



Economic Growth and Employment in the Agricultural Sector in the Democratic Republic of the Congo

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ABSTRACT

This study aimed to analyse the relationship between employment in the agricultural sector and economic growth in the Democratic Republic of the Congo. It employed the empiriocritical approach alongside documentary and observational techniques. The results of the econometric estimates, based on statistics from the World Bank database

for the period 1991–2024, led to the conclusion that employment in the agricultural sector has no significant impact on economic growth. Imports and agricultural value added have a positive but non-significant impact. Conversely, foreign direct investment and inflation have a negative but non-significant impact.

The authorities' efforts should focus on implementing effective agricultural policies that take into account the

rehabilitation of transport infrastructure and marketing systems, as well as access to agricultural credit.

Keywords: Growth, employment in the agricultural sector, Democratic Republic of the Congo.

1. Introduction

The debate on the relationship between economic growth and employment levels remains both open and a major concern, for both developed and developing countries. However, researchers approach the issue differently depending on their area of research, employing varying scientific methodologies and analytical tools.

Generally speaking, the economies of developing countries rely heavily on a potentially rich agricultural sector. However, if poorly organised, this sector can be a significant lever for economic growth. Economic growth could be influenced by employment in the agricultural sector (Korem, A., 2021).

Whilst some researchers view employment in the agricultural sector as a driver of economic growth (Huang and Lin, 2000; Sangwene et al.; Edewor, S & Kottie, G.B., 2023, cited in Korem, A., 2022), others, on the other hand, find a negative (albeit sometimes modest) relationship between employment in the agricultural sector and economic growth (Alemaheyu, G., 2023; Merbaki, I., 2022; Dolo et al., 2022). Economic growth and unemployment are the key indicators through which a country's economy can be assessed. These two variables are all the more important as they are often at the heart of government policies in both rich and developing countries. The health of an economy can be assessed through its economic growth and its level of employment, which are the two macroeconomic variables essential for the implementation of economic policies in many countries (World Bank, 2023, cited in A. Korem, 2021),

The policies of most governments consist of implementing measures aimed either at stimulating economic growth or at maintaining it at an acceptable level. In both cases, the actions of the respective public authorities have an impact on employment levels, whether the aim is to encourage job creation or to keep unemployment at an acceptable level in order to reduce poverty and inequality in society (A. Korem, 2021).

Generally speaking, improved economic growth leads to job creation and, consequently, to a fall in unemployment. This view is shared by Noord et al. (2007) and Makun and Azu (2015) (cited in Korem, A., 2021); who argue that reviving economic growth is often put forward as an effective solution to reducing unemployment. For these authors, economic

growth leads to job creation and a reduction in unemployment, inequality and poverty. This is not always the case.

Economic literature credits the economist Okun (1962) with being the first to analyse the responsiveness of unemployment to changes in economic growth in the USA. This relationship, formalised as Okun's law, suggests that a high growth rate is often associated with a low unemployment rate. In other words, in the short term, there is a close inverse relationship between economic output and changes in the unemployment rate (A. Korem, 2021). The relationship between economic growth and unemployment has become a key driver of policies aimed at promoting the well-being of the populations concerned. It is clear that the full attention of governments is focused on wealth creation whilst generating more jobs.

The implementation of these policies often leads to a reduction in unemployment. This approach has been supported by international institutions through structural adjustment programmes (SAPs). The well-being of the population is undoubtedly the primary objective of every government. The pursuit of economic growth and the reduction of unemployment have now become the priority in development policies. The priority for governments is to find ways to ensure that their populations benefit from the fruits of wealth creation, whilst creating more jobs for them. Wealth creation, underpinned by incentives designed to support economic growth and job creation, is seen as a means of reducing poverty – a goal pursued by most governments (Korem, A., 2021). However, economic growth – even when positive – may or may not lead to job creation for a number of reasons. Firstly, it should be noted that the implementation of certain innovative investment decisions, excessive population growth and uncertainty regarding the effects of exogenous phenomena (wars, health crises, recessions, price fluctuations on international markets, etc.) may or may not be conducive to job creation. Pissarides (1990, cited in A. Korem 2021) argues that 'in the short term, growth may lead to job losses, creating frictional unemployment'. Conversely, caution and uncertainty can make employers reluctant to recruit in certain situations. The work of Gouider et al., 2018 (cited in Korem, A., 2021) states that 'when the economy is on the road to recovery, firms remain cautious about recruiting because they doubt the sustainability of that recovery'.

