new economics of labor migration (Stark and Bloom, 1985) considers that individuals migrate not only because of an expected wage differential, but also to partially overcome household liquidity constraints and to diversify risk in the absence of credit or insurance markets in rural areas. Migration can be presented as a strategy to reduce agricultural risks and financial liquidity constraints for rural households. In this context, migration is a tool for risk diversification (Stark and Levhari, 1982; Stark and Bloom, 1985). It supports the incomes and expenditures of the households of origin and alleviates poverty in rural areas (Nguyen et al., 2015; Amare et al., 2012; Taylor et al., 2003). One of the difficulties faced by rural households is the fact that most of their income comes from the agricultural sector. However, this income fluctuates due to the vagaries of production and the instability of prices of agricultural product. According to these authors, the migration

of active members of a household to different markets is a solution to this problem. Moreover, in the context of failing rural markets such as labor, credit and insurance markets, migration becomes an important factor in overcoming these imperfections affecting rural households' decisions on agricultural production and labor allocation (Ali, 2019; Rozelle et al., 1999; Taylor et al., 2003). The resulting remittances will compensate for the loss of income due to poor harvests and, conversely, family financial support enables migrants to support themselves during periods of unemployment. Thus, Taylor (1999) argues that remittances help promote development by removing the production and investment constraints faced by farm households in poor developing countries. Similarly, migration and remittances are seen as informal insurance mechanisms between migrants and their rural households (Gubert, 2010; Damon, 2010).

However, a second group argues that emigration is detrimental to the development of countries of origin (Dos Santo, 2006; Chami, 2005; Lipton, 1980). Thus, economic migration activities empty the areas of origin of their labor and capital and exclude the production of tradable goods as well as Dutch disease (Massey et al., 2001). The migration process encourages the export of labor (Massey et al., 2001), which should contribute to agricultural production in countries of origin. By benefiting from migrant remittances, recipients are diverted from work (Chami, 2005; Lipton, 1980). Under these conditions, the recipients of these remittances prefer to invest them in consuming goods that are generally imported and thus contribute negatively to agricultural production. According to Dos Santo (2006), the emigration of skilled labor reduces the accumulation of human capital in the country of departure and thus contributes negatively to the economic development of that country. In fact, agricultural irrigation works sometimes use complex agricultural equipment requiring a high level of human capital. The outflow of skilled labor is then an obstacle to the development of agriculture in the countries of origin.

1.2.Empirical framework of the link between emigration and agricultural production

Empirically, de Brauw (2019) reveals that there is a positive and significant relationship between agricultural productivity and the departure of young migrants. This relationship is strong among households that own less agricultural land in Ethiopia (de Brauw, 2015). Based on the new economic theory of labor migration, Li et al. (2013) show that migration intensifies labor shortages in agricultural areas, but remittances compensate for this loss to improve agricultural productivity in north-east of China. In Vietnam, de Brauw and Harigaya (2007) show that migration does not affect agricultural productivity but rather cropping patterns. Conflicting results were found by Rozelle et al. (1999) using a methodology based on simultaneous equations in China. In fact, Rozelle et al. (1999) found that the loss of labor due to migration caused a significant decrease in cereal production.

However, remittances from emigrants increase production, which helps to at least partially offset the negative effect of labor loss (Rozelle et al., 1999). Moreover, Leon-Lesdema and Piracha (2004) also find the same result for Eastern European countries in that migrant remittances positively influence labor productivity in rural areas. Rwelamid and Kirsten (2003) argue that migrant remittances increase household income and thus promote increased agricultural production through investments. A 10% increase in remittance flows translates into a 1% reduction in per capita poverty levels in sub-Saharan Africa (Gupta et al., 2007). According to Gnimassoun and Anyanwu (2019), the diaspora contributes positively and significantly to economic development in Africa and this effect increases with the level of education of emigrants. Also, Amega (2018) found that migrant remittances significantly

improve education and health in sub-Saharan Africa. In contrast, Castles and Kosack (1972) reveal that the migration of the less skilled, irregular and temporary migrants accentuates social divisions, putting migrants at the bottom of the socio-economic ladder. These migrants are often exploited by their bosses and do not contribute effectively to the development of their areas of origin in Europe (Castles and Kosack, 1972).

