Prudential Measures, Monetary Policy and Lending Dynamics in the Agricultural Sector in East Africa

BAHATI Sebasore[1], Redempteur Ntawiratsa[2], Clément BULA Basuayi[2], GAKURU SEMACUMU Jean-Baptiste[4], Paul Senzira Ntahayo[4], Jonas Uwimana[1], & SENGA MATABARO[5]

[1]Ph.D student at University of Rwanda, Researcher at the university center for economic and social research and development (CURDS)
[2]University of Burundi,
[3]Higher Institute of Pedagogy of Bukavu
[4]University of Goma,
[5]Ph.D student at University of Burundi, Researcher at the university center for economic and social research and development (CURDS)

Summary

This Research Highlights the Effects of Prudential Measures and Monetary Policy on Agricultural Credit in the Eac. Using Panel Data Over a Period of 1990-2020, a Random Effects Model Was Chosen. The Results Show That Monetary Policy Has a Positive and Significant Effect on Agricultural Loans. However, Prudential Measures Do Not Have a Significant Direct Effect on the Latter. Conversely, Agricultural Loans Are Positively Influenced by Prudential Measures. While Political Instability Has a Negative Effect on Agricultural Loans. Atms and Bank Branches Are Associated with a Decrease in Agricultural Credit, Suggesting Unequal Access in Rural Areas. The Study Partially Confirms Theories of Financial Regulation and Economic Growth, While Highlighting the Limitations Related to the Lack of Disaggregated Data and the Failure to Take into Account Specific Local Policies. To Strengthen These Findings, Future Research Could Incorporate Sectoral and Institutional Variables, Extend the Period of Analysis, and Include a Comparison with Other Developing Regions.

Keywords: Agricultural Loans, Prudential Measures, Monetary Policy, Political Stability, Atms, Bank Branches, Political Stability

1. Introduction

Agricultural Activity Plays a Crucial Role in Economic Development, Particularly in Sub-saharan Africa. This Activity is the Main Source of Livelihood for the Majority of the Population.[1],[2] they Emphasize That a Robust and Active Agricultural Sector Allows a Country to Feed Its Growing Population in Quantity and Quality, Creates Employment, Generates Foreign Currency and Provides Raw Materials to Industry. But, Despite Its Potential Production Potential, Africa Remains a Net Importer of Food Products, Thus Highlighting the Structural Challenges of the Sector. [2] among These Challenges Are: The Weaknesses of the Financial Market That Significantly Affect the Financing of the Agricultural Sector, as Highlighted by [3].

Moreover,[1] stipulate That the Activities of the Banking Sector Are Always Exposed to Risks Due to the Unavoidable Exposure of Banks to Agricultural Loans, Which Complicates the Long-term Profitability of Agricultural Credit, Particularly in African Economies Where the Agricultural Sector Plays a Significant Role in Job Creation and Growth of the Gross Domestic Product (Gdp).

Besides the Problems Associated with Access to Modern Technologies and Agricultural Land, the Lack of Adequate Financing for the Agricultural Sector is One of the Major Obstacles to the Growth of This Sector in Africa. [4] show That, Although Multiple Agricultural Policies Are Implemented to Increase Financing of the Agricultural Sector, Fewer Studies Have Been Done on Their Effectiveness in Developing Countries. When Compared with China, It Has Adopted the Easing of Prudential Measures for Financing the Agricultural Sector as an Unconventional Monetary Policy Instrument to Reduce the Reserve Ratio of Agricultural Financial Companies.[5]. In This Approach, [6]and [7] show That in-depth Studies on the Implementation of Monetary Policies, the Implementation of Prudential Measures and the Performance of Agricultural Credits Mainly Concern Countries with High Gdp [5]. However, [8] found That in the Uk, the Simultaneous Tightening of Capital Requirements and Monetary Policy Reinforced Each Other, Although This Mainly Affected Smaller Banks.[9] raised a Similar Trend in Belgium, Highlighting an Accommodation Between Capital Obligations and Monetary Policy. In Contrast,[10] [11] proposes That Certain Economic Policies Broaden the Consequences of Financial Regulations. His Study Conducted on Irish and Dutch Banks Between 2003 and 2018, Using the Panel Data Method, Highlights the Complexity of the Relationships Between Prudential Measures and Monetary Policies in the Financing of Agricultural Activities.

However, Previous Research on the Application of Prudential Measures and Monetary Policies to Agricultural Loan Portfolios Has Particularly Studied the Performance and Application in High-income Regions or Countries, Their Performance and Applicability in High-income Countries with Political Stability and Approved Financial Inclusion. However, there is Less Scientific Study Examining This Situation in Low-income Countries Such as the Democratic Republic of Congo, Rwanda, Burundi, Tanzania, Uganda and Kenya, Which Form the East African Community (Eac). This Study is Based on the Hypothesis That Prudential Measures and Monetary Policy Have a Significant Impact on the Agricultural Loan Portfolio in Eac Countries.