Economic growth can be explained by several factors. Sadi and Rezine (2021) argue that 'economic growth is explained by three factors: capital, labour and technical progress'. According to these authors, balanced, stable growth with full employment is possible thanks to the 'technological' factor. Human capital – defined as the totality of knowledge, skills and personal characteristics that promote personal, social and

economic well-being (OECD, 2007, cited in Sadi and Rezine, 2021) – stands out as a key factor in stimulating economic growth. It comprises education, lifelong learning, experience and health. In the same vein, Schult (cited in Sadi and Rezine, 2021) explains that the labour factor has always been taken into account by economists to explain the wealth of nations (OECD, 2007). Physical, intellectual and moral abilities are the determinants of human capital.

Rostow (1970); Ondo (2006); Dercon (2009) and Collin (2010) (cited in Raihanatou & Ekodo, 2023) argue that ‘the agricultural sector is an indispensable source of income for households and businesses. In addition to this, it employs more than half the workforce and generates substantial foreign exchange for developing countries’. Since gaining independence, most African countries (including the DRC) have focused their efforts on natural resources (minerals, oil, etc.).

These were seen as the ideal means of generating the wealth they required. However, shocks from global markets have forced them to diversify their economies, placing particular emphasis on the agricultural sector. GOLLIN, 2010 (cited in Raihanatou & Ekodo 2023), emphasises that agricultural development is essential for the economic growth of densely populated countries with limited access to international markets, as the extent of agriculture-led growth depends on the ability to import agricultural equipment and export agricultural produce. This view is also shared by Dercon (cited in Raihanatou & Ekodo, 2023), who argues that agriculture is essential to the economic growth of landlocked African countries that are poor in natural resources, whereas this is not the case for resource-rich countries. The work of Smith (1976, cited in Raihanatou & Ekodo, 2023) highlights the complementary nature of agriculture and the manufacturing sector, without which the world could not function. They also maintain that the role of agriculture is to sustain, and even stimulate, other sectors.

Several authors have highlighted the driving role of agriculture in a country’s development. François Quesnay, in his day, already emphasised the importance of agriculture by arguing that it was the sole source of a nation’s wealth; and Rostow (cited in Raihanatou & Ekodo, 2023) also advises countries to develop agriculture first before developing industry. All these authors have highlighted the important role of the agricultural sector both in economic growth and in stimulating activity in other sectors.

The agricultural sector in sub-Saharan Africa (SSA) is the largest and holds enormous resources. In the Democratic Republic of the Congo, as in most developing countries, this

immense potential remains under-exploited. Yet it has the potential to resolve most of the issues relating to food insecurity, poverty reduction, income and well-being. In the DRC, this sector employs three-quarters of the population, with agricultural activities being extensive in most cases and often relying on family labour. The agricultural sector is expected to contribute significantly to national wealth creation.

Increased agricultural production has a positive effect on GDP growth, as the agricultural sector generates demand for industrial goods and services (Kuznet, 1964, cited in Raihanatou & Ekodo, 2023). The Democratic Republic of the Congo has been attempting to return to positive economic growth following the resumption of World Bank assistance programmes in the early 2000s. In the DRC, the 1990s were marked by a worsening of the economic crisis that had begun in the late 1970s. The structural adjustment programme (SAP), overseen by international institutions, failed to enable the country to overcome this challenge. This crisis was due to external factors, particularly the fall in commodity prices on international markets – the country’s main source of foreign exchange and revenue – but also to internal political instability and the many governance-related difficulties that plunged the country’s economy into an indescribable situation.

The growth rate for the period 2000–2010 exceeded 5 per cent, reaching 7 per cent in 2010; and inflation reached 46 per cent in 2009; reforms supported by international institutions enabled the government of the Democratic Republic of the Congo to reach the completion point of the Heavily Indebted Poor Countries (HIPC) Initiative (Kambale, 2013). This resulted in the alleviation of external debt and the gradual improvement of the country’s macroeconomic framework (Kambale, 2013).