2. Methodological approach

2.1.Conceptual framework

To estimate the effect of the rate of emigration from Franc zone countries to OECD countries on agricultural productivity, a Cobb-Douglas-type production function is used (Equation 1).

$$Y = F(A, K\ L) = AK^{\alpha}L^{\beta} \quad (1)$$

Where Y represents agricultural value added, K, L and A represent respectively capital, labour and technical progress which is exogenous. Capital is composed of durable physical capital including investment, machinery, infrastructure, equipment, etc. (Solow, 1956) as well as human capital, which refers to the set of physical and intellectual abilities of the worker that make him/her more efficient (Romer, 1986). However, the productivity resulting from technological development other than capital and labour is captured by factor A. The elasticities of capital and labour inputs are captured by α and β respectively (α+β=1). This assumes that the returns are constant at scale. Thus, a doubling of the quantity of each factor leads to a doubling of production. Linearization of equation (1) gives:

$$lnY = lnA + \alpha lnK + \beta lnL \quad (2)$$

However, endogenous growth models predict that technical progress is endogenous, allowing other variables to be introduced into the model. In order to account for the effect of past agricultural productivity on present agricultural productivity, the lagged dependent variable is introduced as an explanatory variable in the model.

2.2. Empirical model and estimation method

In this study, the variable explained is agricultural value added as a percentage of GDP. Emigration is captured by the rate of emigration from Franc zone countries to OECD countries. This variable represents the explanatory variable of interest and is available for each five-year period. All other variables are five-year averages. The model is complemented by control variables such as human capital, inflation, migrant remittances, agricultural labor force and infant mortality rate.

Human capital is measured here by the gross enrolment ratio in secondary education. It is the total enrolment in secondary education, regardless of age, expressed as a percentage of the population of official secondary school age. According to Romer (1986), human capital is necessary for economic development. The rate of inflation is measured by the GDP deflator as an annual percentage and indicates the general price level. The infant mortality rate measures the level of health according to Mundlak et al. (2004). An increase in the infant mortality rate can negatively affect agricultural production. In this context, agricultural workers allocate resources for health needs at the expense of agricultural investments. Migrant remittances are the sum of workers' remittances and compensation of employees as a share of GDP. According

to Mundlak et al. (2004), agricultural labor stimulates agricultural productivity. It is measured as a percentage of total employment.

In order to account for the effect of past agricultural production on present agricultural production, a dynamic model is used. Indeed, in the agricultural production process, farmers anticipate future production on the basis of the income from past production. It is clear that the future value of agricultural production is estimated on the basis of its evolution in the past and the forecast errors made in the past period. The empirical model considered, is then:

$$Y_{it} = \alpha_0 + \alpha_1 Y_{t-1} + \alpha_2 TX\_EMIG + \sum_{i=3}^{7} \alpha_i X_{it} + \gamma_t + \lambda_{it} \quad (3)$$

With Y_{t-1} the lagged variable of agricultural value added; TX_EMIG representing the emigration rate and X, the matrix of control variables mentioned above. γ_t represents the time effect associated with each country and λit denotes white noise. The α_i are parameters to be estimated (i=1,2,3, ...,7).

Estimation techniques such as Generalized Method of Moments (GMM), instrumental variables are often adopted to estimate dynamic panel models. However, these techniques apply only to large sample panels. This work covers a sample of twelve (12) countries over a period of seven (7) quinquennials. For these reasons, the corrected Least Square Dummy Variable estimator (LSDVC) proposed by Bruno (2005) is strongly recommended for small sample sizes and short periods. This estimator takes into account the absence of data in the time interval considered. The LSDVC estimator is then adapted to the structure of our data. Also, the options Blundell and Bond (bb), Arelanon and Bover (ab) and Anderson and Hsiao (ah) available under LSDVC estimator can easily solve a potential endogeneity problem (Bruno, 2005).

2.3. Data and descriptive statistics

The available data relate to a panel of 12 Franc zone countries and cover the period 1980-2010, with observations corresponding to a five-year interval. These countries are: the WAEMU countries on the one hand composed of Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, Togo and the CEMAC countries on the other hand composed of Cameroon, Congo, Gabon and Chad. Data on emigration rates are from Brücker et al. (2013). The WDI database is mobilized for the rest of the data used (WDI 2019).

