



INFLUENCE OF CO-OPERATIVE CHARACTERISTICS ON FINANCIAL PERFORMANCE OF IRISH POTATO FARMER CO-OPERATIVES IN NORTHERN AND WESTERN PROVINCE RWANDA

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ABSTRACT

Purpose - The purpose of this paper is to examine the influence of co-operative characteristics on the financial performance of Irish Potato Farmer Co-operatives (IPFCs) in Northern and Western Provinces, of Rwanda.

Design/Methodology/Approach - The study employed a relational research design in cross-sectional research. A purposive sampling technique was used in selecting 32 IPFCs out of 64 observations that complied with audited financial reports for the period 2018 and 2019 were the primary data used for the research. Key Informants Interviews (KIIs), and Focus Group Discussions (FGDs) were employed for data collection. Panel regression analysis was used as it is suitable to deal with fixed effects (FE) or random effects (RE) error components presented in the model.

Findings - The paper results showed that liquidity, leverage, the number of employees, the value of total assets and the value of share capital are significant factors that contribute to financial performance measured in terms of Return on Assets (ROA) and Return on Equity (ROE). The paper also revealed a limited financial capacity for most IPFCs in the study area, challenging their growth.

Research Limitation: Legal, political factors, technological and cultural factors influencing the performance of farmer co-operatives were not considered in this paper.

Practical Implications - The recommendations will mainly assist IPFCs in achieving desired financial performance and provision of expected services to members. IPFCs are recommended to mobilise their members to increase their shareholding, to raise capital for their co-operatives and thus improve performance levels.

Social Implication: This paper generates facts to inform stakeholders such as policymakers and non-governmental organizations.

Originality/Value - This paper took a holistic perspective to cover all the co-operative-specific characteristics in the performance evaluation.

Keywords: *Co-operatives. farmer. financial performance. irish potato. Rwanda.*



INTRODUCTION

Farmer co-operatives are the main pillars in facilitating the social and economic development of most countries globally (Sunghye & Sang-ho, 2020) and play an essential economic role in agricultural markets (Franken & Cook, 2015; Verhofstadt & Maertens, 2014). The substantial role of farmer co-operatives sparks intense curiosity about their financial performance. In response to the increasing number of co-operatives and their contribution to the economy, farmer co-operatives must be stable in financial performance for long-term survival (Zelhuda, Abdul, Suraya & Md Faruk, 2017). Unless the financial performance of co-operatives is healthy, it may be difficult for co-operative societies to sufficiently serve their members and contribute to national economic development (Tekeste, Muthyalu, & Azmera, 2014). Return on Assets (ROA) and Return on Equity (ROE) were reported by different researchers as the most popular value-based measures for the financial performance of agricultural co-operatives (Zelhuda *et al.*, 2017; Taiwo and Adeniran, 2014) and are frequently used by financial analysts who perceive that the higher return on equity and assets, the better the financial performance (Rosikah, DK, DA, MI & Rohansyah, 2018).

In Rwanda, agriculture is the dominant sector of the economy, contributing a third of the country's GDP and about half of Rwanda's export earnings (NISR, 2017). The expansion of the agricultural sector was specifically done through farming intensification and creating solid agricultural co-operatives (Meador & O'Brien, 2019). The Government views co-operatives as an essential vehicle to improve the agriculture sector, and the number of agricultural co-operatives in the country has increased very rapidly (USAID, 2013). In 2018, Rwanda had approximately 8995 registered co-operatives, of which agricultural co-operatives cover 27.0%. Among 566200 members of non-financial co-operatives, 52.6% belong to agricultural co-operatives (RCA, 2018). The Government of Rwanda has thus established a conducive environment for co-operatives to operate, and this includes laws on co-operative activities, and regulations guiding various governance bodies and entities of the co-operative movement based on hierarchical dependence (MINICOM, 2018). The Government also supports co-operatives in value chain development, research, and extension (ILO, 2017).

