Moving off Agrarian Societies: Agricultural Productivity to Facilitate Economic Transformations and Non-Agricultural Employment Growth in Sub-Saharan Africa

UNITED NATIONS UNIVERSITY
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Yannick Fosso Djoumessi[1*]; Cyrille Bergaly Kamdem[2]; Luc Nembot Ndeffo[1]

[1]University of Dschang, [2]University of Yaounde 2 Soa

ABSTRACT

The main objectives of this work are twofold: we seek first to specify the relationship between agricultural productivity and non-agricultural employment and second to assess the effect of productivity growth on the employment of the off-farm sector in the long run.

The econometric results of our panel VAR depict a causal relationship with single direction from agricultural productivity to non-agricultural employment.

Between productivity and inequalities, causality seems to function only from productivity to inequalities. This explains the fact that productivity growth generates significant inequalities in the distribution of income, which is necessary to enhancing investments in the agricultural sector.

Key words: agricultural productivity, inequalities, non-agricultural employment, panel VAR, SSA

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CONTACT

Yannick Fosso Djoumessi
University of Dschang
E: djoumessiyannick@gmail.com
yannick.djoumessi@univ-dschang.org
P: (+237) 674 770 704 / 656 830 742
https://orcid.org/0000-0002-5245

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INTRODUCTION

Historically, the agricultural sector has been positioned as the main provider of employment and income for most of the population in Sub-Saharan Africa countries .

FAO data show that agriculture accounts for more than 70% across several countries in SSA. For example, the agricultural labor share in Burkina Faso is 78.4%, in Ethiopia 72.2%, in Guinea 78.8% and in Rwanda 75.3%.

However, a rush of people towards a sector is usually observed when that sector constitutes a source of wealth and employment. In SSA, the rush towards the agricultural sector observed for decades leads one to believe that it would almost constitute an inexhaustible source of wealth. However, very far from being a reserve of wealth, the African agricultural sector is the principal provider of disguised unemployment and low incomes.

Thus, one wonders whether the agricultural sector is a trap for African economies. A brief reply to this question undoubtedly involves the relationship between agricultural productivity and the income levels of agricultural workers.

A report by the IMF (2015) estimated that 17 million young people will enter the working population each year during the coming decade. The agricultural sector already plays a role of paramount importance, which costs its poor performance

However, we can observe a growing off-farm sector in some SSA countries, in particular with the appearance of value chains of foodstuffs and industries comprising a source of major employment at the level of transformation, food preparation, packing, distribution, wholesale and retail selling in urban or rural areas. A recent report by the OCDE/FAO (2016) shows that the rural economy, aside from the agricultural sector, progresses quickly and leads to economic transformations (Fig 1.1).

Figure 1.1: Economic transformations

METHODS AND MATERIALS

Ever since Sims's (1980) seminal paper, the VAR models have been very widespread in empirical studies. A significant advantage of these models, compared to those with simple equations, involves the analysis of interactions between variables, sometimes through the analysis of impulse response.

$$Y_{it} = Y_{it-j}A_j + u_{it} + \varepsilon_{it}$$

Thereafter, Wald tests on parameters can be implemented based on the GMM estimator and its covariance matrix. However, the need to test lag length is a crucial stage prior to the causality test in a panel VAR model. According to Holtz-Eakin et al. (1988), in the absence of such tests, no statistical test concerning causal relationships can be formulated.

RESULTS

To certify the permanent influence of an explanatory variable in the long run, it becomes important to ensure on the stationarity of data sets. By testing, such significant results appear only at the level of the second difference of the non-agricultural employment variable (nonagrie_d2).

First, it is important to identify the order of lag for our VAR model. The selection of lag order, based on the three selection models of Andrews and Lu (2001), is presented in the appendix. In terms of the three criteria, the PVAR(1) model is chosen. The results of the regression of the PVAR model with a degree of freedom of 48 are presented in Table 1.1

One concern is to ask if an exogenous shock that occurs in the agricultural sector is transmitted to the non-agricultural sector. For that purpose, we examine the Granger non-causality test as applied to four variables in the system (Table 1.2)

Table 1.1: estimate of the PVAR model

VARIABLES	(1) nonagrie_d2	(2) productivity	(3) poverty	(4) gini
L.nonagrie_d2	0.111**	0.0512	-0.110***	0.281**
	(0.0564)	(0.0857)	(0.0314)	(0.0934)
L.productivity	0.398***	0.537***	-0.0314*	0.106**
	(0.0648)	(0.0840)	(0.0164)	(0.0507)
L.poverty	0.405***	0.190**	1.128***	0.397***
	(0.136)	(0.0915)	(0.0181)	(0.0763)
L.gini	-0.357***	0.194***	0.0284	0.857***
	(0.0944)	(0.0656)	(0.0195)	(0.0794)
Observations	108	108	108	108

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

DISCUSSION

We can observe in the first model (1) that non-agricultural employment has a positive and significant effect on its own growth. And productivity has a positive and significant influence on non-agricultural employment growth in SSA.

