

Is Agriculture the Highest-Risk Sector? A Determination Using Congolese Data

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Abstract

The purpose of this article is to determine the extent of agricultural risk in terms of sectoral risk in the Congo. By applying information asymmetry theory to the banking industry, we postulate that the risk associated with the agricultural sector is not the highest of sectoral risks. The application of the IRISK method produces results that show that, in the Congo, the agricultural sector is indeed not the riskiest of the economic sectors; rather, it is the “wholesale and retail trade, restaurants and hotels” and then “transport, activities of transport auxiliaries and telecommunications” sectors that are the most risky. These results, which are in line with theoretical predictions, imply that it is still possible to consistently finance agriculture provided that Congolese banks change their “negative” perception of this sector.

Keywords

Economic Sectors, Agriculture, Risks, Congo

1. Introduction

The essential function of banks is to collect funds from agents with the capacity to finance and then transform them into jobs according to the needs of units incurring losses (Gurley & Shaw, 1960; Chevalier-Farat, 1992; etc.). However, in SSA, the contribution of these funds to the economy differs markedly from one sector to another. Some sectors benefit more from financial contributions than others, as shown by the data collected from a few community areas or countries.

In fact, during 2016, in the WAEMU zone¹, 3% of the outstanding bank loans recorded at the central credit bureau were for the agriculture, forestry and fish-

¹Banking Commission of the West African Economic and Monetary Union (WAEMU), Annual Report 2016, p. 47

ing sectors; 2% were for extractive industries; 17% were for manufacturing industries; 4% were for electricity, gas and water; 9% were for buildings and public works; 33% were for trade, restaurants and hotels; 10% were for transport, warehouses and communications; 7% were for insurance, real estate and business services; and 16% were for community services. In 2012, as far as the CEMAC space² is concerned, 7% of gross bank credits were allocated to agropastoral and fish farming activities; 4% to extractive industries, 9% to manufacturing industries, 5% to the production, water and electricity distribution sectors, 16% to the transport and telecommunications sectors, 12% to the wholesale and retail trade, restaurants and hotels sectors, and 12% to the building and public works sectors.

It can therefore be noted that agriculture benefits from less bank financing than the transport and telecommunications sectors, manufacturing industries, or building and public works sectors. Agriculture is considered vital for rural and urban populations (FAO, 2012) and a means to address poverty (Cervantes-Godoy & Dewbre, 2010), as well as a source of growth, since it provides raw materials for industry and involves the development of a reservoir of labor and an internal market used by other sectors (Dufumier, 1999).

This information is supported by the data in terms averages and sector ranking obtained from COBAC reports on bank loans and receivables in arrears over the 2006-2017 period. Indeed, over the reference period, with regard to bank credits, the “agriculture, livestock, hunting, forestry and fishing” sector received an average of 5.72% of total bank credits, compared to 12.91% for the manufacturing sector, 15.40% for the wholesale and retail trade, catering and hotel sectors, and 16.72% for the “transport, activities of transport auxiliaries and telecommunications” sector. The same report gives, by sector, indications of the share of outstanding receivables accumulated by banks. It should be noted that the “wholesale and retail trade, restaurants and hotels” sector alone represents, on average, 24.58% of the outstanding receivables, which ranks it at the top of the riskiest sectors, followed by the “activity of financial institutions, real estate business, production of business services”, the “agriculture, livestock, hunting, forestry and fishing” sectors, manufacturing industries with, respectively, 24.36%, 9% and 4.78% of total outstanding receivables³. Based on this information, we can highlight at least two (2) facts, namely, the evidence of an unequal allocation of bank credits by sector and the heterogeneity of sectoral risks.

The classification in terms of the ranking of the two variables (bank loans and overdue receivables) reveals a contradiction. For example, the “wholesale and retail trade, restaurants and hotels” sector is ranked second for bank credits and first for overdue credits. The same is true of the “agriculture, livestock, hunting, forestry and fishing” sector, which is ranked 5th for bank credits and 3rd for outstanding credits. In other words, the wholesale and retail trade, restaurants and

²Banking Commission of Central Africa (COBAC), 2012 report, p. 34.