Furthermore, the GoR has launched a Crop Intensification Program (CIP) to increase national agricultural productivity and food security. Due to their contribution to the gross agricultural production, Irish potatoes were prioritised as one of the most important crops falling under the crop intensification program (FAO, 2016). Production of Irish potatoes covers 40.6% of the gross agricultural production value and 28.7% of the total cultivated area (NISR, 2016).

Despite various interventions by GoR to strengthen co-operatives, limited financial resources and financial dependence were revealed as significant challenges and constraints for developing co-operatives in Rwanda (MINICOM, 2018). These challenges, therefore, constitute one of the major concerns for cooperatives to provide the expected services to their members (Kanamugire, 2017; FAO 2015).



Many factors influence the financial performance of co-operatives, including leverage, co-operative size and liquidity (Haat, Hassan, Rashidah & Sakthi, 2008), uncertainty, growth and capital intensity (Singh, Misra, Kumar, & Tiwari, 2019). Zelhuda *et al.* (2017) have reported the current ratio, leverage, net fixed asset turnover, investment, dividend, and co-operative size as factors contributing to the financial performance of agricultural co-operatives. The number of board of commissioners, and co-operative age are also other factors that affect financial performance (Lee, 2014). Several studies about agricultural cooperatives report more on their financial failure than their success (Beranová & Basovnicková, 2014). In Europe, some co-operatives experience financial problems such as equity, credit and lack of capital (Ozalp, 2019; Pokharel *et al.*, 2019), while others report stable and satisfactory financial autonomy (Rebello *et al.*, 2017). In developing countries, co-operatives' performance has proven to be largely poor (Masuku *et al.*, 2016). Generally, results from both developed and developing countries were inconclusive, hence creating a debate that compelled a paper to address the gap. There are also limited studies that have taken into account the co-operative non-financial characteristics in the performance evaluation. This has therefore necessitated a study to address the gap by analyzing Irish Potato Farmer Co-operatives, (IPFCs) different financial and non-financial characteristics that influence their performance. Specifically, the study sought to: (i) Examine the influence of co-operative size on the financial performance of IPFCs in Northern and Western Provinces (ii) Determine the influence of co-operative age on the financial performance of IPFCs in Northern and Western Provinces (iii) Examine the influence of leverage on the financial performance of IPFCs in Northern and Western Provinces (iv) Determine the influence of liquidity on the financial performance of IPFCs in Northern and Western Provinces (v) Examine the influence of the number of employees on the financial performance of IPFCs in Northern and Western Provinces (vi) Determine the influence of share capital on the financial performance of IPFCs in Northern and Western Provinces and (vii) Examine the influence of membership size on the financial performance of IPFCs in Northern and Western Provinces. The rest of the paper is organised into the theoretical and empirical framework, methodology, results and discussion, and finally, conclusion and recommendations.

THEORIES UNDERPINNING THE STUDY

Resource-Based Theory

The study was guided by Resource-Based Theory (RBT), which examines performance differences of organizations based on their resources (Peteraf & Barney, 2003). The theory explains how organizations maintain unique and sustainable positions in competitive environments (Hoopes *et al.*, 2003). RBT asserts that organizational resources are an essential factor influencing competitive advantage and performance (Othman *et al.*, 2015).

The central idea of RBT is that organizations compete against others based on their resources and capabilities (Barney, 1991; Wernerfelt, 1984). Resources include any tangible or intangible assets that are semi-permanently tied to the organization (Caves, 1980). Similar to previous studies that elaborate performance of co-operative using RBT (Machado *et al.*, 2017; Othman *et al.*, 2015), the theory was used in this study to explain the effect of co-operative specific



financial and non-financial characteristics, namely liquidity, leverage, co-operative size, age, membership size, number of employees and value of share capital on co-operative performance, unlike other theories of performance such as pecking order, trade-off, and signalling which restrict on capital structure. Based on RBT, organizations with adequate resources are expected to achieve desired performance and sustain competitive advantages. The theory was also used to determine which organizational resources contribute to a cooperative's sustainable competitive advantage.

