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Influence of Rural-Urban Migration on Food Insecurity in Cameroon

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Abstract

In Cameroon, rural-urban migration is widespread. This paper, therefore, aimed to verify the influence of rural-urban migration on food insecurity in Cameroon. This study makes use of quantitative research design precisely a survey design in which it helps the researcher in gaining insight of the subject matter and familiarity for later investigation using the Cameroon household consumption surveys (ECAM 4, 2014). The dataset has distinctive information on rural-urban migration which was exploited for the composition of a food Insecurity index was also constructed using six indicators; being unable to eat three square meals a day, unable to eat series and tuber every day, unable to eat vegetables every day, unable to eat meat and fish every day, eat good meals only on feast days and unsatisfied with household minimum food needs. The control function approach was used to estimate rural-urban migration and food insecurity. Findings from the empirical indicates that rural-urban migration has a negative. The results also reveal a negative significant relationship between farm investment and food Insecurity in Cameroon. As a result of these findings, it is recommended that there should be an all-inclusive agricultural programme by the government that will engage the farming population to discourage them from further migration from the rural communities.

Keywords: rural-urban migration, control function, multiple correspondent

1. Introduction

Migration exacerbates these rural-urban structural imbalances in two major direct ways. First, on the supply side, internal migration disproportionately increases the growth rate of urban job-seekers relative to urban population growth, which itself is at historically unprecedented levels, because of the high proportions of well-educated young people who dominate the migrant stream. Their presence tends to swell the growth of urban labour supply while depleting the rural countryside of valuable human capital. Second, on the demand side, most urban job creation is more difficult and costly to accomplish than rural employment creation because of the need for substantial complementary resource inputs for most modern-sector industrial jobs. For example, an ILO (International Labour Office) estimate of investment costs per worker in Egypt in 1969 showed a cost of $5,070 for an industrial job compared with $616 for an agricultural job (ILO 1969).

Generally, rural-urban migration brings a lot of changes as the people move from one geographical area to another for temporary or permanent residence. These changes include urban growth as towns and cities expand to cover greater area of lands and also urbanization leading to an increase in proportion of the people living in cities and major towns. According to Pretty et al (2003), rural population reduces and decreases farming

activities thus, leading to an adverse effect on the various components of food systems. Deshingkar and Grimm (2005) opined that in sub-Saharan Africa, massive break away from subsistence to cash crop farming or manufacturing has translated into temporary or permanent movement of the youth (especially males) and sometimes females from rural centres to urban communities in search of remunerated job opportunities.

Rural-urban migration is characterized negatively by some policy expects and urban developers as means of hindrance to development of cities in many African countries, leading to creation of urban slum areas and causing astronomical increase in crime rate (Gazdar, 2003). As a result, many countries have introduced prudent policies to minimize Insecurity reduction and boost economic development through regulations on population and limitation on activities within the informal sector (Harteveld, 2004).

According to the National Geographic an urban area "is the region surrounding a city. Most inhabitants of urban areas have non-agricultural jobs; there is a density of human structures such as houses, commercial buildings, roads, bridges, and railways" (National Geographic 2013). There is a higher variation of working opportunities than in the rural areas. We also define urban areas as an area with high population density that include social and economic organizations and where the shape of the natural environment is transformed into a constructed landscape.

According to USDA (2013), food insecurity is a condition in which households lack access to adequate food because of limited money or other resources. The Canadian department of agriculture and FAO affirms that food insecurity is the inadequate or insecure access to food due to financial constraints (FAO, 2000).

Hunger, famine and problems of physical access to food are recognised as features of the most extreme forms of Insecurity, which have generally been associated with countries in the Global South. There are therefore challenges to defining food Insecurity, and debates about what is the most appropriate terminology to use for the phenomenon as it is experienced in wealthier, developed countries. While the term food Insecurity has been commonly used in UK policy and media discourse around people on low incomes struggling in relation to food, the concept of food insecurity is more widely used internationally and in academic literature. A commonly cited definition used by Gill & Sharma, (2004) considers food poverty to be "the inability to acquire or consume an adequate quality or sufficient quantity of food in socially acceptable ways, or the uncertainty that one will be able to do so". This definition is derived from a definition of food insecurity provided by Radimer et al (1992). Food poverty is understood to be experienced on a spectrum, characterised first by anxiety about being able to access enough food and followed by modifying diet to make food supplies last and finally by going without food for extended periods.

2. Literature Review

2.1 Theoretical Literature

The effect of rural-urban migration has been treated and examined by different domains and discipline. Many scholars have forwarded theoretical and empirical thought on the issues of distinctiveness, factors and effects of migration on domestics and global level.