Between 2000 and 2012, the unemployment rate fell but remained above 60 per cent. The return of investors, particularly in the mining sector from 2010 to the present day, facilitated by the government’s efforts in the area of governance in general, has contributed to an improvement in the rate of economic growth. The sectors most affected by this resurgence of investment are the mining and services sectors. (Kambale, 2013). It is against this backdrop that our study focuses on the relationship between economic growth and employment in the agricultural sector, a sector with immense potential in the DRC. Could employment in the agricultural sector in the DRC have had a significant impact on the economic growth observed during the period from 1991 to 2024?

This study has enabled us to contribute to the ongoing debate in the literature on the relationship between economic growth and employment in the agricultural sub-sector in the DRC. The aim was to test the validity of Okun's law for the DRC's agricultural sector; and to examine the responsiveness of economic growth in the DRC to increases in employment in the agricultural sector.

More specifically, it analysed the relationship between GDP growth and employment in the agricultural sector in the DRC and sought to explain the factors underpinning this relationship.

2. Methodology

2.1. Data sources and theoretical approach

The data for this study were collected using documentary and observational methods. The statistics analysed were drawn from the World Bank's database covering the period from 1991 to 2024.

This period was chosen in order to shed light on the paradox that a series of policies have been implemented. These policies purported to prioritise agriculture with a view to alleviating food insecurity and enabling this sub-sector to contribute to the country's development. However, paradoxically, agriculture has proved incapable of meeting this need. This is despite the recognised potential of Congolese agriculture.

To assess the relationship between economic growth and employment in the agricultural sector in the DRC, we adopted a purely empirio-critical approach. This involved, firstly, conducting an econometric evaluation of the relationship and, secondly, analysing the results of this evaluation.

Drawing on the literature, we focused primarily on the following variables: employment in the agricultural sector (ESAG) and gross domestic product per capita (GDPPC). It should be noted that, according to the literature, there is a relationship between employment and economic growth.

To examine the effect of employment in the agricultural sector on economic growth, we selected agricultural value added (AVA), imports (Import), inflation (Infl) and foreign direct investment (FDI) as control variables.

The estimation of the parameters of this relationship was made possible through the use of a vector error correction model (VECM), which has certain requirements.

2.2. Model specification

As we have just demonstrated, economic theory holds that there is a relationship between unemployment and economic growth (Okun's law). In other words, there is a relationship between economic growth and employment. It is within this framework that this study aims to identify this relationship specifically for the DRC with regard to growth and employment in the agricultural sector, using the vector error correction model.

The cointegration model, inspired by Johansen and Juselius, in which Z_t is a vector comprising the various variables, and the VAR is modelled as follows:

$$Z_t = \mu + \sum_{i=1}^{n-1} \Pi_i Z_{t-i} + \varepsilon_t \quad (1)$$

where Π_i is a matrix of parameters $n \times n$, μ is a constant term and $\varepsilon_t \approx iid(0, \Omega)$. The VAR system (1) can be written as a vector error correction model (VEC)

$$\Delta Z_t = \mu + \Pi Z_{t-1} + \sum_{i=1}^{n-1} \Gamma_i \Delta Z_{t-i} + \varepsilon_t \quad (2)$$

Where Γ_i is the short-run parameter, and Δ is the first-difference form of the series. The rank of Π and r determines whether the linear combinations of Z_t are stationary. If $r > 1$, this indicates an indirect relationship between the variables. For this study, the vector Z_t comprises employment in the agricultural sector ($ESAG_t$), gross domestic product per capita ($GDPpc(t)$), value added in the agricultural sector (VAA_t), inflation ($INFL_t$), imports ($Import_t$) and direct investment (IDE_t). The choice of control variables took into account the absence of multicollinearity between them and the theoretical links advocated in the literature. Cointegration is possible when GDP per capita is standardised and is expressed as follows:

$$(PIHBT) = c + \alpha ESAG_t + \beta VAA + \gamma Infl + \delta Import + \zeta IDE_t + \varepsilon_t \quad (3)$$

With the cointegration vector given by $(1, -\alpha, -\beta, -\gamma, -\delta, -\zeta)$ in this case.

3. Results

The results presented here are derived from estimates carried out using the Eviews software. The graph below shows the trends in the variables.