Pecking Order Theory (POT)

To supplement the RBT, Pecking Order Theory (POT) developed by Myers and Majluf (1984) was also applied. The theory affirms that internal financing is preferred to external funding, which can only be used as the last option. Therefore, firms finance new investments by resorting to debt only when internal resources are insufficient (Murray & Goyal, 2003; Graham & Harvey, 2001; Myers, 2001). This theory implies that debt financing is suitable when internal cash flows are not enough to finance expenditures (Myers, 1984). POT relies upon the concept of asymmetric information between managers and investors that guides the former in their preferences for raising funds (Mateos-Ronco & Guzman, 2018). According to this theory, firms opt for funding from sources with the lowest degrees of asymmetric information (Cole, 2013). In farmer co-operatives, details of this theory differ considerably from what occurs in IOFs because co-operatives do not have access to outside equity. Therefore, when this option disappears from the pecking order theory, decisions are reduced to choosing between members' internal equity or bank loans. Thus, the pecking order theory suggests that farmer co-operatives can enhance their financial performance by using internal finance, with meagre cost as the priority. This theory was used to explain whether IPFCs in the study area can generate resources through their internal funding.

Theory of Co-operative

To supplement the RBT and POT, the theory of co-operative developed by students of co-operation, particularly Emelianoff (1942) and Philips (1953), and further propounded by Helmberger and Hoos (1962) was applied. The theory was applied to explain the co-operative financial performance from a co-operative point of view. Historians have found evidence of cooperation between many groups of people in Europe, Middle East, America and Africa (Thomas & Hangula, 2011). According to Zimbelman (2007), early agriculture would have been impossible without reciprocal aid among farmers.

The co-operative enterprise is conventionally held to be a non-profit institution guided by the principle of service at cost for the benefit of patrons (Helmberger & Hoos, 1962). However, unless the financial performance of co-operatives is healthy, it may be difficult for co-operative societies to sufficiently serve their members (Tekeste *et al.*, 2014). Several reasons have been offered for why co-operatives might seek to maximise profits. By achieving this objective, a co-operative will maximise funds available for patronage refunds or internal financing growth and



avoid hostility and retaliatory pricing by rival firms (Enke, 1945). The theory was applied to explain whether IPFCs in the study area are financially stable for long-term survival.

Empirical Review and Hypothesis Development

This study aims at testing the effect of co-operative characteristics, namely co-operative size, age, leverage, liquidity, number of employees, the value of share capital, and membership size on co-operative financial performance. Co-operative size is measured in terms of total assets a co-operative owns. Solano and Teruel (2007) reported that the size of a co-operative positively and significantly influences financial performance. Larger co-operatives are more efficient in utilizing their assets than smaller co-operatives; on the other side, smaller co-operatives are found to have higher profitability than larger ones (Singh *et al.*, 2019; Pokharel, 2016). Previous results suggest that large co-operatives may enjoy economies of scale in terms of efficiency, but the benefits of size do not necessarily translate into higher profitability (Singh *et al.*, 2019). Furthermore, the literature emphasizes that as co-operative size increases; the co-operative form of organizations becomes relatively less efficient because preferences become more heterogeneous among members (Hart & Moore, 1996). On the other hand, Loderer and Urs (2010) found that a company's age influences its financial performance. Muhammad and Diah (2017) stated that any co-operative established for a longer period would be more experienced and usually has excellent performance. Therefore, the foregoing discussion leads to the following hypotheses.