Todaro (1969) and Harris-Todaro (1970) put their own feet print in the literature of migration. In the mid of 20th century, the hot debate in the realm of economic school of thought about the under development of less developed countries were population booming in countryside and absences of industrialization in town. The debate only exists for short period of time hence the level of inequality and Insecurity remaining the same when the GNP increases. Even more the rural-urban migration was considered as one factor for the under development of the LDCS. Todaro (1969) and Harris-Todaro (1970) model justified that the condition and level of urban unemployment. The key ideas of the models were /are

1) Rural-urban migration is related with economic aspects

2) The rise of job opportunity in cities mean the rise of urban joblessness in town and even more reduced national product i.e., Todaro contradiction,

3) Migration considered as tuning means of workers in the labour markets in countryside or cities in order to increase the income,

4) The very reason to reach on decision to leave the place of origin by the migrants is the possibility of unemployment in the destination areas.

According to Cornwell and Inder (2004) much of the contemporary literature on economic motivations for rural-urban migration builds on the seminal work of Todaro (1969) and Harris and Todaro (1970). Their models have provided a widely accepted theoretical framework that explained the relationship between rural-urban migration and urban unemployment in many LDCs. Assuming potential migrants respond to the urban employment probability and treating rural-urban migration primarily as an economic phenomenon, the Harris-Todaro model (HT) then demonstrates that, in certain parametric ranges, an increase in urban employment

may actually result in higher levels of urban unemployment and even reduced national product (the Todaro Paradox). The paradox is due to the assumptions that in choosing between labour markets, risk-neutral agents consider expected wages; that the probability of obtaining urban employment is approximated by the ratio of urban jobs to the urban labour force; and that the urban wage rate is considerably and consistently higher than the rural wage rate.

Under these assumptions, inter-labour market (rural-urban) equilibrium mandates urban unemployment. This unemployment ensures that the expected urban wage is equal to the rural wage (which is assumed constant throughout). The repercussion of this simple set of assumptions is that contrary to received wisdom, once the migration response is factored in, several policies aimed at reducing urban unemployment will raise urban unemployment rather than reduce it (Riadh, 1998).

In the HT model migration is regarded as the adjustment mechanism by which workers allocate themselves between different labour markets, some of which are located in urban areas and some in rural areas, while attempting to maximize their expected incomes. The model led to many applied studies most of which confirmed that the relative wages and the perceived probability of finding a job were indeed important determinants of a decision to move. Also, the main conclusion of HT model has had considerable influence on policy formulation in LDC's. From the empirical point of view, the HT model generates unemployment rates which are implausibly high. From the theoretical point of view, the model leaves its driving force, the disparity of urban and rural wages and the fixity of urban wage, unexplained. However, the model, with or without fixed wages, can be modified in a number of ways to introduce many interesting aspects (risk aversion, priority hiring, informal sector, travel costs) which probably will reduce the level of unemployment as predicted by the starting model. One of the predictions of HT model was that the proportional equilibrium size of the urban traditional sector will vary inversely with the rate of job creation. Arellano (1981) indicated that this prediction refers to the steady state and is warranted by a specific assumption about the elasticity of the migration rate.

In this framework, the economic model of the family developed by (Van Banning, & Becker, 1978) form the conceptual basis for our analysis of the contribution of training on agricultural production. The family's objective is assumed to be the maximization of the utility that it derives from consuming the various goods that it produces using inputs of family members' time and market-purchased goods and services, also agricultural services are viewed as consumption good from which parents derive utility. The family's level of consumption of agricultural services depends on both the number of foods that it produces and on the quality of each farm, Blau and Grossberg (1990).

The time spent by women in activities such as food preparation, breastfeeding, collecting water and fuel as well as seeking preventive and curative medical care is an important input into the production of agricultural farms. Mothers, who work, however, may lack the time to adequately breastfeed or prepare nutritious foods for their young children or make use of public services designed to improve agricultural production. Although market substitutes for some time-intensive inputs exist (e.g., prepared foods, hired domestic help) these may be too costly for many women; for many other time-related inputs into agriculture, there are unlikely to be functioning markets. Working women may rely on other members of the household to provide help in the farm while they work, but the quality of care provided by these substitutes, especially if they are older children, may be poor (Blau and Grossberg, 1990). However, women's income generating activities also increase the level of household resources, which should improve nutrition. As a result, detrimental effects of changes in time allocation may be partially or completely offset. Moreover, there is some evidence that women are more likely than men to spend their income in ways that improve children's welfare. What then can we say? The net effect of training on agricultural outcomes is an empirical issue.