The Interest of This Work Lies in Offering an Attempt at the Degree of Applicability of Prudential Measures and Monetary Policies to Agricultural Loan Portfolios, While Presenting Ways of Strengthening, Since There is Still No Appropriate Research on the Effect of These Policies on Agricultural Loan Portfolios.

The Objective of This Study is to Analyze the Effects of Prudential Measures and Monetary Policy on Agricultural Loan Portfolios.

To Achieve This, a Quantitative Approach Was Adopted, as the Variables Studied, Including Prudential Measures, Monetary Policy, and the Loan Portfolio, Are Numerical in Nature. This Approach Makes It Possible to Accurately Assess the Impact of Regulatory Instruments on Agricultural Financing and to Propose Recommendations Adapted to the Economic Realities of Eac Countries.

2. Literature Review
2.1 Theoretical Literature

This Article Focuses on the Theory of Financial Regulation, Economic Growth and Political Instability to Understand and Grasp Credit Management in Agricultural Credit. In a Situation of Repeated Banking Crises Such as the Depression of the 1930s and the Crisis of 2008, the Theory of Financial Regulation Finds an Important Place Because These Situations Require Strict Regulation to Anticipate Systemic Risks in the Financial System in General.[12]. The 2008 Crisis, the Bale Iii Agreements Were Put in Place Introducing Higher Capital Requirements for Banks [13] this Theory of Strict Regulation Aims to Minimize Banking Risks and Ensure the Stability of the Financial System.[14] however, These Prudential Measures May Reduce the Supply of Credit, Particularly in Sectors Considered to Be at High Risk, Such as the Agricultural Sector.[15]. Often Prudential Measures Reduce the Power of Banks to Offer Credits Often Imposed by a Higher Capital Ratio[16]this Theory is More Used to Reduce Loans to Farmers, Often Seen as High-risk Debtors Due to the Volatility of Production and Dependence on Climatic Conditions.[16]in the Context of the East African Community (Eac), Where Agriculture Plays a Crucial Role, These Regulations Can Restrict Access to Credit for Farmers, Thus Hampering Their Development and the Expansion of Investments in This Vital Sector.

The History of the Theory of Political Instability Begins With the Work of[17], Which Examined How Political Institutions and Political Stability Affect the Economic Development of[17]the Characteristics of Political Instability Are Generally Frequent Changes of Government, Internal Conflicts, Electoral Crises, Institutional Uncertainties, Which Create a Risky Situation for Lenders.[18]this Way of Thinking Has Developed With Studies on the Impact of Political Crises on Credit Management, Especially in Developing Countries.[19]this Theory of Political Uncertainty is a Major Threat Factor for Lenders.[20]political Instability is Causing Banks and Other Financial Institutions to Have Doubts About Offering Credit, Especially in Delicate Sectors Such as Agriculture, Which is Especially Exposed to External Crises.[21]. Often, Agricultural Borrowers Are Considered Similarly Less Creditworthy During Periods of Political Instability, as Political Uncertainty Leads to Economic Disruptions (Failure to Maintain Fields During Armed Conflicts, Looting of Plantations and Farms, Etc.) Which Deteriorates the Repayment Power of Loans.[22]. Despite This,[23] proposes That, in Some Resilient Economies, State Support Instruments Can Counteract the Negative Impacts of Political Instability by Ensuring Continued Availability of Credit, Even in Uncertain Political Environments [24]. In This Research, Which Focuses on the East African Community (Eac), Political Instability, which is Recurrent in Some Eac Countries, is One of the Major Obstacles to Accessing Agricultural Credit. Political Changes Make It Difficult for Lenders to Finance Agriculture, a Sector That is Essential for Food Security and Regional Economic Development.

The Theory of Economic Growth Developed From the Work of Solow and Other Classical Economists Who Showed That Growth in Gross Domestic Product (Gdp) is Essential to Stimulate Investment and Access to Credit.[25]this Theory is Based on the Idea That Sustained Economic Growth Creates an Environment Favorable to Credit Expansion, Because Financial Institutions Are More Inclined to Lend in Periods of Economic Prosperity, When Risks Are Perceived to Be Lower.[26] According to This Theory, General Economic Growth Promotes the Increase of Credit in Specific Sectors, Particularly Agriculture.[27]in Times of Economic Growth, Agricultural Borrowers, Although Subject to External Risks Such as Climatic

Conditions, Benefit From a Better Repayment Capacity Due to the Positive Economic Dynamics.[28]financial Institutions Are Also More Willing to Lend When the Economy is Growing, as They Anticipate Higher Returns and a Stable Environment.[29]empirical Work Shows That Increases in Gdp Are Generally Correlated With Increases in Agricultural Lending, as Shown[28] and Other Studies on the Impact of Economic Growth on the Agricultural Sector[28]and[30]this Research Supports the Idea That Economic Growth Stimulates Access to Credit by Creating a More Investment-friendly Environment.[31]in the Case of the Eac, Economic Growth Could Potentially Increase Access to Agricultural Credit, as a Favorable Economic Environment Would Allow Financial Institutions to Relax Lending Conditions and Invest More in the Agricultural Sector, Which is Crucial for the Region.