³Authors based on COBAC reports from 2006 to 2017.

hotels sector, which accumulated more overdue loans than other sectors, benefited from bank loans that were higher average amount than those obtained by the agriculture, breeding, hunting, forestry and fishing sector, which accumulated fewer overdue loans than the latter. As a result, one conclusion can be drawn: the level of loans obtained by a sector apparently does not reflect the risk profile of that sector.

Thus, the behavior of banks in terms of sectoral credit allocation is assessed differently. For example, as far as the authors, [Jessop et al. \(2012\)](#), [Fouquet \(2014\)](#), and [Brulé-Françoise et al. \(2016\)](#) are concerned, agriculture faces several risks⁴ that are difficult to identify and certainly more unpredictable than the risks associated with firms in other sectors, and this is the main reason why banks have always been very reluctant to finance this sector. On the other hand, authors such as [Bardos & Plihon \(1999\)](#) believe that the industrial sector is riskier. This lack of unanimity regarding the identification of sectors deemed riskier highlights the need for further research. This research is all the more useful since it is accepted that “all human activity involves risk, but some are much riskier than others” ([Concina, 2014](#)).

In this context, a study in the Congo is necessary. This choice is motivated by the evidence of the limited contribution of banks in the agricultural sector⁵, i.e., 4% on average over the period 2003-2008, and compared to 30%, 20% and 16%, respectively, for the trade, manufacturing, transport, and telecommunications sectors. Thus, based on applying information asymmetry theory to the banking industry ([Stiglitz & Weiss, 1981](#); [Diamond & Dybvig, 1983](#); etc.), the question that arises is whether agriculture in the Congo is truly riskier than other economic sectors.

In relation to this concern, the objective of this article is to determine the extent of agricultural risk in terms of sectoral risk. The risk here is measured by non-performing loans by banks or the overdue receivables of banks ([Louzis et al., 2012](#)). As such, we assume that the risk associated with the agricultural sector is not the highest in terms of sectoral risk ([Maurer, 2014](#)). To validate this hypothesis, this article, other than the introduction and conclusion, is structured in three sections, namely, a review of the literature, a discussion of the methodology and presentation of related information, and the analysis and interpretation of the results.

2. Literature Review

There has been a great deal of work⁶ on the bank financing of agriculture, most of which is based on information asymmetry theory to explain the credit supply

⁴The risks include the following: operational risk, market risk, credit risk, production and marketing risk, regulatory risk, social risks, etc.

⁵[SOFRECO-CERAPE \(2012\)](#), “République du Congo, Etude du secteur agricole, Diagnostic national”. p.185

⁶For an overview of these studies, cf. [Yadav Priyanka & Sharma Anil K. \(2015\)](#), “Agriculture Credit in Developing Economies: A Review of Relevant Literature”, *International Journal of Economics and Finance*, Vol. 7, n. 12.

behavior of banks.

In essence, it should be recalled that information asymmetries are situations where one side of the market has an informational advantage over the other side. In the credit market, two situations can be observed: adverse selection and moral hazard. Banks were created to reduce the effects of these information asymmetries (Chevalier-Farat, 1992). Within this framework, their primary function is to collect and manage the information necessary for exchanges to be successful (Diamond & Dybvig, 1983). Thus, faced with the situations of adverse selection and moral hazard, banks become cautious. We thus observe a phenomenon of “flight from risk”.

Numerous analyses apply information asymmetry theory to the agricultural sector. According to Jessop et al. (2012), financial institutions are hampered by information asymmetry. Because farmers have low levels of education and lack financial literacy (the lack of records, business plans, or bank accounts), they have difficulty establishing their borrowing profile and tracking loans once the money is disbursed. Credit scoring techniques (which would reduce the cost of assessing loan applications) are difficult to apply because of the lack of standardized and objective data. The high level of rural poverty also means that agricultural loans are easily diverted for consumption, with the professional sphere merging with the private sphere. Thus, according to these authors, few banks are familiar with the agricultural field and have developed specific financial products, as most of them consider this sector unprofitable or even risky. Consequently, bankers who intervene in the rural field with the classic structuring face many risks that they cannot afford (Zonon & Harouna, 2002).