2.2 Empirical Literature

Beyene, and Muche, (2010) examines determinants of household food insecurity among rural households in the Ada Berga district in central Ethiopia. Household calorie acquisition was analysed to measure the status of household food insecurity. Based on the survey of 196 farm households, the logistic model was estimated. Variables related to experiences in farming activities, off-farm and non-farm incomes, land and livestock holdings, as well as soil and water conservation practices significantly affect household food insecurity. A difference in the use of chemical fertilizer has a positive impact on food insecurity where improved food insecurity was observed as the intensity of fertilizer use increases. Results indicate that development interventions aiming at increased income diversification, improved supply of fertilizer, increasing land and livestock productivity will immensely contribute to the attainment of food insecurity. In general, the results of the study produce the implication that attaining food insecurity in the highlands of Ethiopia requires adoption of mixed strategies and policies.

Demeke et al (2011) analyses the effect of rainfall shocks on Ethiopian rural households' food insecurity and vulnerability over time while controlling for a range of other factors. To this end, we generated a time-variant

household food insecurity index which is developed by principal components analysis. Based on the scores of the index, households were classified into relative food insecurity groups and their socioeconomic differences were assessed. The exploratory results show that compared to the less secured households, the more secured ones have male and literate household heads, tend to have a greater number of economically active household members, own more livestock, experience better rainfall outcome, participate in equb (a local savings group), and use chemical fertilizer. Fixed effects regression was used to identify the factors which affect the score's variability and the results indicate that rainfall shock is an important factor affecting households' food insecurity over time. It is also noted that household size, head's age, participation in equb, off-farm activities, use of fertilizer, and livestock ownership positively and significantly affect the food insecurity score. Results from multinomial logistic regression model reinforce the fixed effects regression results by showing the strong association of persistent food insecurity and vulnerability with adverse rainfall shock. A number of conclusions can be drawn from the results which are useful for policymakers as well as for agencies that engage in areas of risk and food insecurity.

Atake et al (2020) assess the impact of agricultural investments on labor productivity and insecurity reduction in rural areas in Togo by analyses of data collected from 4,543 households in four townships via a Community-Based Monitoring System approach. Through descriptive statistics and econometric modelling of agricultural households, we examine such issues as gender disparities, educational levels, water and sanitation, insurance, and income. We find that public investments in health education and telecommunication infrastructure improve farmers' productivity and reduce the number of farmers below the Insecurity line, as do farmers' investments in inputs. We note an estimated farm-income gap between men and women of 44.1% and suggest that increased public and private investments in education, health, safe drinking water, and irrigation infrastructure, as well as improvements in the equitable distribution of endowments such as land would equalize opportunities for disadvantaged or excluded groups and reduce the income gap between men and women.

Onyango et al (2021) examine the importance of food remitting to households in contemporary Nairobi. The first section of the paper provides an overview of the urbanization and rapid growth of Nairobi, which has led to growing socio-economic inequality, precarious livelihoods for the majority, and growing food insecurity, as context for the more detailed empirical analysis of food insecurity and food remittances that follows. It is followed by a description of the survey methodology and sections analysing the differences between migrant and non-migrant households in Nairobi. Attention then turns to the phenomenon of food remitting, showing that over 50% of surveyed households in the city had received food remittances in the previous year. The paper then uses multivariate logistic regression to identify the relationship between Nairobi household characteristics and the probability of receiving food remittances from rural areas. The findings suggest that there are exceptions to the standard migration and Insecurity-driven explanatory model of the drivers of rural-urban food remitting and that greater attention should be paid to other motivations for maintaining rural-urban connectivity in Africa.

Meeske (2018) explore trends in the local food system in Viet Nam, specifically focusing on food consumption patterns, agricultural production, and international trade. Furthermore, it aims to explore whether rural-urban migration and having rural origins affect the diet of migrants. Data in this thesis comes from literature studies, the World Bank, the Food and Agricultural Organization of the United Nations, and the Vietnam Household Living Standards Survey (VHLSS). It is found that the number of consumed kilocalories per capita is increasing, with calories increasingly coming from proteins and fat instead of carbohydrates. Furthermore production, exports, and imports of nearly all food crops has increased over the years. Especially the production of rice is considerable. The analysis of the effect of rural-urban migration and having rural origins on diets of migrants points to the pattern of migrant households adopting urban diets when moving into urban areas. This has greatest consequences for the consumption of rice and food away from home.