H₁: Co-operative size positively and significantly influences financial performance

H₂: Co-operative age positively and significantly influences financial performance

Debt financing is still the most common method co-operatives employ to acquire cash in times of need (Briggeman *et al.*, 2014). Previous studies reported that reliance on debt financing could positively or negatively affect the financial performance of both investor-owned firms and agriculture co-operatives. Boyd *et al.* (2007) find that higher leverage has a negative impact on ROE of agricultural co-operatives. Larger co-operatives have lower financial leverage as external financing involves higher costs and increases risk; if incomes decline in the future, so will performance (Singh *et al.*, 2019). Moreover, agricultural co-operatives have achieved a higher performance with lower leverage, and they are better prepared to face any future uncertainty (Lerman & Parliament, 1991). According to Muhammad and Diah (2017), a higher rate of debt results in high financial risk, reducing the ROA. On the contrary, when debt is low, the financial risk is also low, leading to increased financial performance (Peni, 2011). The research conducted by Liargovas and Skandalis (2010) showed a correlation between leverage and financial performance. Majumdar and Chhibber (1999) have also found a negative relationship between financial performance and firm leverage. The above discussion leads to the following hypothesis.

H₃: Leverage has a negative and significant influence on financial performance



Liquidity shows the ability of the business to discharge its current liabilities and is measured in terms of the Current Ratio (CR). According to Pandey (2010), the industry standard for the current ratio is 2:1. If the current ratio is higher, the firm's ability to meet its current liabilities will be higher in terms of the margin of safety. Previous studies report an inverse relationship between liquidity and financial performance. Tailab (2014) study found a positive and significant effect of liquidity on financial performance. The findings of Matar *et al.* (2018), Audax (2018), and Matar and Eneizan (2018) revealed a positive relationship between liquidity and financial performance. However, Mirza (2013), and Demirgünes (2016) concluded that liquidity in terms of the current ratio has a statistically negative effect on financial performance. Furthermore, Rabirou, *et al.* (2013) report that the number of employees and the amount invested influence financial performance. A study by Odhiambo (2019) found that co-operative membership size affects financial performance. The above discussion leads to the following hypotheses.

H₄: Co-operative liquidity positively and significantly influences financial performance

H₅: Co-operative number of employees positively and significantly influences financial performance

H₆: Co-operative share capital positively and significantly influences financial performance

H₇: Co-operative membership size positively and significantly influences financial performance

METHODOLOGY

The study employed a relational research design in cross-sectional research as recommended by different scholars (Bryman, 2012). The study's target population was 76 IPFCs operating in the District of Burera and Musanze in the Northern Province and Nyabihu and Rubavu in the Western Province (NCCR, 2019). These areas were purposively selected given their predominance in Irish Potatoes farming compared to others. In addition, due to their climatic conditions, they are the most productive, accounting for about 90% of Rwanda's national Irish Potatoes production (NISR, 2017).

A purposive sampling technique was used in selecting IPFCs that comprise the study. Only co-operatives with audited financial reports were taken purposively to examine their financial performance (NCCR, 2019). Given the bookkeeping problem facing co-operatives in the area (FECOPPORWA, 2018), 32 co-operatives have managed to avail their audited financial statements for two years (2018 and 2019). This requirement was essential since most IPFCs in the area were not audited since their establishment, leaving 32 IPFCs out of 64 observations that complied with audited financial reports for the period 2018 and 2019 were the primary data source (NCCR, 2019). The small number of IPFCs in the area is explained by reforms undertaken by RCA, including merging the co-operatives to improve their performance (Nkurunziza, 2019). However, previous studies assessed the financial performance of co-operatives using a small number of observations (Singh *et al.*, 2019; Kagunda, 2018; Xaba *et al.*, 2018) and a period of two years (Dube & Ozkan, 2019; Xaba *et al.*, 2018.). Concerning qualitative data, Key Informants Interviews (KIIs), and Focus Group Discussions (FGDs) were employed for data collection. KIIs guide was applied to collect data from representatives of the



National Co-operative Confederation of Rwanda, the Irish Potato Federation, chairpersons of co-operative unions, Districts’ Co-operative Officers, Sector Executive Secretaries, and all co-operative managers. Concerning FGDs, two were conducted with board members and the Supervisory committee. Each FGD was composed of five board members of primary co-operatives and three members of the supervisory committee.