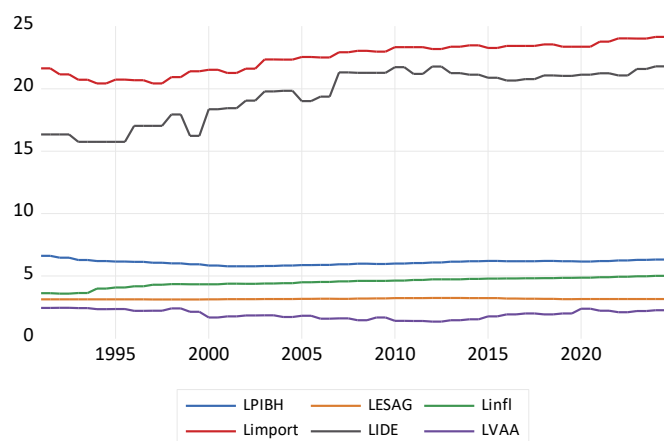


Figure 1. Trends in the variables covered by this study.

Source: estimates carried out by us using Eviews

This result indicates that there is a trend towards cointegration between the variables; however, before testing this cointegration relationship, we carried out a stationarity test, the results of which are shown in Table No. below:

Table 1. Results of the stationarity test.

Variables	Statistic	Critical at 5%	First difference	Critical value at 5%	Order of integration
	Level				
LESAG	-1.208341	-2.905519	-8.462712	-2.906210	I(1)
LPIBH	-2.428701	-2.882910	-12.38164	-2.883073	I(1)
LIDE	-1.136345	-2.882910	-12.60673	-2.883073	I(1)
LVAA	-1.616576	-2.882910	-11.49214	-2.883073	I(1)
Limport	-0.172749	-2.882910	-11.69718	-2.883073	I(1)
Linfl	-2.393240	-2.882910	-12.42775	-2.883073	I(1)

Source: estimates carried out by us using Eviews

As shown in this table, all variables are stationary in first differences. This paved the way for the Johansen test to verify whether there is at least one cointegration relationship; the results of which are shown in the table below:

Table 2. Results of the Johansen test.

Unrestricted Cointegration Rank Test (Trace)				
Hypothesised		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical value	Prob.**
None *	0.716211	192.0424	95.75366	0.0000
At most 1 *	0.480779	111.4328	69.81889	0.0000
At most 2 *	0.406852	69.48556	47.85613	0.0001
At most 3 *	0.362320	36.05768	29.79707	0.0083
At most 4	0.105041	7.262868	15.49471	0.5473
At most 5	0.002502	0.160345	3.841465	0.6888
The trace test indicates 4 cointegrating equations at the 0.05 level indicates rejection of the hypothesis at the 0.05 level MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesised		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical value	Prob.**
None *	0.716211	80.60960	40.07757	0.0000
At most 1 *	0.480779	41.94721	33.87687	0.0044

At most 2 *	0.406852	33.42789	27.58434	0.0079
At most 3 *	0.362320	28.79481	21.13162	0.0034
At most 4	0.105041	7.102523	14.26460	0.4771
At most 5	0.002502	0.160345	3.841465	0.6888
The Max-eigenvalue test indicates 4 cointegrating equations at the 0.05 level *Indicates rejection of the hypothesis at the 0.05 level **MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted cointegration coefficients (normalised by $b'S11*b=I$):				

Source: estimates carried out by us using Eviews

This result shows that there are at least four cointegration relationships, the assessment of which yielded the results shown in the table below:

According to these results, there is a relationship between economic growth and employment in the agricultural sector in the Democratic Republic of the Congo that is not statistically significant at the 95 per cent level. Although this shows that if employment in the agricultural sector (ESAG) increases by 1 per cent, GDPH increases by 8.09 per cent ; if agricultural value added (AVA) increases by 1 per cent, GDPH also increases by 0.99 per cent; if imports increase by 1 per cent, GDPH decreases by 0.08 per cent; if inflation rises by 1 per cent, GDPH increases by 0.04 per cent; if foreign direct investment (FDI) rises by 1 per cent, GDPH falls by 0.05 per cent.

Table 3. Results of the estimation using the Vector Error Correction Model (VECM).