Sedoo et al (2019) investigated the effect of rural-urban migration on food insecurity of rural households in Kwande local government area of Benue State, Nigeria. Using multistage sampling technique and a semi-structured questionnaire as instrument, data for the study was collected from a sample of three hundred and eighty-nine (389) rural dwellers in the state. The study revealed the major causes and determined the effect of rural-urban migration on the food insecurity of Kwande local government area and suggested measures to reduce the rate of rural-urban migration. Given that the F- statistics of 98.094 is significant at 1% level of significance, it implies that the computed F-value was higher than the F-tabulated value of (1.94) at 5% level of significance and (2.51) at 1% level of significance. Therefore, the alternative hypothesis which states that factors such as search for job, quest for skill acquisition, search for better education, quest for marriage, insecurity, social amenities, and natural disasters are the determining factors of rural urban migration was accepted. Therefore, the study concluded that reduction of rural-urban migration and improvement in food insecurity are dependent on these factors. Based on the effects of rural-urban migration, it was recommended that government/policy makers come up with policies that would lead to increased rural development and farm mechanization.

3. Methodology

This study makes use of quantitative research design precisely a survey design in which it helps the researcher in gaining insight of the subject matter and familiarity for later investigation using the Cameroon household consumption surveys (ECAM 4, 2014). It equally specifies the econometric model.

3.1 Nature and Source of Data

This study makes use of data from Cameroon's fourth Household Consumption Survey (ECAM 4) conducted in 2014. This survey was compiled and carried out by the National Institute of Statistics, Department of Statistics and National Accounts. This is the fourth household survey conducted so far in the country. This survey actually aimed at identifying various indicators showing the Insecurity profile and the standards of living of Cameroonians.

3.2 Model Specification

The control function approach is an econometric method used to correct for biases that arise as a consequence of selection and/or endogeneity. It is the leading approach for dealing with selection bias in the correlated random coefficients model (Heckman & Navarro, 2004), but it can be applied in more general semiparametric settings (see Newey, Powell & Vella, 1999). In our model, we use the causal link of rural-urban migration captured as an index (RUM_i) and food insecurity (FIS) captured as inadequate or insecure access to food due to financial constraints can be depicted by the following structural equation:

$$FIS_i = \varnothing_1 \forall_{EP} + \sum_i \perp_i RUM_i + \Delta_1 \quad (1)$$

From equation (1) $\varnothing_1$ is a vector of exogenous covariates such as marital status of farmer characteristics, household size and migrant age characteristics, $\perp$ is the parameter of the potentially endogenous explanatory variable, normally, the estimation of the parameter $\perp_i$ would show the effect of rural-urban migration on household food insecurity. $\forall_{vp}$ is the vector of parameters to be estimated and Δ_1 is the error term that captures both random effects and unobservable variables, while $i = 1,2.....N.$

Given that equation (1) is a simultaneous equation in which we can simultaneously determine food insecurity function and rural-urban migration determinants. This simultaneous determination of the outcome and endogenous variable may result to causality effect that can cause an endogenous bias. Further, there is a possibility to omit important variables that can potentially influence the food insecurity relation; this also can cause bias in our result. However, this bias can be solved through the use of instrumental variable approach. Instrumental variables are those variables that can be used to treat the bias problem that is cause by either omission of variables in the outcome equation or problem of causality. The instruments can be related to the potential endogenous variable that is migration and not the outcome variable. We used the log of average annual precipitation from 2008-2014 as our instruments to treat the problem of the bias. The reduced form of rural-urban migration generating the food security strategy can take the following form:

$$RUM_i = \emptyset_2 \forall_{RUMi} + \emptyset_2 X_{RUMi} + \Delta_{2i} \quad (2)$$

In equation (2), $\varnothing_2$ is a vector of exogenous instrumental variable affecting RUM_i but has no direct influence on food insecurity, $\forall_{RUMi}$ and X_{RUMi} are vectors of parameters of exogenous explanatory variables in the reduced form of RUM_i to be estimated and Δ_{2i} is the error term that captures both the random effects and other relevant but unobservable characteristics or complementary inputs. The 2SLS model based on equations (1) and equation (2) will be estimated for the determinants of food insecurity using the econometric software STATA 14.

