



CONTRIBUTIONS OF THE AGRICULTURAL VALUE-ADDED OUTPUT TO EMPLOYMENT CREATION AND REGIONAL TRADE INTEGRATION IN SUB-SAHARAN AFRICA

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Abstract

This study ascertained the extent to which agricultural value-added output translates to employment creation and regional integration in sub-Saharan Africa. Observations were drawn from 22 countries in the region and a Dynamic panel data Econometric model of the Generalized Method of Moment (GMM) was applied from 2000 to 2017. The data for this study were collected from World Bank Development Indicators, and a combination of Okun's law for growth and Ohlin-Vanek (1968) was adopted. Evidence from the study revealed that increased agricultural value-added output reduced unemployment by 0.102%, while regional integration increased by 0.441%. The long-run elasticity of agro-allied industrialization output to regional trade was 0.56%. Hence, the study supports agricultural policies that promote agricultural value-added output to improve regional integration and a reversed unemployment trend in the region.

Keywords: Unemployment, regional integration, agro value added output, panel data, Africa, Agriculture

Introduction

Agriculture, a mainstay of the African economy is a unifying trait that doubles as the destination sector for regional integration and trade expansion. The regional ecosystem has placed agriculture as cardinal to the development of most countries in the African continent with enormous potentials for sustainable economic growth and export promotion. African Development Bank reveals a burgeoning population of agriculturists in Africa who are employed by the different nodes of the Agri systems and food value chain. For instance, the World Bank (2018) indicated that 65%, 68%, and 70% of Nigerians, Tanzanians, and Cameroonians are directly or indirectly employed in the agricultural sector respectively. Data from index Mundi also showed that in 2017, the percentage contribution of agriculture and related activities to gross domestic product stood at 25%, 29%, and 17% for the three countries, respectively.

Despite a large expanse of arable land and a high proportion of the population engaged in agriculture, most African countries continue to import a high percentage of food and other agricultural product from abroad. Furthermore, the African continent spends about US\$35 billion every year to buy food and agricultural imports to buffer the gap posed by lack of

food self-sufficiency from its aggregated yearly outputs. Import accounts for about 1.7 times the value of its export. Also, between 1998 and 2007, total net food imports grew at an average of 3.4% annually (Woldemichael, Salami, Mukasa, Simpasa, and Shimeles, 2017). Likewise, participants in the agricultural sector have been operating at less than full capacity both in labor potential and resource deposit. It is in this light that Dieye (2016) stated that "Unless agriculture is fully transformed, Africa will remain trapped in a low productivity cycle". This implies that the region will lack the capacity to drive agricultural value-added output which could improve the local manufacturing sector and encourage employment and diverse livelihood opportunities for a youthful and growing population.

It is also postulated that the structural transformation in sub-Saharan Africa cannot be achieved without adequate attention to the agro-allied industry. This includes agro-allied industries whose primary raw materials are agricultural products and could drive value-added output in the region. It is also expected that industries should provide large employment opportunities that will absorb the surplus labor in the agricultural sector. Empirical studies revealed that due to their forward and backward linkages, agro-industries

could have higher multiplier effect on job creation. In contrast, Africa cannot still engage over 50% of its graduates, and such amounts to 10 million graduates churned out from 668 universities in Africa with no job amidst the agricultural potentials (Balogun, 2016). Conversely, evidence from the World Bank development indicator shows that the unemployment rate as of 2017 in Africa was 7.3%. The grouped unemployment by sex further reveals that the share of the ratio of unemployed youths to unemployed female youths consistently grew greater than the male youths. The share of male youths employed by agriculture as at 2017 was 57.59%, while the female employed youths in agriculture was 57.11%. This represents a gradual decrease from 69.57% for females and 65.23% for male youths employed since the 1980s. Therefore, the current pattern of unemployment growth persists in the recent times with more than 10 million youths entering the labor market every year and such pose a considerable threat to social cohesion and political stability, (Woldemichael *et al.*, 2017).