The study employed secondary panel data which had a cross-section unit and time element. Variables such as co-operative liquidity, leverage, age, size, membership size, number of employees, and value of share capital data obtained from audited financial reports for 2018 and 2019, and administrative documents were analyzed.

Panel regression analysis was used as it is suitable to deal with Fixed Effects (FE) or Random Effects (RE) error components presented in the model. Hausman test was used to assess which model is appropriate, FE model or RE (Hausman, 1978). This test is translated into the following hypotheses: H_0 : Random effect model is appropriate, H_a : Fixed effect model is appropriate. The results indicate $\chi^2=5.3$, p -value = 0.2703 for ROE and $\chi^2= 5.17$, p -value = 0.2047 for ROA, as p -values are greater than 0.05 (Alpha). As a result, RE model is appropriate for both financial performance measures at the significant level of 0.05, as recommended by (Torres-Reyna, 2007). Using panel data, the following model was employed to capture the relationship between cooperative-specific characteristics variables and financial performance (ROA and ROE).

$$ROA_{it}=\beta_0+\beta_1LIQ_{it}+\beta_2DEBT_{it}+\beta_3AGE_{it}+\beta_4SIZE_{it}+\beta_5Mem_{it}+\beta_6Emp_{it}+\beta_7SCAP_{it}+\varepsilon_{it} \text{-----} (1)$$

$$ROE_{it}=\beta_0+\beta_1LIQ_{it}+\beta_2DEBT_{it}+\beta_3AGE_{it}+\beta_4SIZE_{it}+\beta_5Mem_{it}+\beta_6Emp_{it}+\beta_7SCAP_{it}+\varepsilon_{it} \text{-----} (2)$$

Where ROA and ROE are the financial performance measures in terms of Return on Assets and Return on Equity respectively, β_0 is a constant, $\beta_1 - \beta_7$ are regression model parameters, LIQ is liquidity, DEBT is leverage, Age is the number of years from the date of establishment of IPFC, SIZE is the value of total assets in \$, Mem is the membership size of IPFC, Emp is the number of employees of IPFC, SCAP is the value of co-operative share capital in \$, ε stands for the error term, i and t denote co-operative and time respectively. To supplement and validate quantitative outcomes, qualitative data obtained from KIIs and FGDs were analysed using content analysis to provide sensible and meaningful results. In this case, the interview data were transcribed, sorted, and arranged. Subsequently, the information obtained was coded into different themes, which were further interpreted into meaningful information.

Table 1: Description of variables as specified in the panel regression analysis

Variable Category	Variable name	Symbol	Variable Description	Expected sign
IPFCs Characteristics (Financial and non-financial)	Current Ratio	LIQ	Current Assets/Current liabilities	+/-
	Leverage	DEBT	Total liabilities/Total assets	+/-
	Co-operative age	AGE	Number of years	-
	Co-operative size	SIZE	Total assets in \$	+/-
	Membership size	MEM	Number of co-operative members	-
	Number of employees	EMP	Number of employees	+
	Value of share capital	SCAP	The amount of share capital in \$	+



IPFCS	Financial	Return on Equity	ROE	Net profit/total equity
Performance		Return on Assets	ROA	Net profit/total assets

To deal with the possible problem of heteroskedasticity and serial correlation, the study uses robustness standard errors (Huber-White sandwich estimator) similar to previous studies (Avarmaa *et al.*, 2013). In addition, residual normality testing was carried out using Skewness and Kurtosis tests for normality as indicated in Appendix Table A2. This test has shown that the variables were not normally distributed. According to Risnawati *et al.* (2019), the robust method is used when data contain outliers and have an abnormal distribution that affects the parameter estimator. After robustness, Skewness and Kurtosis test in Appendix Table A3 has shown the probability of Skewness of 0.8139, meaning that Skewness is asymptotically normally distributed (p-value > 0.05). Similarly, Kurtosis of 0.1767 is also asymptotically normally distributed (p-value > 0.05). Hence, residuals show normal distribution.