Using the 2014 Cameroon household consumption survey as our data source, we observed that since Cameroon is pre-dominated by rural inhabitants, it's possible that some of the households were not interviewed and so there will be some missing values in our outcome variable and so biasing the result. There is therefore a need to deal with potential sample selection bias. The Heckman procedure is used to deal with the sample selection bias. To control for potential sample selection bias, the whole sample, which includes recorded household food insecurity, and none recorded by choice is used. To handle the selection problem, we introduce equation (3):

$$\Pi = 1(\emptyset_1 \forall_\Pi + \emptyset_3 X_\Pi + \Delta_3 > 0) \tag{3}$$

In equation (3), Π is an indicator function for the selection of the observation in to the sample, it takes the value zero when food insecurity is not recorded and vice versa, $\forall_\Pi$ and X_Π are vectors of parameters of exogenous explanatory variables in the sample selection equation, while $\emptyset_3$ is a vector of exogenous variables instrumenting for the selection of food insecurity into the estimation sample and Δ_3 is the error term that captures both the random effects and unobservable characteristics of selection. Equation (3) is the probit for sample selection and it will help correct any sample selection bias in the estimated parameters. The correction factor derived from equation (3) is the inverse of the Mills ratio.

Given the heterogeneity of food insecurity due to non-linear interaction of migration with unobservable and omitted variables could also bias the estimated structural coefficients of our result. The control function approach is used to address this issue. Thus, to take care of potential endogeneity bias, heterogeneity bias and non-linear interactions of unobservable variables with the observed regressors specified in the food insecurity function regressors simultaneously, equation (3) above can be upgraded to equation (4) as follows:

$$FIS_I = \emptyset_1 \forall + \perp RUM + \gamma_1 \hat{\Delta}_2 + \exists I + \nabla_2 (\hat{\Delta}_2 * RUM) + \Theta \tag{4}$$

Following equation (4), $\hat{\Delta}_2$ is fitted residual of RUM, derived from the reduced form linear probability model of rural-urban migration; I is the inverse of the Mills ratio obtained after estimating the probit model for selection; $(\hat{\Delta}_2 * RUM)$ is interaction of the fitted rural-urban migration residual with the actual value of migration conditions, Θ is a composite error term comprising Δ_1 and the unpredicted part of Δ_2, under the assumption that $E(\Theta) = 0$ and $\forall, \perp, \exists, \gamma$ are parameters to be estimated.

The exclusion restrictions are imposed on equation (4) since the set of instruments for climate rural-urban migration is absent from equation (4). The terms I, $\hat{\Delta}_2$ and $(\hat{\Delta}_2 * RUM)$ in equation (4) are the control function variables because they control for the effects of unobserved factors that would otherwise contaminate the estimates of structural parameters. The reduced form rural-urban migration residual, Δ_2 serves as the control for unobservable variables that correlates with RUM. In particular, if an unobserved variable is linear in $\hat{\Delta}_2$, it is only the constant term that is affected by the unobservable and the instrumental variable estimates of equation (4) are consistent even without the inclusion of the interaction term. In conclusion, the instrumental variable estimates of equation (4) are unbiased and consistent only when: (a) the expected value of the interaction between rural-urban migration and its residual is zero, or the interaction between rural-urban migration and its fitted residual is linear and (b) there is no sample selection problem. But, if the correlation is non-linear, then the control function approach is required and the inclusion of the interaction term in equation (4) purges the estimated coefficients of the effects of unobservable variables.

4. Results and Discussion

4.1 Weighted Descriptive Statistics

Table 1. Weighted Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
Variables of Interest				
Food Insecurity (Normalise index)	0.4238959	0.3552261	0	1
Endogenous Variable				
Rural-Urban Migration	0.3852675	0.4866637	0	1
Exogenous/Demographics				
Country fight against Insecurity	0.8947029	0.3069391	0	1

Migrant has a paid job	0.8694206	0.3369434	0	1
Success of the pricing policy on food products	0.3120762	0.4633457	0	1
Decreasing or falling standard of living of the household	0.4249624	0.4943426	0	1
At least one member of the household owns the land	0.6368737	0.480906	0	1
HH member has obtained loan for business	0.0317227	0.1752627	0	1
Marital Status of farmer (1= Married, 0 otherwise)	0.2416225	0.4280712	0	1
Primary Education	0.3929222	0.488405	0	1
Secondary Education	0.2527861	0.434614	0	1
Higher Education	0.0262275	0.1598129	0	1
A member of the household is a farmer	0.7136575	0.4520562	0	1
A member of the household save money	0.6355619	0.4812774	0	1
Migrants' Age (In Years)	20.87094	18.60576	0	99
Gender of migrant; (Male)	0.4809204	0.4996412	0	1
Household size	8.980959	4.805494	1	30
Household size square	103.7499	120.9893	1	900
Residual	0.0802233	0.1899535	-0.4445708	0.5390484
Interact_V	0.2139673	0.312213	-0.073	1.150742
Total	**46,560**			