On the other hand, opportunities in the agricultural sector are not exhaustive with employment creation but also enhances regional integration through trade. The agro-industrial development dimension allows countries to shift from exporting raw/unprocessed agricultural commodities to exporting value-added food products which not only generates more jobs and foreign earnings but also reduces the country's exposure to excessive volatility of international agricultural prices. Very significantly, this also allows for import substitution, with more value-added products made in the country. The successful development of the agro-industry and the promotion of inclusive, sustainable, and resilient food systems can offer developing countries a strong driver for long-term economic growth and resistance to international market price volatility. The agricultural value chain through agro-industries generate significant jobs, maintain market prices, and creates entrepreneurship opportunities for the burgeoning youthful population. World Bank, (2018) noted that the contribution of agriculture to total exports has remained very low in most sub-Saharan African economies despite the inherent opportunities. For example, the contribution of agriculture to total export is 8%, 40%, and 6% for Nigeria, Tanzania, and Cameroun respectively as at 2018.

Previous studies by Filmer (2013) and Dieye (2016) on economic report for Africa on unemployment, revealed that agricultural value addition is expected to possess an inverse effect on unemployment but it could not be certain if the effects could be sustainable over a long period. It is also expected that agro-allied industrialization would have a positive impact on regional integration through regional commerce. The identified gap from the previous studies tends to ascertain whether the effects of agricultural value addition are positive or negative and sustainable in sub-Saharan Africa. The debate is still ongoing to ascertain the reason behind the inverse response of employment

to the agriculture value chain in Africa. It is on this premise of high unemployment, underperforming regional trade, in the agricultural sector, high level of food importation, this study raises the following questions; what contributions have the agricultural value chain to the high unemployment rate in Africa and to what extent can the agricultural value chain impact the regional trade growth?

Literature Review

There has been several theories highlighting the importance of agro-processing in economic growth and development. Some of these theories include the Three-sector theory of economy put forward by Fisher (1939), Clark (1957), and Fourstire (1954), and the Hirschman hypothesis. The theory describes the structural transformation in the process of economic development as sequential domination by the primary sector (agriculture), followed by the secondary sector (manufacturing), and finally the tertiary sector (trade and service). An observed basic pattern is a decline in the relative importance of the agricultural sector as per capita income increases, and the increasing importance of the industrial and service sectors respectively (Kwiatkowski and Krzetowska, 2015). The Hirschman (1958) linkage hypothesis on the other hand emphasized the ability of an industry to influence the performance of another sector in the economy. For instance, an industry could generate demand or encourage investment in the product of another industry through a backward linkage and forward linkage (FAO, 1997).

Further explaining the term “linkage”, Fisher (1939) explains that economists do refer to the connection between sectors as linkages and they differentiated between forwarding linkage and backward linkage. A sector is said to have a forward linkage with the rest of the economy when the sector or its output is being used as input in other sector economic activities. While on the other hand backward linkage is viewed from the perspective that a sector is a procurer of factor inputs from the other sectors in the economy. Hence, the 'linkage hypothesis' postulates that the best development path lies in selecting productive sectors where expansion will promote progress in other sectors of the economy Ncube *et al.* (2015). It therefore logically disapproves the Balanced Growth Theory that emphasized a simultaneous growth in all sectors of the economy of a country. According to Anríquez and Stamoulis (2007), the input-output matrix reflects the linkages between sectors in an economy. The matrix shows how the total output of each sector is distributed between final consumers (households, government, and intermediate inputs users), it also describes how each sector sells inputs to all the other sectors of the economy. This inter-sectoral linkage could further be viewed from an output-employment relationship or output-investment relationship.

Megbowon *et al.* (2017), empirically examined the relationship between agro-processing sub-sector output and agricultural sector employment in South Africa by

using time series data from 1975-2015. The study employed an ARDL-bounds testing approach to examine the existence of a long-run equilibrium relationship. The result of the ARDL test confirmed the existence of a long-run relationship among the variables examined. The long-run estimate result revealed that the relationship between agro-processing output and agricultural sector employment is negative in the long-run. The study further examined the causality between agro-processing output and agricultural sector employment using the TYDL causality test and it observed a unidirectional causal relationship running from agro-processing output to agricultural sector employment. While it is deduced that agro-processing sector output is found to be unable to promote agricultural sector employment, this study recommends the stimulation of agricultural export for agricultural sector employment generation in South Africa.