RESULTS AND DISCUSSION

Co-operative Financial and Non-Financial Characteristics

Results in Appendix Table A4 indicate that 81.5% of IPFCs in 2018 and 65.62% in 2019 had share capital below \$5000. This shows how IPFCs in the area suffer a shortage of share capital which is a considerable challenge to their growth, competitive posture and improved performance. During a key informant interview, a co-operative manager provided the following reason: *"in our co-operatives, it is not possible to increase capital through members' shareholding because our district fixes a maximum amount under the pretext of reported mismanagement (Co-operative manager, 29th September 2019).* This practice constitutes a big challenge for cooperatives to uphold the principle of autonomy and independence. The preferred way for a co-operative to raise capital is to enable members willing and able to subscribe to additional capital shares without voting rights (ICA, 2015). Lack of sufficient capital will always lead to dependence on government and donors, thus stimulating the interference of local authorities in the co-operative management and administration.

The total assets which measure the size of IPFCs are less than \$20,000 for about 78.12% of IPFCs in 2018 and 34.37% in 2019. As the value of share capital owned by co-operatives is not enough to finance the assets, their size remains small. However, the value of total assets has increased comparing the years 2018 and 2019. As reported in Appendix Table A4, only 6.26% of IPFCs had total assets valued between \$40,000 and 60,000, while in 2019, the number increased to 40.62%. The current ratio ranges between 9.1 and 12.0 for 40.62% of IPFCs in 2018 and 43.75% in 2019. The current ratio above 1 for all co-operatives indicates their ability to cover short-term obligations. As shown in Appendix Table A4, co-operatives in the area are characterised by labour shortages. Results indicate that 84.38% of IPFCs in 2018 and 68.75% only had one employee executing all co-operative managerial and other activities. Results indicate that 84.38% of IPFCs in 2018 and 68.75% in 2019, respectively, had only one employee executing all co-operative managerial and other activities.



Summary statistics and correlation of variables

Table 2 reports the summary statistics of dependent and independent variables for IPFCs. As per the Table, the average ROA and ROE for IPFCs are 18.8% and 28.5%, respectively, which indicates that IPFCs in Northern and Western Provinces in Rwanda have positive and satisfactory returns. Values for what is considered good levels for ROA and ROE can vary depending upon the farm circumstances and who is evaluating the farm. Generally, a ROA ratio of around 5% or higher is considered good while an ROE of around 10% or higher is considered good (Gregory, 2018). However, positive ROA and ROE among co-operatives in the study area are explained by the lower SIZE in terms of total assets and share capital values than their net income. In Table 2, it is observed that the mean LIQ in terms of the current ratio is 6.989. A current ratio of 2:1 is considered normal for most businesses and an acceptable standard universally (Harris and Fulton, 1996). It implies that IPFCs are keeping high liquidity; this is simply because members perform most of the co-operative activities which minimise cash outflow. In addition, the Table reports a lower average DEBT (0.334) than the industry standard (with a mean value of 0.50) showing that most co-operatives use their internal finance, as reported by Dube (2019). In contrast to the pecking order theory which affirms that internal financing is preferred to external funding; most IPFCs do not choose to use only their internal finance because they are sufficient, though their size is too small to comply with loan requirements. The following caption from one of the board members in an FGD said: *“With a small capital, our co-operative cannot afford valuable non-current assets. Consequently, getting a bank loan is hard since we do not have collateral. As a result, improving our production will always be difficult”*. (Co-operative Board member, 30th September 2019).