2.3.1. State of agricultural production in the Franc zone

The evolution of the agricultural sector's contribution to GDP in the Franc zone between 1980 and 2015 is not linear in time (Figure 1). It can be seen that agriculture occupies an important place in the economies of WAEMU countries compared to those of CEMAC over the entire period of the study. The figure show that agricultural value added increased steadily over the period 1980-1995 in WAEMU. However, it declined significantly from 34.7% in 1995 to 30.4% in 2000. This fall was continuous until 2010 when it evolved to reach 31.42% in 2015. This growth is still low compared to the growth that began in the 1980s and 1990s. Even though agriculture remains the cornerstone of the economy of CEMAC countries, its share in the GDP declined significantly over the period 1980-1985 from 23.21% in 1980 to 17.96% in 1985. In 1990, it increased slightly to 18.02% before declining again to 19.37% in 2005. However, it would continue to fall until 2015 (18.29%).

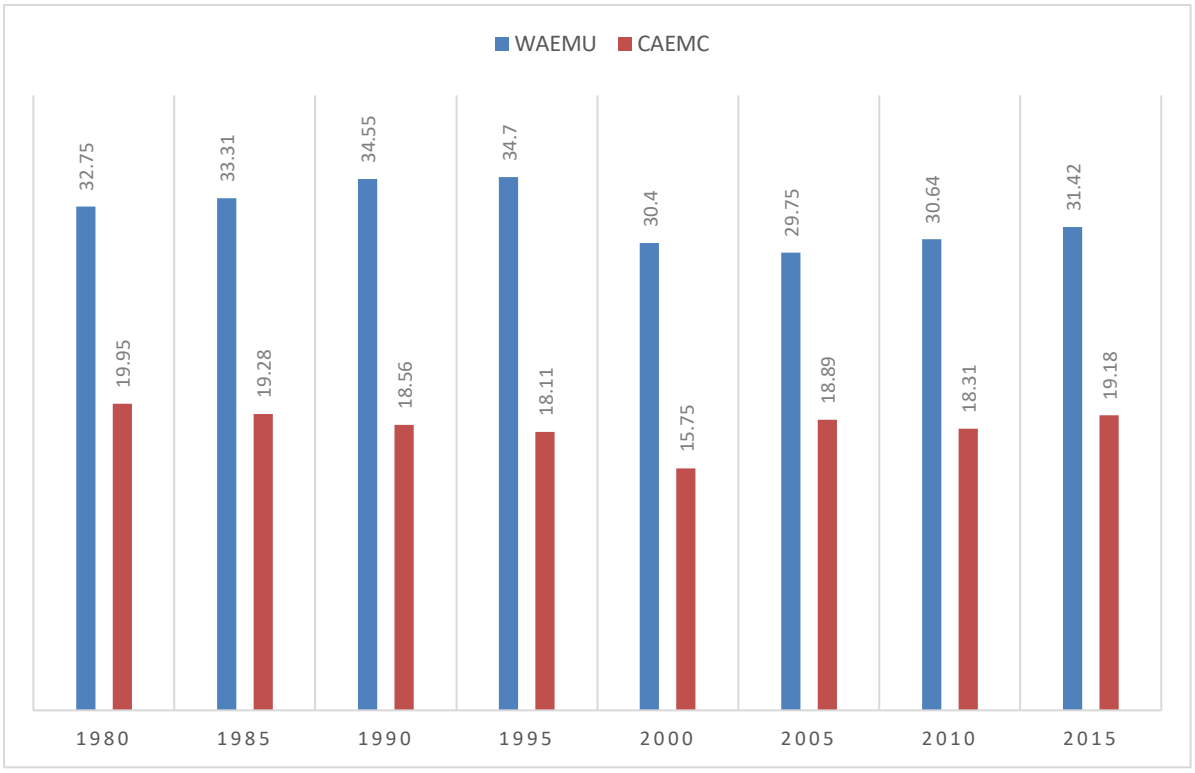

Figure 1: Agricultural value added in the Franc zone (percentage of GDP)
Source: The authors, using data from WDI (2019).

2.3.2. State of emigration in the Franc zone

The evolution in the rate of emigration from Franc zone countries to OECD countries between 1980 and 2010 is illustrated in Figure 2.