Oji-Okoro (2011) examined the impact of the agricultural sector on the Nigerian economy. A multiple regression model was used to analyze the data obtained from CBN statistical bulletin and World Bank's development indicators. The result indicated a positive relationship between Gross Domestic Product (GDP) vis a vis domestic savings, government expenditure on agriculture and foreign direct investment between the period of 1986-2007. It was also revealed in the study that 81% of the variation in GDP could be explained by Domestic Savings, Government Expenditure on agriculture, and Foreign Direct Investment. To improve the agricultural sector, it is recommended that the government provides more funding for agricultural universities in Nigeria to carry out research in all areas of agricultural production. This will lead to more exports and improvement in the competitiveness of Nigeria's agricultural production in international markets. The Central Bank of Nigeria (CBN) should also come up with a stable policy for loan disbursement to farmers at a reasonable interest payback.

Following a theoretical approach, Oni (2013), identified the constraints to agro-industrial development in Nigeria and proffered policy prescriptions to be implemented to remove them to fast track the attainment of poverty reduction and rapid economic development in the country. The identified constraints include; marketing problems, infrastructure inadequacies, and unstable input and output prices. Policy actions for removing the constraints must include improvement in downstream commodity activities, environmental management, increased funding, and efficiency in agricultural spending. The government must invest heavily in rural infrastructure and such investment must ensure the development of infrastructure in the rural area. In a similar study, Ogbalubi and Wokocha (2013), examined the effects of agricultural development on employment generation regarding Nigeria. The study identified some major factors constraining the development of the agricultural sector in Nigeria such as neglect of agriculture arising from the discovery of oil, inadequate infrastructural facilities, inadequate extension services, shortage of labor to rural-urban migration, declining quality of land because of oil

activities in the Niger Delta Region, policy inconsistency, etc. The paper recommends the provision of credit facilities to farmers, extension services, price stabilization, and making agriculture a priority etc to ensure that the sector takes its rightful place in our economy.

Goaied and Sassi (2016) also investigated the employment-output relationship with panel data set of 15 industries over 1983–2010. Output–employment elasticities were estimated using the mean group estimator. The study established the existence of a long-run relationship between employment intensities and value-added in all the industries examined. The estimated long-term employment intensity of output growth was positive and significant at the 5% level for most industries except for the mining sector where it is negative and the hotels, bars, and restaurants sector which is shown to be insignificant. Their study identified the ability of agriculture to create jobs, in the long run, to be very weak. Jelilov and Bahago (2017) focused on the analysis of the agro-allied industry and the possibility of reducing the poverty level of the Nigerian populace and enhance a better economic condition. The study employed annual data ranging from 1986-2015. Using the Augmented DickyFuller to check for stationarity of variables and the co-integration test to check for the long-run relationship between the variables, the study found a long-run relationship between agricultural value-added and gross domestic product.

In the study of Muzindutsi *et al.* (2014) where the interaction between manufacturing sector output and aggregate non-agricultural sector employment was examined, using the VAR model, manufacturing output growth was found to be directly related to an increase in aggregate employment rate in the short-run. Whereas in the long-run, manufacturing output growth was followed by a decline in non-agricultural employment in the country (South Africa). On other hand, using descriptive statistics, cost and return analysis, Kareem *et al.* (2009), analyzed the agro-allied industry and the possibility of alleviating the poverty level of the Nigerian populace and enhance employment generation. The study sought among other things, to determine- the socio-economic characteristics of the respondents, relative profitability to cost function, and relationship between costs and output level. The result revealed the average age of the operators of corn milling to be 43 years. Most of them had secondary school education and all were married. The returns analysis showed an average profit of N30, 660.81, while the average total costs were N15, 047.18. Among the problems adversely affecting the corn milling industry are Incessant power failure, capital, among others. The study concluded, the need for a concerted effort by the government towards enhanced interest in corn milling business through credit facility, and provision of infrastructural facilities. Lastly, the government should improve a conducive business environment by subsidizing some of the production inputs which tend to make commercial agriculture more attractive and profitable to the citizenry. All these among others are recommended to promote the growth of agro-allied and

employment generation.