Source: Authors computation

From table 1, the descriptive statistics of variables identify that, 67.84 percent of the household have equipment for farming which facilitate the cultivation of crop in the rural areas and 64.74 percent of the household is Christian implying that their religion is not a hindrance to farm activities while the country is fighting against Insecurity at a rate of 89.47 percent; 86.94 percent of the migrant has a paid job; 63.68 percent of the household has a member who owns a piece of land; 3.17 percent of the household member has obtained loan for business; 24.16 percent of farmer are married. This reveals that most of the household population were literate as their have the basic educational skills of reading and writing. Again, the result shows that 16.66 percent of the farmers has technical or vocational training which will enhance them to be more efficient and effective in their farming activity; 71.36 percent a member of the household is a farmer; 63.55 percent a member of the household save money.

4.2 Synopsis of Food Insecurity Index

A food insecurity indicator was constructed using proximity of unable to eat three square meals a day, unable to eat series and tuber everyday, unable to eat vegetable everyday, unable to eat meat and fish everyday, eat good meal only on feast days and unsatisfied with household minimum food needs with the help of the dimension reduction technique known as the multiple correspondence analysis (MCA). The column categories in standard normalization show that dimension 3 was automatically dropped given the fact that the principal inertia was too low. The % inertia of proximity of household unable to eat three square meals a day show that 9.8% of households were affected by the variable food insecurity with a contribution of 0.102 and 0.006 in dimension 1 and 2 respectively while 0.7% of households were unaffected with a contribution of 0.073 and 0.004 in dimension 1 and 2 respectively. Unable to eat series and tuber everyday had a percentage inertia of 16.4% of households were affected with a contribution of 0.159 and 0.000 in dimension 1 and 2 respectively. 6.4% of households were not affected by this variable with a contribution of 0.063 and 0.000 respectively. With being unable to eat vegetable everyday, 13.9% of households were affected with a contribution of 0.136 and 0.002 in dimension 1 and 2 respectively. 7.5% of households were unaffected by this variable with a contribution of 0.073 and 0.001 respectively.

Table 2. Statistics for column categories in standard normalization

Categories		**Overall**		**dimension_1**	**dimension_2**

	Mass	quality	%Inert	Coord	Sqcorr	Contrib	Coord	Sqcorr	Contrib
foodins									
0	0.097	0.984	0.070	0.869	0.984	0.073	0.205	0.000	0.004
1	0.070	0.984	0.098	-1.211	0.984	0.102	-0.286	0.000	0.006
poorearst									
0	0.120	0.915	0.064	-0.723	0.915	0.063	0.035	0.000	0.000
1	0.047	0.915	0.164	1.840	0.915	0.159	-0.088	0.000	0.000
pooreatveg~e									
0	0.058	0.923	0.139	1.532	0.923	0.136	-0.196	0.000	0.002
1	0.109	0.923	0.075	-0.821	0.923	0.073	-0.105	0.000	0.001
pooreatmea~h									
0	0.088	0.937	0.102	-1.070	0.937	0.101	-0.070	0.000	0.000
1	0.078	0.937	0.115	1.206	0.937	0.114	0.079	0.000	0.000
pooreatfea~d									
0	0.095	0.974	0.074	-0.898	0.974	0.077	0.039	0.000	0.000
1	0.072	0.974	0.098	1.189	0.974	0.101	-0.051	0.000	0.000
notsatisfied									
0	0.084	0.188	0.000	-0.025	0.174	0.000	2.410	0.014	0.488
1	0.083	0.188	0.000	0.026	0.174	0.000	-2.452	0.014	0.497

Source: Authors computation

Furthermore, 11.5% of households were affected as they were unable to eat meat and fish every day with a contribution of 0.114 and 0.000 in dimension one and two respectively. Only 10.2% of households were unaffected with contributions of 0.101 and 0.000 in dimension 1 and 2 respectively. 9.8% of households were affected by the fact that they only eat good meal only on feast days with a contribution of 0.101 and 0.000 in dimension 1 and 2 respectively. 7.4% of households were unaffected with contributions of 0.077 and 0.000 in dimension 1 and 2 respectively.