2.2 Empirical Review

Several Studies Stipulate That There is a Relationship Between Prudential Measures and Monetary Policy on Agricultural Credits. Thus,[32], Confirm That an Increase in Prudential Measures and Monetary Policies Leads to a Decrease. In Addition, Political Instability Reduces Agricultural Credits. This Has Been Confirmed by Studies by [33] but contradicted by [34], This Assumes That in Some Resilient Economies, maintaining a Political Guarantee Keeps Agricultural Lending High.

For the Rest, an Improvement in Gdp Implies an Increase in Agricultural Credits, Which Confirms the Results of [28], [35],[31],[36],[37],[38],[39],[40], and [41]. However, These Results Are Nuanced by the Conclusions of [42]and [43].

A Positive Change in Atms and Bank Branches Restricts Agricultural Lending, respectively. This Situation is Explained by Increasing Competition and a Credit Supply More Oriented Towards Loans in Urban Areas. These Results Were Confirmed by [28],[44], and Other Studies Cited. These Results Suggest the Need for a Balance Between Prudential Measures of Banks and Facilitation of Agricultural Lending, Especially in Rural Areas.

3. Methodology

The Methodological Approach is Based on a Panel Model, but Adapted to the Eac. Secondary Data Are Drawn from the National Banks of Each Member Country and the World Bank. The Analysis Uses the Us Dollar as the Monetary Unit. Each National Currency is Converted at the Real Exchange Rate. The Period is 1990 to 2020. The Dependent Variable is the Agricultural Loan Portfolio.

3.1 Estimation of Models

At This Stage, We Have Presented, in the Current Context of the Congolese, Burundian and Rwandan Economies, the Specification of a Model for Agricultural Loans for the Drc, Burundi and Rwanda as Follows:

$$Y_{mbt=\alpha_0} + \alpha_1 MP_t + \alpha_2 PRU_t + \alpha_3 TRAB_{bt} + \alpha_4 I_t + \alpha_5 BFE_{bt} + \alpha_6 NGF_t + \alpha_7 OCE_{bt} + \alpha_8 IR_{bt} + \alpha_9 ATM_{bt} + \alpha_{10} CBB_{bt} + \alpha_{11} QI_t + \alpha_{12} PS_t + U_t$$

Or:

- Ymbt = Bank's Agricultural Portfolio
- Mp = Monetary Policy
- Pru = Prudential Policy
- Trab = Total Real Assets of Banks

-      Fng = National and Global Factors
-      Bfe = Bank Fixed Effects
-      Oce = Other Receivables on the Economy
-      Ir = Interest Rate
-      Atm = Bank Atms Per 100,000 Adults
-      Cbb = Commercial Bank Branches Per 100,000 Adults
-      Iq = Quality of Institutions
-      Ps = Political Stability
-      U = Error Term.
-      the Estimation Will Be Carried Out by Fixed and Random Effects Regressions Modeling the Variations Specific to Each Country and Each Bank.

-      the Hausman Test Will Be Used to Determine Which of the Fixed or Random Effects is Most Appropriate for the Available Data.

3.2 Coefficients

- Monetary Policy Coefficients. Interpretation of the Coefficients: Examining the Influence of Monetary Policies on Agricultural Lending. A Positive Coefficient Indicates That Expansionary Monetary Policies Increase the Supply of Credit.
- Prudential Measures Coefficients (Pru): Assessment of the Effect of Prudential Measures on the Stability and Availability of Loans. A Negative Coefficient Could Indicate That Stricter Regulations Reduce Access to Credit.
- Fixed-effects and Random-effects Models to Distinguish Between-country and Within-country Variations.
- Hausman Tests, to Determine Whether Fixed or Random Effects Are Most Appropriate.