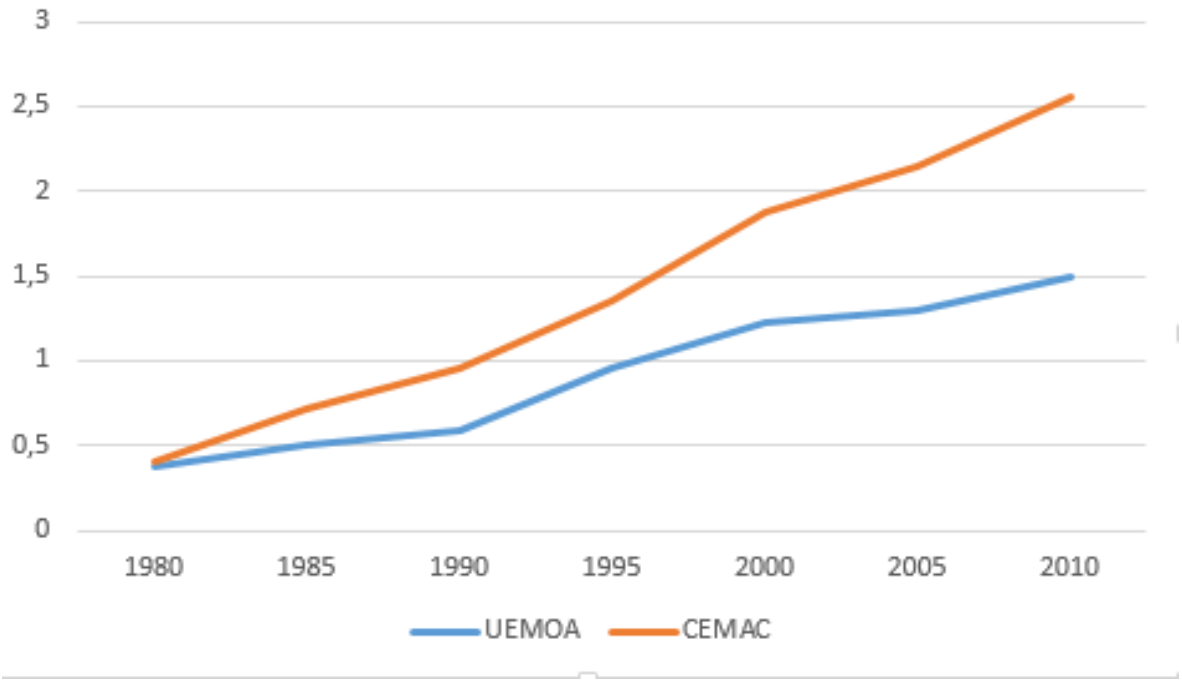

Figure 2: Change in the rate of emigration from Franc zone countries to OECD countries
Source: The authors, using OECD emigration data.

This trend shows that the rate of emigration increased continuously over the entire period under consideration (1980-2010) within the two regional blocs, with slight shifts in 1990, 2000 and 2005. CEMAC recorded the highest emigration rate. It increased more than six-fold over the period under consideration, from only 0.4% in 1980 to 2.56% in 2010. It increased, especially from 1990 onwards. The high emigration rate in CEMAC can be justified by several reasons, including natural vagaries, socio-political instability, and conflicts over natural resources, and unemployment. Thus, since 1960, Lake Chad, which is close to Cameroon and Chad, has seen its surface area reduced by 95% under the effects of climate change (UNCTAD, 2018). This has had serious repercussions on the livelihoods of millions of people and has fostered tensions within the region, leading to migration (UNCTAD, 2018). In addition, most CEMAC countries, including Cameroon, the Republic of Congo and Chad, have been shaken by coups d'état, ethnic and linguistic conflicts and civil wars.

In the WAEMU, the emigration rate has certainly evolved, but to a lesser extent than that observed in the CEMAC. It recorded a fourfold increase in the emigration rate over the period under consideration, from 0.37% in 1980 to 1.5% in 2010. Emigration within WAEMU can be explained by climatic vagaries, as revealed by UNCTAD (2018) of a positive correlation among natural disasters that have occurred.

2.3.3. Global and individual description of variables

Over the period 1980-2010, CEMAC recorded the highest average emigration rate estimated at 1.85% against 0.92% for WAEMU (Table 1).