Tisimia (2014), examined the growth of small agro-processing firms and their influence on employment focusing on labor productivity in the Mbeya and Morogoro Regions of Tanzania. A total of 102 firms represented different types and locations in the study area. Time-series and cross-sectional data were collected from sampled districts and firms. Employment creation trends, labor productivity performance, and factors affecting the firm's growth were examined using descriptive statistics and multiple regression analysis. The analysis revealed that about 63.6% of firms operated under capacity, hence employing below their potential due to low supply of raw materials, inadequate capital, and poor marketing systems and high cost of energy. Labor productivity growth was influenced by experience, education, training, and physical capital. Furthermore, the growth of firms was influenced by the value of raw-materials, manager's education, and energy cost. Small agro-processing firms in Morogoro Region grew faster (62.7%) compared to firms in Mbeya (37.3%). The difference may be due to Morogoro having better access to factor and product markets, hence with lower transport cost for inputs and reduced distribution cost of processed products. The study recommends that the government and non-governmental organizations promote the production of high value raw-material as a contributing factor by 30% to the growth of firms. Such interventions will have a significant effect on employment growth. Furthermore, the government and other non-governmental organization should improve human and physical capital, while emphasizing technological innovation and adherence to processing products according to standards set by responsible authorities.

It is observed from the contributions in literature and those not reported that studies have considered the employment-output relationship from aggregate, sectoral, and aggregate-sectoral levels point of view. Considering the subject empirically from a cross country point of view will ascertain the theoretical opinion and also establish if agro-allied Industrialization could be a driver of employment and regional integration in sub-Saharan Africa or not.

Analytical Framework

Renewed efforts are focused on the agricultural development theories and application of the agro-allied industrialization model in the agricultural sector. Representing the translation linkages of the agricultural value addition to employment creation and regional integration, the relationship of the Okun's Law that relates the quantitative impact on the aggregate output of change on the unemployment rate is applied (Abel *et al.*, 2014). Okun's law allowed us to trace the linkages of the agro-allied industrialization, youth unemployment, and regional integration in Africa.

Okun's Law and Theory

To buttress further, relating Output and Unemployment, Okun's law tries to ascertain the much output that an economy produced under conditions of full

employment. Hence, it suggested that the gap between an economy's full-employment output and its actual level of output increased by 2% points for each percentage point the unemployment rate increased. The potential Gross National Product (GNP) also assumed some facts to exist in the economy. For example, technological knowledge, capital stock, natural resources, skill, and education of the labor force. Deriving the unemployment-output relationship with trend and elasticity, we follow Okun's derivation considering a constant elasticity relationship in the relevant range between the ratio of actual (A) to potential (P) output and the employment rate ($N=100-U$) as a fraction of its potential level (N_i) thus;

$$\frac{N}{N_f} = \left(\frac{A}{P} \right)^a \dots(1)$$

Similarly, considering that there is a constant growth rate(r) of potential output beginning from some level P_0 such that at time t we have thus;

$$P_t = P_0 e^{rt}, \dots(2)$$

By making the N_i (the employment rate) at time t subject we have thus;

$$N_t = \frac{A_t^a * N_f}{P_0^a * e^{art}} \dots(3)$$

Then by taking the log of both side in equation (3) thus:

$$\text{Log}N_t = \log \frac{N_f}{P_0^a} + a \log A_t - (ar)t \dots(4)$$

The coefficient of $\log A$ is the output elasticity of employment rate, the coefficient of time is the elasticity and the potential growth rate and the intercept yields the benchmark (P_0) for any given N_t . Equation (4) therefore allows us to specify in general term a dynamic panel data econometric model for the set objectives in this study thus:

$$y_{it} = \delta y_{i,t-1} + x_{it}^1 \beta + \mu_i + u_{it} \dots(5)$$

For $I = 1, 2, \dots, N$ and $t = 1, 2, \dots, T$. δ is a scalar x_{it} is $k \times 1$, μ_i denotes the i -th individuals' effect and u_{it} is the disturbance following Baltagi and Kao (2000). Then translating equation 5 into the objective of our study, we therefore specify our model to ascertain if agro-allied industrialization can save Africa from existing high unemployment. Likewise to evaluate the two possible outcomes of the raised question (if yes and if No) thus;

$$\text{UNE}_{it} = \alpha_{it} + \gamma / \text{UNE}_{it-1} + \phi_1 / \text{agro_ind}_{it} + \phi_2 / \text{agro_ind}_{it-1} + \delta / \text{pop}_{it} + \gamma_i + \varepsilon_{it} \dots(6)$$

Where agro_ind is agro-allied industrialization proxy with agro value-added from Gross Domestic product for all the 22 African countries. UNE is the total youth unemployment ratio to the labor force. Pop is the population of the 22 countries in sub-Sahara Africa. Then, the long-run elasticity of the association between the unemployment and agro-allied value output is

evaluated from equation (5) to equation (7) thus:

$$\frac{\beta}{1-\delta} \dots (7)$$

where β is the coefficient of determinants of the agro-allied industrialization output and δ is the coefficient of the lag of unemployment.

Ohlin-Vanek (HOV) Model

International trade is seen as the cornerstone for regional integration (Jetin and Mikic, 2016). It is in this light that a joint publication set aside the vision to improve regional integration and also create a common market after the early years of independence. Therefore, the likes of the Ricardian model of two goods and one factor (labor), Heckscher-Ohlin and Ohlin-Vanek (HOV) (1968) Model studied integration as a function of trade. Following the Ohlin-Vanek (HOV) model, the goal is to predict the pattern of trade in goods between the two or more countries based on their differences in factor endowments, the vector of the net export equals;

$$T = Y^i - D^i \dots (8)$$

Where Y^i denotes the (Nx1) vector of outputs in each industry for i country and D^i denotes the (Nx1) vector of demand of each good. Also, the factor content of trade is defined as;

$$F^i = AT^i \dots (9)$$

For an (Mx1) vector. Then, expressing the net export as a function of the factor input in an econometric model, the model is transformed to;

$$T^i = A^1 \beta \Rightarrow (AA^1)^{-1} AT^i \dots (10)$$

and $\hat{\beta}$ is a contaminated estimate of the vector of relative factors endowment. In the same way, equation (10) allows us to modify and specify in dynamic panel econometrics to ascertain the dynamic effects of agro-allied industrialization on net export as a proxy for regional integration thus;

$$\begin{aligned} Net_export_{it} &= \hat{\delta}_{it} + \phi / Net_export_{it-1} \\ &+ \lambda_1 / agro_ind_{it} + \lambda_2 / agro_ind_{it-1} \\ &+ \lambda_3 / exchange_rate \\ &+ \lambda_4 / labour_{it} + \lambda_5 / capital_{it} + \mu_{it} + \varpi_{it}, \dots (11) \end{aligned}$$

Where net export (export less import) in the region is used as a proxy for regional integration, an exchange rate (price) is the trade of currency in the region based in dollars for all the 22 countries in the region, Labour is the labor input factor, capital is the capital input factor across the countries at time t .

Data Sources and Materials

The scope of this study covers some countries in the sub-Saharan African region. The United Nations description of SSA comprises of the countries and territories that belong to the south of the Sahara in the African

continent. All the data from this study were collected from the World Bank Development indicator from 2000 to 2017 and 22 countries in sub-Saharan Africa were selected based on the consistency of data. The various variables of interest in this study include; agricultural value addition output measured in percentage of the gross domestic product of the value-added in the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. Secondly, unemployment refers to the share of the labor force that is without work but available for and seeking employment calculated in percentage of the labor force. Labour input refers to the population of the countries measured in millions of people. GNI per capita is gross national income divided by the midyear population. GNI (formerly GNP) is the sum of value added by all resident producers plus any product taxes (fewer subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad. Data are in current local currency and millions of units. The net export defines the exports as a capacity to import equals the current price value of exports of goods and services deflated by the import price index. Data are in constant local currency. The exchange rate also defined as the official exchange rate refers to the exchange rate determined by national authorities or to the rate determined in the legally sanctioned exchange market. It is calculated as an annual average based on monthly averages (local currency units relative to the U.S. dollar).