4. Results
Table 1. Descriptive Statistics Burundi, Drc and Rwanda, Tanzania, Kenya and Uganda

	Mean	Maximum	Minimum	SD	J. Bera	Prob.	Observations
LNYBT	15.81	21.33	6.97	4.03	31.11	0	186
LNMP	17.28	27.65	2.14	6.68	49.52	0	186
LNPRU	21.15	24.56	15.94	1.55	2.82	0.24	186
LNXBT	15.13	27.67	0.49	8.05	14.01	0	186
LNZT	19.77	24.64	14.74	2.85	13.78	0	186
LNFB	186.7	23773.13	27.03	1778.86	216308.6	0	186
LNCESP	14.03	27.83	4.82	5.04	0.27	0.88	186
LNINTE	6.74	29.58	16.68	7.98	18.45	0	186
LNGAB	0.36	2.27	3.22	1.19	8.6	0.01	186
LNSUCBA	0.61	1.84	3.58	0.89	41	0	186
LNQUALIN	1	1.53	0	0.27	42.79	0	186
LNPROSTA	4.32	18.73	4.24	4.75	14.75	0	186

Source: Data Computed Bank from the Bcc, Bnr, Brb, Bot, Cbk, Bou and Wb Data Reports.

The Results in the Table Indicate Significant Variability Among the Different Variables Across All 186 Observations, Which Has Important Implications for Policies and Practices in the Agricultural Financial Sector. For Example, Lnybt, Representing Total Agricultural Loans, displays a Mean of 15.81 With Moderate Dispersion (Standard Deviation of 4.03) but a Non-normal Distribution (Jb = 31.11, P = 0), Suggesting the Presence of Outliers or Marked Asymmetries. Similarly, Lnmp Displays High Dispersion (Standard Deviation of 6.68) and a Non-normal Distribution (Jb = 49.52), Indicating Significant Contextual Disparities. In

Contrast, Lnpru Displays Low Variation (Standard Deviation of 1.55) and a Normal Distribution (Jb = 2.82, P = 0.24), Which Favors Econometric Analysis for This Measure. Several Other Variables, Such as Lnxbt, Lnzt, Lnfb, Lntinte, Lngab, Lnsucba, Lnqualin, and Lnprosta, Show Varied Standard Deviations and, for the Most Part, Significant Non-normality, Indicating Disparities Between Institutions and National Contexts. These Findings Imply That Subsequent Analyses Should Use Robust Econometric Techniques or Data Transformations to Mitigate the Impact of Extreme Values and Ensure Reliable Results, Thus Allowing Agricultural Credit Support Policies to Be Adapted to the Heterogeneous Realities of the Sector.

Table 2. Model Estimation

	BUR	DRC	RWA	Tanzania	Kenya	Uganda
Variable	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**
C	19.91	-21.45	-25.11	8.22	-1.43	-25.39
Monetary Policy (PM)	-1.60	0.02	-12.25	-0.67***	-2.26	3.47***
Prudential policies (PRUt)	-0.52***	0.18	1.88**	-0.31***	2.97	-0.69
Total real assets of banks (TARB)	1.91	0.27***	14.59	-0.14**	0.02	-0.21
National and global factors (NGFt)	-0.46	1.45***	1.13	-0.08	0.70	-0.95
Bank fixed effects (BFEt)	-0.02	0.00	0.04	-0.28***	0.16	-0.08
Interest rate (IRt)	-0.01	-0.01	-0.06	-0.07**	0.67**	0.51
Automated teller machine (ATM) for 100,000 adults	0.53	-0.33	-0.13	**0.10**	**0.94****	**-0.24***
Commercial bank branches per 100,000 adults (CBBt)	-0.73	0.82	2.38	-0.07	0.10	0.03
Quality of institutions (QIt)	-3.01**	-	12.12	0.31	-0.16	2.43**
Political Stability	0.01	0.03	0.24	-0.08***	-0.03	0.17
R-squared	0.55	0.78	0.72	0.99	0.89	0.84
Adjusted R-squared	0.32	0.68	0.58	0.99	0.83	0.76
SE of regression	O.60	0.56	2.27	0.08	0.67	0.97
Logarithmic probability	-21.20	-19.99	-62.60			
F-statistics	2.40	8.10	5.10	592.66***	14.95***	9.71***
Durbin-Watson statistic	0.95	1.48	1.49	1.9	1.68	1.58

Source: Data Calculated from the Bcc, Bnr, Brb and Bm Reports. * * *: Significant at 99%, **: Significant at 95% and *: Significant at 90%.

Burundi
Yatb = 19.91 – 0.52 Pru -3.01qi (1).

According to Equation (1) From Table 3.2, if All Other Variables Remain Constant, a One-unit Increase in Prudential Policy (Pru) Leads to a 0.52% Decrease in Agricultural Lending, and a One-unit Increase in Institutional Quality (Qi) Leads to a 3.01% Decrease in Agricultural Lending.

Drc
Yatd= -21.45 + 0.27 Trab + 1.45 Bfe (2).

From Equation (2) in Table 3.2, Holding Other Variables Constant, a One-unit Increase in Total Real Bank Assets (Trab) Leads to a 0.27% Increase in Agricultural Loans, and a One-unit Increase in Bank Fixed Effects (Bfe) Leads to a 1.45% Increase in Agricultural Loans.

Rwanda
Yatr= -25.11 + 1.88 Pru (3).