In the same vein, Fouquet (2014) considers that, for bankers, providing credit to the agriculture field is very risky. Indeed, by financing the economy, a banker is led to take risks that cover the activity financed, the hazards of production, the uncertainties of marketing, and uncertainty in terms of cash and inventory management. In regard to financing agricultural activities, a banker is also faced with other risks, which are often much more difficult to control, including climatic hazards (drought, excessive rain, hail, frost, wind) and many other risks induced by pests and parasites that threaten plant harvests, as well as uncertainties due to animal diseases.

Numerous empirical studies have been carried out to shed light on the reasons for the low level of financing in the agricultural sector. Keeton & Morris (1987), for example, showed in the case of the United States that nonperforming loans, and thus the risk borne by the agricultural sector, were at the root of the agricultural crisis observed in that country during the period 1979-1985.

Additionally, the Italian Agency for Development Cooperation (2018) revealed in its report on Tunisia that the proportion of agricultural credit in this country remains very low compared to other sectors and represents, on average, over the period 2000-2017, only 5.3% of total credit. This situation can be explained in particular by the refusal to grant credit to actors in rural areas because

of the risks associated with their activity.

[SOFRECO-CERAPE \(2012\)](#), in particular, has shown that in the Congo, banks have neither the capacity nor the will to engage in agricultural production. Indeed, according to [SOFRECO-CERAPE \(2012\)](#), the high risk of non-recovery and level of provisions for bad debts do not allow banks to support the agricultural sector. As a result, banks tend to concentrate the majority of their credit in the oil, industry and trade sectors.

[Maudos et al. \(2005\)](#) analyze the behavior of banks in Spain in terms of financing sectors of activity. Their analysis shows that Spanish banks have a preference for lending to the building sector (housing, real estate and construction). These scholars explain this by focusing on the solidity of this sector and its independence from the economic cycle. Indeed, according to these authors, Spanish banks invest in sectors for which assets depreciate less and have more value, unlike the Information and Communication Technology (ICT) sector, for example, where depreciation rates are high and prices are deflationary.

This brief review of the literature shows that the agriculture field is faced with risks that do not encourage banks to support it. Other economic sectors are not as risk-free. However, analyses involving sectoral risk classification, which could help to understand the motive behind banks' behavior in terms of sectoral credit allocation, seem to be lacking for the Congo in particular. Addressing this issue is the essential contribution of this article.

3. Methodology

The methodology used here is based on the work of [Bardos & Plihon \(1999\)](#). Indeed, when analyzing the case of France, these authors developed the IRISK method, which allows for the identification of risky sectors and for which the broad outlines are presented below.

[Bardos & Plihon \(1999\)](#) began by defining the criteria for identifying risky sectors. Four criteria were identified for this purpose: 1) the frequency of legal events, that is, the annual number of failures relative to the total number of firms in the sector under consideration; 2) the extent of bank indebtedness; 3) the proportion of firms with the most unfavorable scores (probability of failure greater than 31%); and 4) the risky share of bank indebtedness.

These scholars then mobilized three sources of information to identify sector risk indicators, namely, information obtained from the clerks of commercial courts, notably, on company failures; the accounting base, consisting of the annual tax balance sheets of companies that achieve a certain threshold of turnover or that have obtained bank loans exceeding five times the threshold for registration at the central risk office. Information was also obtained from the central risk register, which records monthly the individual amounts of loans above a threshold granted to companies by each bank.

Finally, these scholars carried out an analysis of credit risk in various sectors following three steps. The first step was identifying risky sectors on the basis of

indicators constructed from the abovementioned sources of information and their classification according to the magnitude of the respective risks. The second step was providing a detailed description of the riskiest sectors. Finally, the last step was identifying the banks engaged in these sectors.

Thus, within the framework of this IRISK method, a sector is considered riskier if its average risk is higher than the average risk of all sectors. Bardos & Plihon (1999) were therefore able to define a risk classification based on the four (4) criteria for identifying risk sectors previously presented. Five (5) risk classes are determined, namely 1) the most risky or class 1, grouping together the sectors combining the four (4) criteria; 2) class 2 for sectors concerned by three (3) criteria; 3) class 3 assigned to sectors presenting two (2) risk criteria; 4) class 4 applied to sectors presenting only one (1) criterion; and finally class 5, i.e. the least risky for sectors not concerned by any of the criteria.