Results and Discussion

Table 1 is estimate from the Generalized Method of Moment with constrained small $T = 18$. The system GMM estimators have shown to be consistent in improving precision and in turn, reduces the finite sample bias, assuming the orthogonality conditions (Baltagi and Kao, 2000). Based on the said assumptions, the dynamics panel model estimated the system of equations as shown in Table 1. The three equations estimate denoted in columns 1,2 and 3; column 1 is an improvement from each other others based on the Hansen test, Sargan test for over-identifying restriction for instrumental variables, AR(1), and AR(2) test for autocorrelation and serial correlation outcomes. Therefore, Table 1 analyzed the impact of agricultural value addition on youth unemployment in the region. Hence, the model estimate from column 2 with 8 instrumental variables showed the desired result over the model estimate in column 1 and column 3. From column 2, the lag of unemployment has a positive and significant association with unemployment. For example, a 1% increase in the first lag of unemployment denoted by $lnune$ would lead to a 1.001% increase in unemployment at the current time. This implies that unemployment in the region accumulates over time in the region. In contrast, $lnagro_value_a$ showed an inverse and non-significant effect on $Lnune$ in the region. For instance, a 1%

increase in *lnagro_value_a* (agricultural value addition) would reduce *Lnune* by -0.102% in the region but not significant. Hence, this implied that although agro agricultural value addition has the potential to reverse the high unemployment in the region, the current agricultural value addition process still falls short of some potential to effectively reverse high unemployment in the region significantly. Likewise,

labor showed to be positively related to unemployment in the region. This suggests that an increase in labor in the region increases unemployment. It is therefore implied that labor in the region is not being used to improve employment creation and which suggests the non-utilization of labor. The result from column 2 and column 3 seem similar in outcomes and imply the same interpretation as in column 2.

Table 1: Impact of agricultural value addition on youth unemployment in the region

Variable	(1) DGMM	(2) DGMM1-CL-a	(3) DGMM2-CL-a
Lag of dependent(Lnune)	0.703*** (0.0445)	1.001*** (0.132)	1.133*** (0.180)
<i>lnagro_value_a</i> _t	-0.168 (0.116)	-0.102 (0.0790)	-0.0745 (0.104)
L. <i>lnagro_value_a</i> _{t-1}	-0.0114 (0.110)	0.0230 (0.0583)	0.0253 (0.0580)
Lnlabour	0.232 (0.355)	0.181 (0.122)	0.0923 (0.190)
Observations	348	348	348
Number of crossed country effect	22 YES	22 YES	22 YES
year effect	NO	NO	NO
Hansen_test	17.43	6.775	6.775
Hansen Prob	1	0.148	0.148
Sargan_test	336.8	7.576	7.576
Sargan Prob	0	0.108	0.108
AR(1)_test	-2.394	-2.519	-2.406
AR(1)_P-value	0.0167	0.0118	0.0161
AR(2)_test	-0.996	-1.086	-0.993
AR(2)_P-value	0.319	0.278	0.321
No. of Instruments	139	8	8

*Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. DGMM1 & DGMM2 denote One-Step & Two-Step GMM respectively. Also regressions with suffix "END" treat lnagro_value_a & lagged lnune as endogenous. Regressions with suffix "CL" follow Roodman(2009) and collapse the instrument matrix. a & b denote lag(1 5) & lag(2 4) respectively*