We observe in (2) that agricultural productivity has a positive and significant influence on its own growth. In a similar way, the variable Gini has a positive and significant influence on the productivity growth of the farm sector. Indeed, this result, surprising as it is, seems to justify the fact that inequalities, sometimes very large ones, are necessary for capitalist producers to carry out investments in agricultural sectors. This is in line with the development theory of Lindert (2000) and Piketty and Saez (2001).

The results of the Granger causality test enables us to ensure the effective existence of a causal relationship with a single direction, from agricultural productivity to non-agricultural employment (H0 is rejected). This means that changes in farm productivity can explain the level of off-farm employment.

In terms of the IRF responses to the analyses of dependent variables to the shocks on each variable in the system, we observe in Figure 1.3 below that the technical progress that shocks agricultural productivity has a constant effect in the medium run and an increasingly positive effect on non-agricultural employment growth and inequalities in the long run.
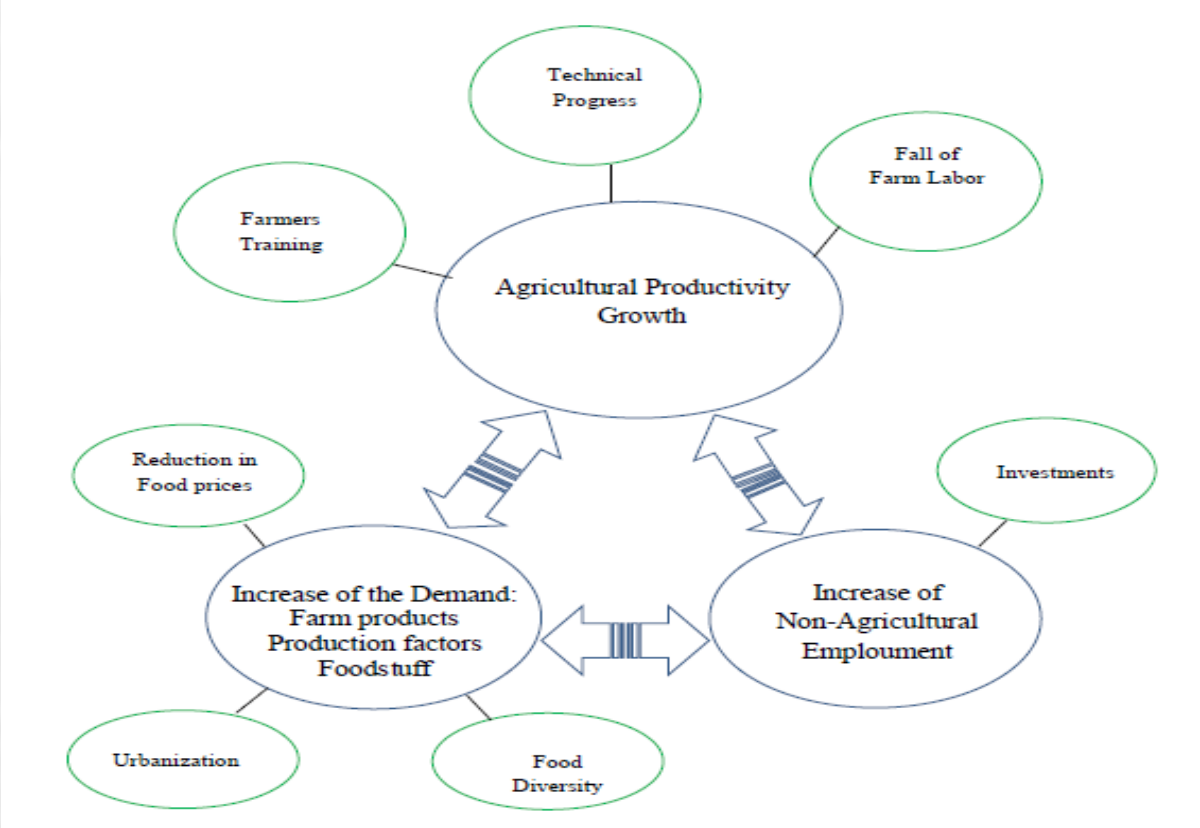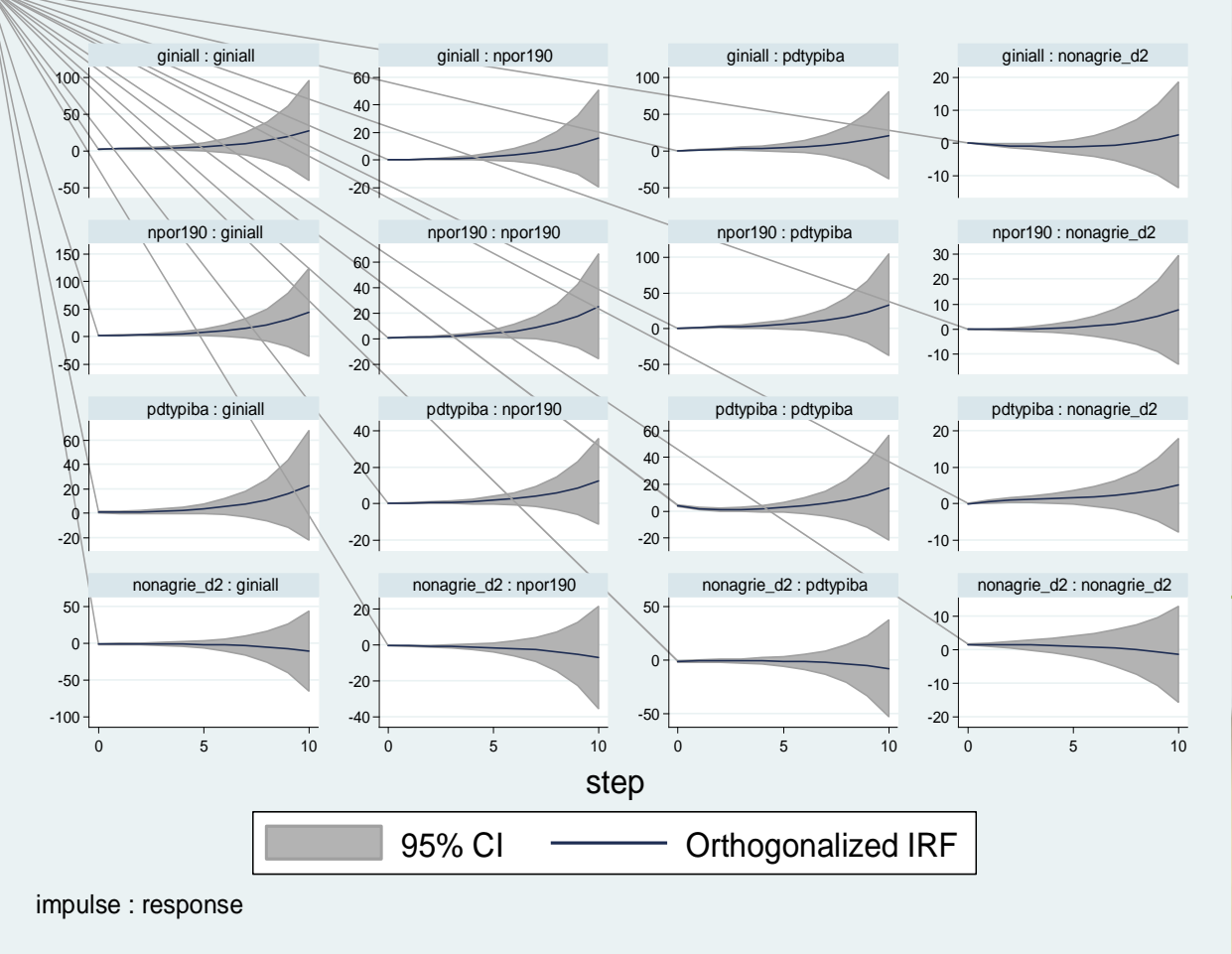
Figure 1.3 : impulse response functions (IRF)

CONCLUSIONS

It is important to recall the theoretical model of labour surplus established by Lewis (1954), Fei and Ranis (1963), which is used to analyse the implications of (i) an increase in population and (ii) agricultural productivity growth. Perkins et al. (2006) analysed the implications of demographic pressure in the Fei-Ranis model. The central contribution of this article is related to a theoretical analysis of the second implication and thereafter as an empirical check in the context of Sub-Saharan African economies.

A panel VAR model applying GMM estimators is used on a sample of 13 countries over the 1993-2012 period. We find the existence of a causal relationship with a single direction, from agricultural productivity to non-agricultural employment, and with a double direction between productivity and inequalities.

An important policy implication that directly stems from this analysis centres on the re-organization of the off-farm sector (industries and services) as a large absorber of labour surplus.