4.3 Estimate of Rural-urban Migration in Cameroon (Reduced Form Estimates)

From the table below, the following causal effect relationships can be established. The results reveal that there exists a positive relationship between the country fighting against poverty and rural-urban migration. This implies that a 1% increase in the country fighting against poverty will increase rural-urban migration by 3.14. Ceteris paribus, when the government decide to curb unemployment by creating and opening state owned corporation in which in most cases will be open in urban areas, more rural dweller will move to the urban areas. This finding was seen to be significant at a 1% level of significance. This result contradicts our apriori theoretical expectations. Also, there exist a positive relationship between migrant has a paid job and rural-urban migration in Cameroon. A person who had a paid job turns to increase the level of rural-urban migration by 0.1735. This finding was not in line with the apriori theoretical expectations. This finding was seen to be significant at a 1% level of significance.

Table 3. Reduced form estimates for rural-urban migration

Variables	Coef.	Std. Err.	P>|t|
Country fight against poverty	0.0314275	0.0078029	0.000
Migrant has a paid job	0.0513012	0.0067582	0.000
Success of the pricing policy on food products	0.0415406	0.0051524	0.000
Decreasing or falling standard of living of the household	0.0395711	0.0048844	0.000
At least one member of the household owns the land	-0.1588656	0.0077065	0.000
HH member has obtained loan for business	0.0409413	0.0145897	0.005

Marital Status of farmer (1= Married, 0 otherwise)	-.0537624	0.0066449	0.000
Primary Education	0.0617575	0.0054315	0.000
Secondary Education	0.1676171	0.0066307	0.000
Higher Education	0.3311946	0.0148442	0.000
A member of the household is a farmer	-.3546327	0.0080779	0.000
A member of the household save money	0.0279094	0.0049914	0.000
Migrants' Age (In Years)	0.0006561	0.0001633	0.000
Gender of migrant; (Male)	-.0160988	0.0047531	0.001
Household size	0.0217691	0.0015676	0.000
Household size square	-.0010895	0.0000607	0.000
_cons	0.4672344	0.0137392	0.000
Observation	46,560		
R^2	0.2704		
F-Statistics	0.0000		

Source: Authors computation

From the P-value of 0.000 it can be concluded that the overall model is significant at 1%. Also, the adjusted R^2 value of 0.2704 indicates that 27.04% variations in household food insecurity is accounted by other factors not included in the model.

4.4 Linking Rural-Urban Migration and Food Insecurity

Table 4. Linking rural-urban migration and food insecurity

Variable	**CF Without Interaction**	**CF With Interaction**
	Dependent Variable: Food Insecurity	
Rural-Urban Migration	-0.0514*** (-9.50)	-0.1226*** (-8.96)
Country fight against poverty	-0.0096 (-1.11)	-0.0114 (-1.31)
Migrant has a paid job	0.1575*** (21.83)	0.1556*** (21.51)
Success of the pricing policy on food products	0.0114** (2.11)	0.0083 (1.53)
Decreasing or falling standard of living of the household	-0.0033 (-0.66)	-0.0061 (-1.21)
At least one member of the household owns the land	0.0593*** (9.54)	0.0732*** (10.97)
HH member has obtained loan for business	0.0247** (2.02)	0.0233*** (1.92)
Marital Status of farmer (1= Married, 0 otherwise)	0.0010 (0.15)	0.0030 (0.43)
Primary Education	0.0175*** (2.87)	0.0163*** (2.67)
Secondary Education	-0.0230***	-0.0326***

	(-3.26)	(-4.42)
Higher Education	0.0175 (1.04)	-0.0226 (-1.21)
A member of the household is a farmer	-0.2507 (-1.09)	-0.2262 (-0.88)
A member of the household save money	0.0542*** (10.57)	0.0536*** (10.45)
Migrants' Age (In Years)	-0.00001 (-0.01)	-0.00002 (-0.18)
Gender of migrant; (Male)	0.0092* (1.88)	0.0104** (2.11)
Household size	-0.0146*** (-7.25)	-0.0152*** (-7.53)
Household size square	0.0004*** (5.61)	0.0005*** (5.85)
Residi	0.3024*** (19.70)	0.3053*** (19.90)
INTERACT-V	n/a	0.2485*** (5.73)
Cons	0.5344** (2.33)	0.5084** (1.97)
Observation	27,263	27,263
R-squared	0.0685	0.0672
Partial R^2 (on excluded instruments)	73.99 [22, 27240; 0.000]	81.56 [19, 27243; 0.0000]