As we did not have all the information necessary for the application of this method, for this article we will limit ourselves to information such as “importance of bank indebtedness” and “risky part of bank indebtedness”, i.e. a study for categories of risk ranging from classes 3 to 4. Indeed, the data mobilized for this work, taken from COBAC's reports for the period from 2006 to 2017, only provide us with information that will enable us to construct only two sector risk indicators (average risk of the sector, average risk of all sectors) necessary to identify risky sectors before ranking them according to the extent of the risks they respectively bear.

4. Presentation, Analysis and Interpretation of the Results

The application of the IRISK method yielded the results presented in Table 1 and the classification of the sectors according to their average risk makes it

Table 1. Magnitude of risk by sector.

Sectors ^a	Risky portion of bank indebtedness (average 2006-2017) or average risk
B ₁	4.42
B ₂	2.25
B ₃	0.75
B ₄	5.11
B ₅	4.29
B ₆	6.94
B ₇	4.91
B ₈	1.62
B ₉	3.26

Source: Authors based on COBAC data. ^aB1: agriculture, animal husbandry, hunting, forestry and fishing; B2: mining and quarrying; B3: manufacturing; B4: electricity, gas, steam and water supply; B5: construction and public works; B6: wholesale and retail trade, restaurants and hotels; B7: transport, activities of transport auxiliaries and telecommunications; B8: activities of financial institutions, real estate, production of business services; B9: production of social and personal community services.

possible to determine their position or rank (**Table 2**).

Table 1 and **Table 2** shows that, compared to the average risk of all sectors (3.73 billion CFA francs), the “wholesale and retail trade, restaurants and hotels”, “production and distribution of electricity, gas, steam, water”, “transport, activities of transport and telecommunications auxiliaries”, “agriculture, livestock, hunting, forestry and fishing”, and “construction and public works” sectors are the most risky, while the “production, social and personal community services”, “extractive industries”, “activity of financial institutions, real estate business, production of business services”, and “manufacturing industries” sectors are the least risky. However, among the five (5) riskiest sectors, agriculture ranks 4th, ahead of the “construction and public works” and behind the sectors “wholesale and retail trade, restaurants and hotels”, “production and distribution of electricity, gas, steam, water”, and “transport, activities of transport auxiliaries and telecommunications” sectors. As can be seen, agriculture is not the riskiest of the riskier sectors. However, this sector benefits from less financing than some sectors that appear to be riskier than it is. This is the case for the “wholesale and retail trade, restaurants and hotels” and “transport, activities of transport auxiliaries and telecommunications” sectors, which have, respectively, benefited on average over the period 2009-2017, 15.40% and 16.72% of total credits allocated, which is more than the 5.72% allocated to the agricultural sector (**Table S1** in the appendix), or approximately three times the amount allocated to this sector. In other words, since agriculture is not the riskiest sector, it could have obtained more financing than the riskier sectors. However, this is not the case.

A lesson can be drawn from this result: in the Congo, the agricultural sector is not the riskiest of economic sectors. This result confirms the analyses conducted by **Concina (2014)**, which states that “all human activity is risky, and some are riskier than others”. Indeed, agriculture appears in the class of riskier sectors.

Table 2. Position (ranking) of sectors in terms of the average risk of all sectors (in descending order).

Sectors	Medium risk	Medium risk (all sectors)	Rank	Risk class*
B6:	6.94		1	riskier
B4:	5.11		2	riskier
B7:	4.91		3	riskier
B1:	4.42		4	riskier
B5:	4.29	3.73	5	riskier
B9:	3.26		6	less risky
B2:	2.25		7	less risky
B8:	1.62		8	less risky
B3:	0.75		9	less risky

Source: Authors based on COBAC data. *riskier if sector average > average of all sectors; less risky if average sector < average of all sectors.

However, its ranking (rank 4) puts into perspective the magnitude of the risk it carries, and therefore allows us to say that it is not the riskiest sector as it is believed, since other sectors such as “wholesale and retail trade, restaurants and hotels”, “production and distribution of electricity, gas, steam, water”, “transport, activities of transport auxiliaries and telecommunications” occupy, respectively, rank 1, 2 and 3.