Table 1: Overall description of variables

Variables	Sub-regional groupings of the Franc zone								Franc zone (CEMAC and WAEMU)			
	CEMAC				WAEMU							
	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
Agricultural value added	18.40	14.68	3.53	53.08	32.52	9.21	13.72	55.23	27.82	13.08	3.53	55.23
Emigration rate	01.85	2.41	0.05	8.54	0.9235	1.20	0.04	5.22	1.234	1.74	0.04	8.54
Migrant remittances	0.20	0.18	0.003	0.69	3.31	2.76	0.36	11.65	2.39	2.72	0.003	11.65
Agricultural labor force	56.52	18.18	38.25	83.51	59.61	17.17	39.36	88.93	58.58	17.42	38.25	88.93
Human Capital	31.18	17.55	5.90	66.07	19.535	13.15	2.85	55.07	23.41	15.65	2.85	66.07
Infant mortality rate	75.94	22.80	40.56	121.32	93.19	25.26	39.38	153.88	87.16	25.65	39.38	153.88
Inflation	5.64	4.12	-3.41	14.48	7.726	13.05	-1.42	83.65	7.08	11.11	-3.41	83.65

Source: Authors, using WDI (2019) and OECD emigration data

The average emigration rate of the Franc zone is about 1.23% of total active population. The average agricultural value added in the overall product is 27.81% for all Franc zone countries. The average contribution of agricultural value added to the GDP of WAEMU countries is higher, estimated at 32.52%, than that of the CEMAC zone, which is estimated at 18.40%. However, the emigration of CEMAC populations to OECD countries is higher than that of the WAEMU. In contrast, WAEMU countries contribute more to agricultural production to GDP than CEMAC countries. Table 2 presents the averages of the variables by country for the entire Franc zone from 1980 to 2010.

Guinea Bissau leads in terms of agricultural value added in the overall product at 47.29% followed by Chad (40.45%). Gabon takes the last place with an average agricultural value added of 6.46% and this can be explained by its high oil production, which is the primary raw material with a strong influence on the Gabonese economy. The share of employment in the agricultural sector in Guinea Bissau is also higher compared to other countries in the Franc zone. Gabon's emigration rate is higher (4.72%) followed by that of Guinea Bissau (2.84%).

Table 2: Description of variables by country

Countries	Agricultural added value	Emigration rate	Transfer of migrants' remittances	Agricultural labor force	Human Capital	Mortality rate	Inflation
Benin	29.20	0.32	3.72	48.53	26.91	94.53	4.64
Burkina Faso	31.55	0.09	3.89	76.62	11.43	90.12	3.37
Ivory Coast	25.78	0.42	0.84	50.70	25.21	95.97	5.24
Guinea Bissau	47.29	2.85	2.91	84.86	16.25	112.3	29.17
Mali	35.79	0.91	3.89	50.71	18.34	115.74	5.45
Niger	38.23	0.08	1.11	76.83	8.15	102.29	3.84
Senegal	16.73	1.89	5.57	46.79	20.21	65.82	4.07
Togo	35.59	0.83	4.51	41.88	32.90	79.73	4.92
Cameroon	18.82	0.64	0.35	61.94	21.07	85.94	4.14
Congo	7.88	0.02	0.22	39.60	52.74	59.44	6.83
Gabon	6.46	4.73	0.07	41.83	41.46	55.31	6.14
Chad	40.45	0.08	0.05	82.71	12.87	103.09	5.16

Source: Authors, using WDI (2019) and OECD emigration data

3. Results and Discussions

The coefficient associated with the emigration rate is negative and significant at 1% in the Franc zone and in the CEMAC unlike in the WAEMU, where it is positive and significant at the 1% level (Table 3).

Table 3: Estimation of the effect of emigration on agricultural productivity in the Franc zone

Variables	Sub-regional groupings		Franc zone (WAEMU and CEMAC)
	CEMAC	WAEMU	
Lags of agricultural value added (log)	-2.402***	0.599***	0.831***
	(0.24)	(0.13)	(0.07)
Emigration rate (log)	-2.074***	0.199***	-0.062***
	(0.76)	(0.06)	(0.01)
Migrant remittances (log)	-0.0190	-0.001	-0.016***
	(0.45)	(0.01)	(0.01)
Agricultural labor force (log)	-7.590***	0.246	0.209
	(2.35)	(0.21)	(0.47)
Human capital: Secondary school enrolment rate (log)	0.135	0.078	-0.001
	(0.88)	(0.13)	(0.05)
Infant mortality rate (log)	4.524***	0.248	-0.166
	(0.41)	(0.22)	(0.19)
Inflation	-0.022***	0.026**	0.007***
	(0.001)	(0.01)	(0.01)