Cointegration equation:	CointEq1
LPIBH (-1)	1.000000
LESAG (-1)	-8.096472
	(0.87495)
	[-9.25361]
LVAA (-1)	-0.992665
	(0.10701)
	[-9.27615]
LINFL (-1)	0.040308
	(0.10398)
	[0.38767]
LIMPORT (-1)	-0.089313
	(0.05710)
	[-1.56405]
LIDE(-1)	0.054480
	(0.03965)

	[1.37404]					
C	22.14369					
Error Correction:	D(LPIBH)	D(LESAG)	D(LVAA)	D(LINFL)	D(LIMPORT)	D(LIDE)
CointEq1	-0.057745	0.033995	0.302458	-0.083618	-0.070702	0.348473
	(0.04203)	(0.00864)	(0.14370)	(0.07224)	(0.29827)	(0.84457)
	[-1.37376]	[3.93357]	[2.10477]	[-1.15746]	[-0.23704]	[0.41260]

Source: estimates carried out by us using Eviews

$$\epsilon t = \ln PIB - 8,09LESAG - 0,99LVAA + 0,040 LInfl - 0,08LImport + 0,05 LIDE + 22,14$$

$$LPIBH = -22,14 + 8,09 LESAG + 0,99 LVAA - 0,04 LInfl + 0,08 LImport - 0,05 LIDE$$

The relationship between the variables ESAG and GDP is positive but not significant. This means that, although the relationship between the two variables is positive, employment in the agricultural sector does not have a significant impact on economic growth.

The relationship between the variables VAA and Imports on the one hand, and GDP on the other, is positive but not significant. In other words, agricultural value added and imports have a positive but not significant impact on economic growth.

The relationship between the variables 'Inflation' and 'FDI' on the one hand, and GDP on the other, is negative and non-significant. This means that inflation and foreign direct investment have a negative and non-significant impact on economic growth.

The impulse responses are shown in the graph below:

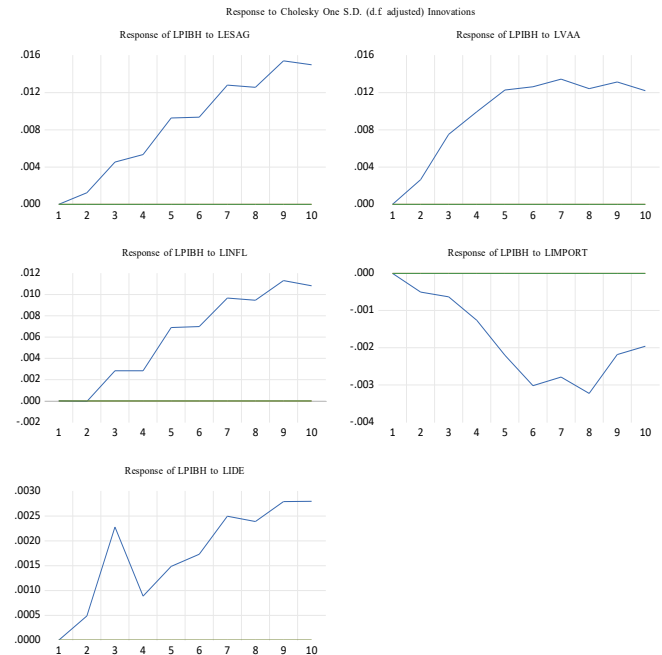


Figure 2. Impulse responses to shocks in the explanatory variables on the dependent variable, normalised.

The results of the stability test are shown in the figure below:

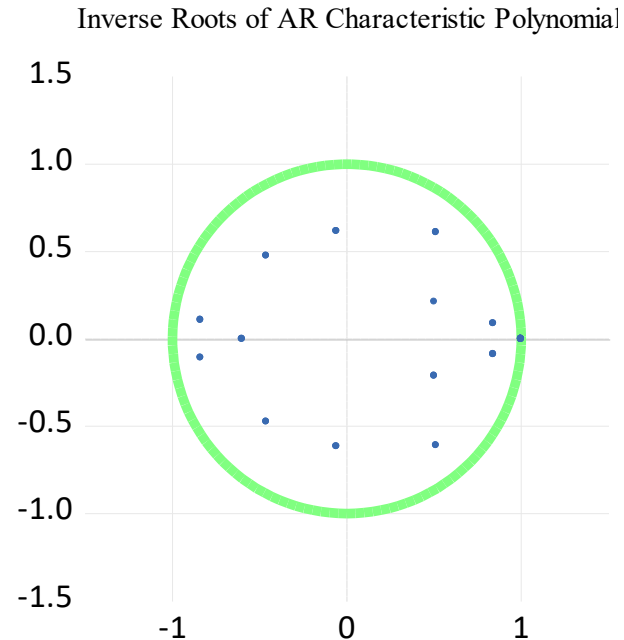


Figure 3. Stability test result for the model.