According to Equation (3), Subtracted from Table 3.2, if All Other Variables Remain Constant, a One-unit Increase in Prudential Policy (Pru) Leads to a 1.88% Increase in Agricultural Loans.

According to the Results in Table 3.2, if All Other Variables Remain Constant, in Burundi, a One-unit Increase in Prudential Policy (Pru) Leads to a 0.52% Decrease in Agricultural Loans, and a One-unit Increase in Institutional Quality (Qi) Leads to a 3.01% Decrease in Agricultural Loans.

In the Democratic Republic of Congo (Drc), a One-unit Increase in Total Real Bank Assets (Trab) Leads to a 0.27% Increase in Agricultural Loans, and a One-unit Increase in Bank Fixed Effects (Bfe) Leads to a 1.45% Increase in Agricultural Loans.

In Rwanda, a One-unit Increase in Prudential Policy (Pru) Results in a 1.88% Increase in Agricultural Loans.

Tanzania
Yabt =8.22 - 0.67 Mp - 0.31 Pru - 0.14trab - 0.28 Fng - 0.07 Ir - 0.08ps (4)

Equation (4) Constructed from Table 4.2 States That a One-unit Increase in Monetary Policy (Mp) Decreases Agricultural Lending by 0.67%. A One-unit Increase in Prudential Measures (Pru) Leads to a Decrease of 0.31%. A One-unit Increase in Total Real Assets of Banks (Trab) Reduces Agricultural Lending by 0.14%. A One-unit Increase in Bank Fixed Effects (Bfe) Leads to a Decrease of 0.28%. A 1-unit Increase in the Interest Rate (Ti) Reduces Agricultural Lending by 0.07%. Finally, a 1-unit Increase in Political Stability (Sp) Decreases Agricultural Lending by 0.08%.

Kenya
Yabt = -1.43 + 0.67 Ir + 0.94 Atm (5)

Equation (5) Constructed on the Basis of Table 4.2, Shows That a One-unit Increase in the Interest Rate (Ir) Increases Agricultural Loans by 0.67%. A One-unit Increase in Automated Teller Machines (Atms) Results in a 0.94% Increase in Agricultural Loans.

Uganda
Yabt = -25.39+ 3.47 Mp - 0.24 Atm + 2.43 Iq (6)

Table 4.2, Outputting Equation (20), Shows That in Tanzania, Monetary Policy (Mp) Has a Negative Effect on Agricultural Loans, Reducing Them by 0.67% for Every One-unit Increase. Similarly, Prudential Measures (Pru) Decrease Agricultural Loans by 0.31%, and Total Real Assets of Banks (Trab) Leads to a 0.14% Reduction in Agricultural Loans. Bank Fixed Effects (Bfe) Also Negatively Impact Agricultural Loans, With a Decrease of 0.28%. Interest Rate (Ir) Contributes to a 0.07% Decrease in Agricultural Loans, and Political Stability (Sp) Decreases Agricultural Loans by 0.08%.

In Kenya, the Results Show That the Interest Rate (Ir) Has a Positive Effect, Increasing Agricultural Loans by 0.67% for Every One-unit Increase. Furthermore, the Number of Automated Teller Machines (Atms) Also Has a Positive Effect on Agricultural Loans, Increasing Them by 0.94%.

In Uganda, Monetary Policy (Mp) Has a Positive Impact on Agricultural Lending, Increasing It by 3.47% for Each Additional Unit. Institutional Quality (Iq) Improves Agricultural Lending by 2.43%, While the Number of Automated Teller Machines (Atms) Exerts Negative Pressure, Reducing Agricultural Lending by 0.24%.

In Summary, the Results Reveal That Prudential Measures Have a Significant Impact on Agricultural Lending in Rwanda and Burundi, while in the Democratic Republic of Congo (Drc), These Measures Showed No Significant Effect on Agricultural Credit. Moreover, Monetary Policy Does Not Appear to Have a Direct and Significant Relationship with Agricultural Lending in the Three Countries Studied.

In Summary, the Results Reveal Contrasting Effects of Monetary Policy and Prudential Measures on Agricultural Lending in the Three Countries Studied. In Tanzania, Both Monetary Policy and Prudential Measures Have a Negative Effect on Agricultural Lending. In Kenya, Prudential Measures Have No Significant Impact, and Monetary Policy Does Not Show a Direct Relationship with Agricultural Credit. In Uganda, Monetary Policy Has a Positive and Significant Effect on Agricultural Lending, While Prudential Measures Did Not Show a Significant Effect. In Sum, the Effects of Monetary Policy and Prudential Measures Vary Across Countries.