Secondly, to ascertain the effects of agricultural value addition on regional cooperation and trade, the system Generalized Method of Moment is used to estimate equation 11, and the outcome is shown in Table 2. From Table 2, the result of column 2 with 8 instrumental variables produced the desired outcome compared to others. From column 2 estimates, a 1% increase in the first-order lag of *Lnint_trade* will lead to a 0.933% significant increase in regional trade. Interestingly, agricultural value addition has a positive relationship with regional trade and suggests regional cooperation. For example, 1% increase in the *lnagro_value_a* (agricultural value-added output) will lead to 0.441% significant increase in regional trade. This implies that regional integration improved as agricultural value-

added output increased. Other variables such as exchange rate and labor are not significant and are therefore not focused on in this study. The result from column 2 also shows a similar implication with the result from column 3. Since agricultural value addition promotes regional trade and cooperation, the long-run elasticity of agro-allied industrialization with regional trade is estimated by $\frac{\beta}{1-\rho}$ where β is the coefficient of

determinants of the regional trade (*lnagro_value_a - agro industrialization*) and ρ is the coefficient of the first lag of *lnint_trade* (international trade). Therefore,

$$\frac{0.441}{1-0.933} = 0.559\% \quad \text{the long-run elasticity (elastic) for the } \log \text{agro_value.}$$

Table 2: Effect of agricultural value addition on regional cooperation and trade

Variable	(1) DGMM	(2) DGMM1-CL-a	(3) DGMM2-CL-a
lnint_trade,t-1	0.705*** (0.0770)	0.933*** (0.227)	0.950*** (0.232)
L2.lnint_trade,t-2	0.0601 (0.0571)	0.0417 (0.0920)	0.0233 (0.0845)
lnagro_value_a	0.722*** (0.209)	0.441* (0.235)	0.453* (0.255)
Lnexr	0.186 (0.123)	0.0404 (0.146)	0.0515 (0.152)
Lnlabour	-1.044* (0.603)	-0.914 (1.000)	-1.010 (1.012)
Observations	316	316	316
Number of crossed country effect	22 YES	22 YES	22 YES
year effect	NO	NO	NO
Hansen_test	16.11	2.463	2.463
Hansen Prob	1	0.482	0.482
Sargan_test	197	1.722	1.722
Sargan Prob	0.000137	0.632	0.632
AR(1)_test	-2.901	-2.321	-2.330
AR(1)_P-value	0.00372	0.0203	0.0198
AR(2)_test	-0.398	-0.349	-0.197
AR(2)_P-value	0.691	0.727	0.844
No. of Instruments	135	8	8

*Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. DGMM1 & DGMM2 denote One-Step & Two-Step GMM respectively. Alsoregressions with suffix "END" treat lnagro_value_a & lagged lnune as endogenous. Regressions with suffix "CL" follow Roodman (2009) and collapse the instrument matrix. a & b denote lag(1 5) & lag(2 4) respectively*

Conclusion

Agricultural value addition has shown the potentials to reverse the increasing unemployment in the region and subsequently encourage regional integration through trade. Evidence from the study revealed that unemployment accumulates in the region over time, while agricultural value addition currently in the region has the potentials to reverse the high unemployment, but the obtained outcome is not significant. Regional integration also improves by the increase in export in the region over time. Likewise, regional integration improves as agricultural value addition increases in the region significantly. The result from the long-run elasticity coefficient at 0.55% for *logagro_value_output* to the log of net exports further supported that result from the correlation between the agricultural value addition and international trade as previously noted by Filmer (2013) and Dieye (2016). The policy implications from the study hence suggest more advancement in the agricultural value addition to significantly curb the increasing unemployment in the region. Regional integration remains one of the major goals of the regional economy thus, the policy implication drawn from the study suggests that the promotion of agricultural value addition would improve regional integration and reverse unemployment in turn. For example, a 1% increase in the *lnagro_value_output* leads to a 0.44% increase in regional integration and reversed unemployment in the region by -0.10%. Summarily, the perceived impact of the agricultural value addition on the unemployment index currently is

not sustained, while deepened efforts are recommended to resuscitate the agricultural sector viably. To this end, agricultural value addition, unemployment, and regional integration nexus could be a timely study that should be investigated over time.

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