Source: estimation carried out by us using Eviews

This result shows that the model parameters are stable or robust.

4. Discussion of the Results

When employment in the agricultural sector increases by one per cent, economic growth rises by 8.09 per cent. This confirms the aspect of Okun's law which states that high growth is associated with a low unemployment rate. In other words, there is a positive relationship between employment and economic growth. Our main finding confirms this theory.

This finding is consistent with those of Alemayehu (2021); Dolo, A. et al. (2022) and Korem (2022), who each found results consistent with our own.

Alemayehu (2021) found that the agricultural sector in general, and livestock farming in particular – as a sector with high employment potential – has not been a source of growth in Ethiopia, with the result that growth and unemployment have moved in the same direction. This means that employment fell at a time when the country was experiencing high growth. The author attributes this situation to the failure of undergraduate and postgraduate education to enable young people to find employment.

Korem (2021) found, within the WAEMU region, a negative relationship between GDP growth and unemployment in Niger and Togo during the period 1986–2018. According to his findings, there is a positive relationship between growth and employment in both countries.

Dolo et al. (2022), for their part, found that one of the causes of the precarious living conditions faced by young people in Mali lies in the nature of economic growth, which is low in job creation and characterised by a low level of diversification in the production sector and sources of growth. The author attributes this finding to persistent poverty in rural and peri-urban areas, the extremely young age structure of the Malian population, rural-to-urban migration, and economic migration.

These findings, which validate Okun's law for these various countries, can be explained by the similarity in the characteristics of the different economies in which these studies were conducted, even though they were carried out using different methods and at different times.

However, we note that whilst the direction of the relationship between the two variables is the same, its magnitude (or robustness) is not. In general, the results found in developed countries contrast with those found in countries with fragile economies, where agriculture remains a largely neglected sub-sector.

In contrast to these findings, other authors have reported negative results. This is the case with ABU (2016), who found that there is no relationship between economic growth and unemployment. In contrast to our findings, this difference may be explained by the nature of their methodological approach, which involved conducting an econometric analysis based on questionable data.

Merbaki (2022) found that in Algeria, the elasticity of employment is negative and insignificant when economic growth increases. In other words, economic performance during the period 1999–2019 did not translate into significant job creation. Economic activity does not create enough jobs.

Korem (2021), in his study conducted within the WAEMU region, also found — for the period 1986–2018, with the exception of the results for Togo and Niger — a finding contrary to ours. That is to say, a positive relationship between economic growth and unemployment for the other countries in the union. In fact, these countries of the West African Economic and Monetary Union are developing countries; this difference may be explained by the gap between sub-regional integration ambitions and the specific national realities of each country. Furthermore, the characteristics of these economies, and indeed the objectives of their public policies regarding employment and growth, cannot be the same.

Our findings, which confirm that agricultural value added has a positive but non-significant impact on economic growth, are consistent with those of Raihanatou & Ekodo (2023), who found that agricultural modernisation has a positive effect on economic growth in the CEMAC zone.

Whilst our results confirm that imports have a negative but non-significant impact on economic growth, IGWE & Essouly (2023) confirm that the share of employment in the agricultural sector is negative for an economic development level of \$1,510.92.

5. Conclusion

This study aimed to assess the impact of employment in the agricultural sector on economic growth in the DRC, covering the period from 1991 to 2024.

The data were sourced from the World Bank, and the estimation was carried out using a vector error correction model.

The results show that employment in the agricultural sector has a positive but non-significant impact on economic growth.

The relationship between the ESAG and GDPH variables is positive but not significant. This means that employment in the agricultural sector does not have a significant impact on growth, although the impact is positive. The same applies to agricultural value added and imports, which have a positive but non-significant impact on economic growth. However, inflation and foreign direct investment have a negative but non-significant impact on economic growth.

These results imply that the rehabilitation of transport infrastructure and marketing structures for agricultural products is necessary in the DRC.

It is also necessary to ensure access to credit to support initiatives, innovations and production in the agricultural sector, so as to enable this sector to generate greater value added and create more jobs.

Ways must be found to ensure interaction between the (traditional) informal sector and the modern sector in order to generate added value and jobs.

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