The Results Reveal Notable Disparities in the Impact of Monetary and Prudential Policies on Agricultural Lending Across Countries in the Region Studied, Suggesting the Need for a Differentiated Approach to Economic Policy. In Burundi, the Negative Effect of Prudential Measures and Institutional Quality on Agricultural Lending Reveals Regulatory and Institutional Constraints That May Hamper Financing of the Agricultural Sector. These Results Call for Prudential Reform and an Improvement in the Institutional Climate to Facilitate Access to Credit. In the Drc, the Positive Effects of Banks' Real Assets and Banking Structure Suggest That Strengthening Bank Capacity Could Boost Agricultural Lending. In Rwanda, Prudential Measures Have a Positive Effect, Which Could Reflect Better Risk Management and Increased Confidence in the Banking System, Thus Calling for the Strengthening of Supervisory Mechanisms. In Tanzania, the Widespread Negative Effects of the Main Variables Indicate That Macroeconomic and Regulatory Conditions Are Not Favorable to Agricultural Financing, requiring a Revision of Monetary and Prudential Policies to Support This Sector. In Kenya, the Results Show That Improving Access to Banking Services Through Atms and an Appropriate Interest Rate Policy Can Promote Agricultural Credit, Highlighting the Importance of Financial Inclusion. Finally, in Uganda, the Positive Impact of Monetary Policy and Institutional Quality on Agricultural Credit Suggests the Effectiveness of Economic and Institutional Reforms in That Country, While the Reduction in Credit Due to the Increase in Atms Indicates a Possible Shift of Agricultural Customers Towards Other Forms of Financing or an Inadequacy of the Products Offered. These Results Call on Policymakers to Adapt Prudential and Monetary Frameworks According to National Specificities, While Promoting a Stable Institutional Environment, Accessible Financial Infrastructure, and Products Adapted to the Needs of the Agricultural Sector.

Table 3. Agricultural Credit Panel for All Countries (Burundi, Drc, Rwanda, Tanzania, Kenya and Uganda)

Variables	Pooled least squares	Fixed effects	Random effects
C	-6.16	-12.32	9.61
Monetary Policy (MPt)	0.27***	0.15	0.02
Prudential policies (PRUt)	1.35***	0.19	0.43*
Total real assets of banks (TRAt)	-0.27***	0.11*	0.01
National and global Factors (NGF)	-0.21*	1.05***	-0.19
Bank fixed effects (BFEt)	9.28	-,83	1.28
Other claims on the economy (ACEt)	-0.21***	-0.09	-0.04
Interest rate (IRt)	0.04*	0.00	0.02
ATMs of Banks for 100,000 adults (ATMt)	0.37*	0.46**	0.17
Commercial bank branches per 100,000 adults (CBBt)	-0.06	0.00	0.17
Quality of institutions (QIt)	0.20	0.11	0.92
Political stability (PSt)	-0.12*	-0.02	-0.13*
R-squared	0.79	0.86	0.43
Adjusted R-squared	0.78	0.84	0.27
SE of regression	1.87	1.57	1.70
Sum squared residence	605.33	418.69	417.27
Log likelihood	-373.67	-339.38	
F-statistic	62.68***	65.22***	2.75***
Mean dependent var	15.80	15.80	15.80
SD dependent var	4.02	4.03	2.00
Akaike Info Criterion	4.15	3.83	
Black Criterion	4.35	4.12	
Hannan-Quinn criter.	4.23	3.95	
Durbin-Watson stat	0.72	0.55	0.49
Hausman test			1,000

Source: Data Calculated from the Bcc, Bnr, Brb and Bm Reports. * * *: Significant at 99%, **: Significant at 95% and *: Significant at 90%.

The Results Presented in Table 3 Reveal the Results of Three Approaches or Methods: Pooled Least Squares, Fixed Effects and Randomness.

Table 5.6 Shows the Equation for the Grouped Least Squares Method as Follows:

Yabt = -6.16 + 0.27 Mp + 1.35 Pru – 0.27 Trab – 0.21 Ngf – 0.21 Oce + 0.04 Ir + 0.37 Atm – 0.12 Ps (7)

From This Equation (25) It Appears That Monetary Policy (B=0.27; P<1%), Prudential Measures (B=1.35; P<1%), Interest Rate (B=0.04; P<10%), and Atms Per 100,000 Adults (B=0.37; P<10%) Positively Influence Agricultural Loans. Conversely, Variables Such as Total Real Assets of Banks (B=-0.27; P<1%), Domestic and Global Factors (Gdp) (B=-0.21; P<10%), Other Claims on the Economy (B=-0.21; P<1%), and Political Stability (B=-0.12; P<1%) Negatively Affect Agricultural Loans.