Source: Authors computation

From the results, rural-urban migration has a negative correlation with food insecurity. This means that as Rural-Urban Migration increase by a unity, food insecurity decreased by 0.0514 units and this is significant at 1% level of significant. Country fight against poverty has a negative correlation with food insecurity. This implies that as Country fight against Insecurity increase by a unity, food insecurity decreased by 0.0096 units and this is statistically insignificant. Migrant has a paid job has a positive correlation with food insecurity. This means that as the number of Migrant with paid job increase by a unity, food insecurity increased by 0.1575 units and this is significant at 1% level of significant. Success of the pricing policy on food products has a positive correlation with food insecurity. This means that as the Success of the pricing policy on food products increase by a unity, food insecurity increased by 0.0114 units and this is significant at 5% level of significant. Decreasing or falling standard of living of the household compared to last year has a negative correlation with food insecurity. This implies that as Decreasing or falling standard of living of the household compared to last year increases by 1unit, food insecurity decreased by 0.0033units and this is statistically insignificant.

At least one member of the household owns land has a positive correlation with food insecurity. This means that as the member of the household owns land increase by 1unit, food insecurity increased by 0.0593 units and this is significant at 1% level of significant. At Least a HH Member Has Obtained loan for business has a positive correlation with food insecurity. This means that as at Least a HH Member Has Obtained loan for business increases by 1unit, food Insecurity increased by 0247 units and this is significant at 5% level of significant. Marital Status of migrant has a positive correlation with food insecurity. This means that being married will increase food Insecurity by 0010 units and this is insignificant. Primary Education has a positive correlation with food insecurity. This implies that having Primary Education will increase food Insecurity more by 0175 units as compared to no education and this is significant at 1% levels of significance. Secondary Education has a negative correlation with food insecurity. This implies that as Secondary Education decrease food insecurity by 023unit as compared to no secondary education and this is significant at 1% levels of significance.

Higher Education has a positive correlation with food insecurity. This means that Higher Education increase food Insecurity by 0.0175 units relative to no higher education and this is insignificant. At least a member of the household is a farmer or has a farmed land has a negative correlation with food insecurity. This implies that as At least a member of the household is a farmer or has a farmed land increase by a unity, food insecurity decreased by 0.2507units and this is insignificant. At least a member of the household save money has a positive correlation with food insecurity. This means that as at least a member of the household save money increase by a unity, food Insecurity increases by 0.0542 units and this is significant at 1% levels of significance. Migrants' Age (In Years) has a negative correlation with food insecurity. This means that as Migrants' Age (In Years) increase by a unity, food insecurity decreases by 0.00001 units and this is insignificant. Male migrant has a positive correlation with food insecurity. This means that being a Male migrant will increase food insecurity more by 0092units as compared to being female migrant and this is significant at 10% levels of significance.

Household size has a negative correlation with food insecurity. This implies that as Household size increase by a unity, food insecurity decreased by 0.0146 units and this is significant at 1% levels of significance. Household size square has a positive correlation with food insecurity. This means that as Household size square increase by a unity, food insecurity increases by 0.0004 units and this is significant at 1% levels of significance. The result in column three has the interactive variable (at least household has available electricity and at least household has access to water). The sign of the coefficients of the independent variables found in column two remain the same. It is however observed that the coefficient of success of the pricing policy on food products became insignificant. It is also observed that both the magnitudes of the coefficients of almost all of the variables have sharply improved.

Worthy of note, the interactive variable of the social Amenities, that is the joint effect of at least household has available electricity and at least household has access to water, is positive. The result specifically shows that, at least household has available electricity interacts with at least household has access to water, food insecurity increases by 0.25%. This result is significant at 1% level of significance. The main implication of the result is that, both social Amenities are complementing each other, that is the complementarity effect is present. However, the social Amenities are complemented to each other, meaning that, the increase production and use of one cannot be done at the detriment of the other.

5. Conclusion

The findings from the control function estimate correlating the influence of rural-urban migration on food Insecurity deduced a negative influence as an increase in the number of rural-urban migrants will lead to a fall in food insecurity. This could be as a result of a reduction in the number of mouths to feed. This result is in accordance with Osondu et al (2014) where in investigating the relationship between rural–urban migration, remittance economy and agricultural investment among small scale farmers in Umuahia South Local Government Area was carried out in Abia State, Nigeria conclude that when people migrate, the household size which has to do with the mouths to feed reduce then with the remittances from the migrant, the standard of leaving for the rural family will increase thereby improving their feeding habits and reducing food insecurity. Cameroon leaders should strive to promote good governance in other to engender rural empowerment, employment and socio-economic development. Incentives such as farm machinery should be distributed to improve the productivity of the few existing small-scale farmers in rural areas. Farmers should form cooperatives to have a common forum for obtaining incentives easily from both public and private sectors.

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