The results show that the risk associated with the agricultural sector is not as high, let alone prohibitively high, as frequently claimed by financial institutions (Maurer, 2014). Moreover, according to Meyer (2011), no data were found to support the argument that agricultural loans are riskier than others.

This result is contrary to that obtained by Bardos & Plihon (1999) in the case of France, where these authors identified the industrial sector as the riskiest sector. However, the analysis based on the IRISK method indicates that in the Congo, the manufacturing sector is the least risky of all sectors, as it ranks 9 and has an average risk of 0.75.

In addition, this result is contrary to the conclusions of Jessop et al. (2012), SOFRECO-CERAPE (2012) and the Italian Agency for Development Cooperation regarding 6 countries (Cambodia, Mali, Senegal, Tanzania, Thailand, Tunisia), Congo and Tunisia, where these authors showed that agriculture in these countries is not a good credit risk for banks.

It appears that in the Congo, agriculture, which is not riskier than other sectors, benefits from less bank financing. This could be because for banks, agriculture is a complex sector with multiple risks that they have not yet managed to assess properly (Jessop et al., 2012; Fouquet, 2014; Brulé-Françoise et al., 2016), giving it the image of a high-risk sector. In other words, Congolese agriculture could be the victim of the “negative” perception that banks have of the sector, which would also explain the low level of capital inflows into the sector.

However, this low level of funding for agriculture, which thus constitutes a paradox, could have several causes, other than the risk associated with the latter itself, but which undoubtedly contribute to amplify it. Indeed, it could be noted the absence of accompanying measures for the agricultural sector, in accordance with Nsengiyumva & Mayoukou (2020), who highlight the weak organization of markets for the sale of products, as well as the absence of guarantees and mechanisms for the conservation of products.

5. Conclusion

The objective of this article was to determine the ranking of the agriculture field in terms of sectoral risk. By applying information asymmetry theory to the banking industry (Stiglitz & Weiss, 1981; Diamond & Dybvig, 1983), we showed that the hypothesis stating that the agricultural sector is not associated with the highest sectoral risk was indeed supported (Maurer, 2014). The use of the IRISK method has produced results that confirm our hypothesis by attesting that the agricultural sector is not the riskiest of economic sectors, although it receives less

financing than the “wholesale and retail trade, restaurants and hotels”, “transport, activities of transport auxiliaries and telecommunications” sectors, which are among the riskiest and at the same time, receive more contributions from banks.

The somewhat “negative” image that banks have of the agriculture field contributes to this sector being considered highly risky. For banks to change their perception of this sector, should specialized banks that are oriented to this sector be developed? It is hopeful that public authorities will find here strong arguments in favor of bank financing for this sector due to its importance for poverty reduction on the one hand, and of the banks’ popularization of the ownership of the updated central risk register on the other hand.

To these actions should be added the setting up of support mechanisms such as insurance covering banks against climatic risks that could cause the loss of production; the investment of public authorities in structures for the conservation and disposal of products.

However, this work has been limited due to the non-availability of all the data. Thus, we believe that the possession of all the data necessary for this study would strengthen our results. Better information from the central risk file would be an undeniable asset for this analysis and future research on the issue, particularly within the agricultural sector itself.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix

Table S1. Bank Loans and Past Due Receivables by Segment over the Period 2006-2017 (average and rank).

Sectors	Bank loans		Outstanding receivables	
	Average	Rank	Average	Rank
B1: Agriculture, breeding, hunting, forestry and fishing	5.72	5	9.00	3
B2: Extractive Industries	2.90	8	0	9
B3: Manufacturing Industries	12.91	3	4.78	4
B4: Production and distribution of electricity, gas, steam and water	4.88	7	0.65	8
B5: Buildings and public works	9.08	4	1.36	7
B6: Wholesale and retail trade, restaurants and hotels	15.40	2	24.58	1
B7: Transport, activities of transport auxiliaries and telecommunications	16.72	1	3.11	5
B8: Activity of financial institutions, real estate business, production of business services	5.62	6	24.36	2
B9: Production, social and personal community services	1.94	9	2.56	6

Source: Authors based on COBAC reports from 2006 to 2017.