Table 5.6 Presents the Results of the Fixed Effects Method in Equation (7) as Follows:

Yabt = -12.32 +0.11trab +1.05 Ngf +0.46atm (8)

It is Evident from Equation (26) That Total Bank Assets (B=0.11; P<10%), Domestic and Global Factors (Gdp) (B= 1.05; P<1%), and Atms Per 100,000 Adults (B=0.46; P<5%) Have a Positive Impact on Agricultural Loans. Furthermore, it is Noted That if All Other Factors Remain Constant, Other Variables Do Not Affect Agricultural Loans. Furthermore, Table 5.6 Shows the Results of the Random Effects Method,

Yabt = 9.61 + 0.43 Pru – 0.13ps (9)

Equation (27) Indicates That Prudential Measures (B=0.43; P<10%) Are Positively Associated with Agricultural Lending, While Only Political Stability (B=-0.13; P<10%) is Negatively Associated with Agricultural Lending.

To Choose Between the Pooled Least Squares (Pls) Model and the Fixed Effects Model (Fem), the Chow Test Was Used, With the Null Hypothesis (Ho) Indicating That the Pooled Least Squares (Pls) Model Was Appropriate, and the Alternative Hypothesis (Ha) Suggesting That the Fixed Effects Model (Fem) Was Appropriate. Given That the P-value of the F-test Was 0.03 ≤ 0.05 and the P-value of the Chi-square Was 0.015 ≤ 0.05; the Appropriate Choice Was the Fixed Effects Model.

Furthermore, the Decision Between Fixed Effects (Fe) and Random Effects (Re) Models Was Made Using the Hausman Test. In This Case, the P-value Was 1 > 0.05; Indicating That the Null Hypothesis Could Not Be Rejected, and Therefore the Choice Was Made for Random Effects (Re), Which Indicates Greater Efficiency.

The Results of the Analysis Reveal Significant Implications for Public Policy Formulation and Banking Practices in Agricultural Support. On the One Hand, Monetary Policy, Prudential Measures, and Accessibility to Atms Appear to Be Effective Levers for Promoting the Expansion of Agricultural Lending, Suggesting That Monetary Authorities and Regulators Should Maintain an Incentive and Stable Framework to Encourage Agricultural Financing. On the Other Hand, the Negative Impact of Political Stability, Banking Assets, and Other Claims on the Economy Highlights the Vulnerabilities of the Agricultural Sector in the Face of Institutional Uncertainties and Credit Allocation Choices. The Variation in Results Across Methods (Pls, Fem, Re) Also Highlights the Importance of a Rigorous Methodological Choice to Ensure the Robustness of the Recommendations. The Use of the Random Effects Model, validated by the Hausman Test, Indicates That Unobserved Specific Differences Between Countries or Periods Did Not Bias the Estimates, Reinforcing the Credibility of the Conclusions. These Findings Call for Strengthening Institutional Stability and Better Targeting of Financial Resources Towards Priority Agricultural Sectors.

3. Discussion of Results

The R² (0.43) and Adjusted R² (0.27) Values Indicate That the Independent Variables Explain Approximately 27% of the Variance in Agricultural Loans. This Level of Variation Suggests That a Significant Part of the Behavior of Agricultural Credit Depends on Other Contextual or Structural Factors, Often Not Captured in Standard Macroeconomic Models. Regarding the Impact of Prudential Measures, a 1% Increase Leads to a -1.67% Decrease in Agricultural Loans. This Negative Relationship is Consistent with the Theory of Financial Regulation, According to Which Stricter Capital Requirements and Liquidity Standards Can Restrict the Supply of Credit.[45][46] this Observation is Supported by the Work of [47], and Confirmed by Those of [48], Which Indicate That Basel Iii Standards May Limit the Ability of Banks to

Finance Sectors Perceived as Risky. However, it is Contradicted by [49], and by Jayati Et Al. (2020), Who Argue That Well-designed Regulations Can Strengthen Trust in the Banking System, Improving Access to Credit in the Long Run. In East Africa, This Tension is Manifested by the Emergence of Alternative Models Aimed at Circumventing These Constraints: Agricultural Microleasing, Inventory-based Financing (Warrantage), and Integrated Value Chain Financing [50][51][52] these Mechanisms Offer Specific Responses to the Limits of Traditional Bank Financing and Could Explain Certain Local Variations Not Captured in Our Model.

Regarding Political Stability, a 1% Deterioration is Associated With a 0.13% Decline in Agricultural Loans. This Negative Relationship is Supported by Studies by [53, 54], and by That of [55], Which Show That Political Uncertainty Discourages Long-term Investments in Vulnerable Sectors Such as Agriculture. However, in Strengthened Institutional Contexts, Some Economies Can Maintain High Credit Volumes Thanks to Compensatory Mechanisms: State Guarantees, Agricultural Development Banks or Stabilization Funds [56][57], as Shown [58] [59]. Furthermore, the Results Indicate That a 1% Increase in Gdp (National and Global Macroeconomic Factors) Leads to a 1.38 Increase in Agricultural Credit. This Positive Correlation is Consistent with the Logic of Endogenous Growth Theory, According to Which Economic Expansion Supports Demand and Debt Capacity in All Sectors (Barro, 1991; Romer, 1994). This Relationship is Consistent With the Work of De[28],[60],[61],[62],[63],[64],[65],[66],[28],[32],[33],[34],[35],[31],[36],[37],[38],[39],[40], and[41], Who Emphasize That Economic Growth Promotes Agricultural Profitability and Attracts More Financing. However,[67] and [68] Note That in Some Cases Economic Growth is Concentrated in Non-agricultural Sectors, Thus Limiting Its Spillover Effect on Rural Credit.