Source: Authors. Note: *** p<0.01, ** p<0.05, * p<0.1 (standard errors in parentheses)

It implies that an increase of one additional unit in the emigration rate leads to a decline in agricultural value added by 1.48% in the CEMAC and 0.063% in the Franc zone. In contrast, this increase leads to a 0.20% rise in agricultural value added in the WAEMU (Table 3). This result shows that emigration makes a negative contribution to agricultural value added in the Franc zone as a whole and particularly in the CEMAC, in line with the pessimistic thesis of the negative effect of emigration on agricultural development. These results are in contrast with those of de Brauw (2019), but are similar to those of Rozelle et al. (1999) in the case of China, where the loss of labor due to migration would contribute to a significant decline in cereal production. In fact, a massive outflow of workers from an economy to destination areas can reduce the labor force in the agricultural sector and consequently lower agricultural productivity.

The results showed that emigration positively affects agricultural value added in the WAEMU. This result corroborates those of de Brauw (2019) and Taylor and Lopez-Feldman (2010) who suggest that rural households' access to migrant labor markets could increase the income and land productivity of households in the countries of origin. Emigration can be a source of investment in the agricultural and non-agricultural sectors and even in human capital through remittances from migrants.

An increase of one additional unit in migrants' remittances reduces agricultural value added by around 0.02% at the 1% threshold in the Franc zone. Remittances then make a negative contribution to agricultural value added in the Franc zone. Similar results were found by Rozelle et al. (1999) regarding the adverse effects of migrant remittances on agricultural growth. In fact, beneficiaries

who become dependent on these transfers may no longer be interested in agricultural activities. These transfers could also be used for consumption purposes instead of investing them in the agricultural sector.

The coefficient associated with the share of the agricultural labor force is statistically equal to zero in the WAEMU and the Franc zone. However, the share of labor in the agricultural sector negatively affects agricultural value added in CEMAC at 1% level. An increase of one unit in the share of agricultural labor leads to a decline in agricultural value added of average about 0.84% in the CEMAC. This result is consistent with those of Devadoss et al. (2020) for Northern American economies, but inconsistent with those of Eichman et al. (2010) in the implementation of land protection policy from the Northwest Forest Plan project. This result could be justified by a certainly unskilled agricultural labor force or a massive departure of valid labor force (especially young people) to outside the CEMAC zone.

It is clear that agricultural development in a context of climate change requires the adoption of new technologies (Ali et al., 2020) and therefore a qualified labor force (Ali and Monkounti, 2020). Also, Devadoss et al. (2020) found that the immigration policies implemented in U.S. have eroded the advantage of labor intensive agriculture, leading to the fall of agricultural production. Moreover, the results show that inflation is positively related to agricultural value added and statistically significant in the global zone in general (Franc zone) at 1% level and in WAEMU at 5% level. However, the results suggestion that failing to control inflation could negatively affect the agricultural development. This was the case of CEMAC countries (Table 3). Indeed, the average inflation rate in CEMAC countries was about 5.57% compared to 4.50% in WAEMU except Guinea Bissau. This result suggests that the development of pricing policies in favor of producers can contribute to improving agricultural value added within the Franc zone.

4. Conclusion

Migration policies in the face of economic development, especially in developing countries such as those in the Franc zone whose economies are driven by agriculture, remain topical in both national and international debates. The aim of this article is to analyze the effects of emigration from Franc zone countries to OECD countries on agricultural growth. Thus, using unbalanced panel data over the period 1980-2010, the LSDVC estimator is applied to a dynamic model. The results reveal that there is heterogeneity in the effect of emigration on agricultural value added in CEMAC and WAEMU. The results reveal that emigration negatively affects agricultural value added in CEMAC while it positively contributes to agricultural productivity in WAEMU. However, emigration contributes negatively to agricultural added in the Franc zone as a whole. Moreover, migrant remittances contribute negatively to agricultural value added in the Franc zone, as does agricultural labor, which negatively affects agricultural value added in CEMAC. The authorities of the franc zone in general and of CEMAC in particular should encourage any policies to combat emigration. However, support for policies aimed at promoting emigration is strongly recommended in the WAEMU. There is a need to strengthen human capital through the enrolment of children in secondary school in CEMAC. Moreover, the development of pricing policies in favor of producers can contribute to improving agricultural productivity within the Franc zone.

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