The Results Also Reveal a Surprising Negative Effect of Banking Infrastructure: a 1% Increase in the Number of Atms (-0.93) and Commercial Bank Branches (-0.40) Per 100,000 Adults Leads to a Decrease in Agricultural Credit. This Relationship Can Be Interpreted by an Urbanization of Banking Supply, Where New Infrastructure Does Not Necessarily Target Rural Agricultural Areas, and by Increased Interbank Competition That Pushes Banks to Focus on More Profitable Segments. These Results Are Consistent with the Work of [28],[44],[69],[70],[71],[72],[73], [74],[75]and [76], but contradicted by [77], Which Argues That Expanding the Banking Network Can Improve Rural Financial Inclusion if Accompanied by Suitable Products.

Finally, Several Recent Studies on East Africa Confirm the Relevance of Alternative Models Adapted to the Realities of Agricultural Financing in This Region.[50] Documents the Use of Agricultural Leasing and Input Financing in Kenya and Uganda While [51] shows the Effectiveness of Group Lending in Reducing Default Risk in Rwanda. In the Same Reasoning [78] assesses the Role of Digital and Mobile Financing in Agricultural Credit in Tanzania and the [52] Describes the Development of Integrated Agricultural Value Chain Financing in East Africa, Particularly for High-value Crops. Integrating These Approaches into Public Policies and Financial Institutions' Strategies Could Explain Some of the Observed Variations and Provide an Avenue for Strengthening Access to Agricultural Credit in Contexts Where Traditional Banking Models Remain Limited.

5. Conclusion

This Study Aimed to Examine How Prudential Policies and Monetary Policy Affect Agricultural Loans in the Member Countries of the East African Community (Eac). It Used a Panel Data Analysis Over Several Decades. Three Econometric Approaches Were Applied: Pooled Least Squares, Fixed Effects, and Random Effects. The Hausman Test Confirmed That the Random Effects Model Was the Most Appropriate.

The Results from the Chosen Model Show That Prudential Policies Have a Positive and Significant Effect on Agricultural Loans. This Suggests That Stronger Banking Supervision Improves Access to Agricultural Credit. In Contrast, Monetary Policy Does Not Show a Significant Effect. Its Influence on Agricultural Loans Appears Limited. Political Stability Has a Negative Impact on Agricultural Credit. This Highlights the Importance of a Stable Institutional Environment.

Access to Banking Services, measured by the Number of Atms, has a Favorable Effect. It Supports the Development of Agricultural Credit. Other Variables, Such as Other Claims on the Economy or Some Global Factors, Have a Negative Effect. These Results Confirm the Complexity of the Determinants of Agricultural Credit.

However, This Study Has Certain Limitations That Should Be Acknowledged. First, the Data Used Are Not Disaggregated According to National Specificities, Which May Mask Dynamics Specific to Each Country Studied. In Addition, the Absence of Recent Sectoral Variables, Particularly Those Related to Agricultural or Financial Reforms, Could Limit the Explanatory Scope of the Model. The Study Also Does Not Take into Account the Differentiated Effects According to the Types of Agricultural Actors (Smallholders, Cooperatives, Agribusinesses, Etc.), Which Could Influence the Understanding of Credit Distribution Mechanisms. These Limitations May Have Influenced the Results, Notably by Reducing the Ability to Capture Important Contextual Effects or to Identify Specific Barriers to Access to Credit in Certain Agricultural Segments.

For Future Research, Several Avenues Can Be Considered to Strengthen the Robustness and Relevance of the Analyses. It Would Be Relevant to Integrate More Disaggregated Data, Taking into Account the Specific Characteristics of the Countries, Sectors, and Actors Involved. The Introduction of Qualitative Variables from Interviews or Field Surveys with Lenders and Borrowers Would Allow for a Deeper Understanding of Behaviors and Perceptions Surrounding Agricultural Credit. A Comparative Approach Including Other Developing Regions (for Example, South Asia or Latin America) Would Also Offer a Broader and More Enriching Analytical Framework. Finally, a More Detailed Analysis of Banking Infrastructure, Including, for Example, the Density of Branches, Mobile Services, or Coverage in Rural Areas, Would Provide Additional Elements for Assessing the Barriers and Levers to Access to Agricultural Finance.

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