IPFCs age has a mean of 3.719 from the date of establishment; the small number of years is explained by RCA's different reforms, including merging the co-operatives to improve their performance (Nkurunziza, 2019); some of IFCs existed before merging. The mean number of IPFCs members is 379 with 60 and 1400 minimum and maximum, respectively; this number is reasonable given the country's total number of agricultural co-operative members. As reported in the Table, the firm size measured in terms of total assets provides a mean value of \$31979.21, and a standard deviation of \$44033.96, which indicates a wide variance among all the IPFCs. Some of the IPFCs in the area do not even have buildings to accommodate their business activities. With a minimum of \$458.42 and a maximum of \$244750, some IPFCs are large enough to finance their business, whereas others are smaller and cannot afford to achieve the desired performance. The mean value of share capital of \$4171.813 indicates a big challenge for IPFCs' performance and growth.



Table 2: Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	64	0.188	0.189	0.01	0.88
ROE	64	0.285	0.237	0.01	1.21
LIQ	64	6.989	2.310	3.6	11.44
DEBT	64	0.334	0.204	0.06	0.750
AGE	64	3.719	1.061	2	9
Mem	64	379	326.745	60	1400
Emp	64	1.344	0.623	1	3
SIZE	64	31979.21	44033.96	458.42	244750
SCAP	64	4171.813	4880.619	390	28416

Prior to using the panel regression model, Pearson correlation coefficient for examining the association between independent and dependent variables was applied. As reported in Appendix Table A1, when ROA is considered a measure of performance, Pearson correlation indicates a positive and significant relationship between LIQ, DEBT and IPFCs performance. On the other side, ROA is negatively and significantly correlated with IFCs AGE and SIZE. LIQ and DEBT are also positively and significantly associated with ROE. The correlation matrix further tested the assumption of multicollinearity using the correlation matrix. As indicated, no multicollinearity problem exists since none of the variables correlates above 0.8 (Senaviratna and Cooray, 2019). Variance Inflation Factor (VIF) and Tolerance (1/VIF) were further used as diagnostic tests to ascertain whether there is any sign of multicollinearity among explanatory variables. When VIF is greater than 10 and 1/VIF is lower than 0.1, it implies poor estimates (Gujarati, 2004). As reported in Appendix Table A1, all VIF values are below 10, while all 1/VIF are greater than 0.1, indicating that multicollinearity among explanatory variables is not a major problem in the model.

Regression Results

This study applied regression analysis using data estimators to predict and estimate the effect of some explanatory variables on the dependent variables. The random effect model was used to analyse the impact of IPFCs' specific characteristics on their performance. Table 3 and 4 reports regression results which identified the factors that affect the financial performance of IPFCs measured in terms of ROA and ROE, respectively.

Results of the regression analysis in Table 3 indicate that the value of the overall R-square is 0.60, showing that all seven variables have described a 60% disparity in financial performance measured in terms of ROA. Among co-operative specific characteristics, only LIQ, SIZE, and SCAP significantly affected ROA. As revealed, IPFCs leverage measured by total liabilities to total assets (DEBT) that examine the ability of IPFCs to meet their long-term financial obligations showed that DEBT has an insignificant effect on ROA. This result supports the study by Singh *et al.* (2019) and Zelhuda *et al.* (2017), which reported that DEBT does not significantly influence ROA. This negative and not statistically significant relationship between DEBT and performance (ROA) supports Ferreira and Vilela (2004) arguments, saying that a higher rate of bankruptcy and default risk would arise due to leverage.

ISSN: 2408-7920

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On the contrary, the result showed that ROA is positively and significantly affected by liquidity (CR), showing that when IPFCs invest their liquid assets efficiently, high returns are generated. The results are consistent with Takon and Ogakwu (2013) studies that support a positive significant relationship between liquidity and ROA. Moreover, these results depict the reality given by Resource-Based Theory (RBT), that firms with higher liquidity ratios have better performance due to the availability of financial resources to conduct business operations.

The negative coefficient of co-operative SIZE indicates that financial performance (ROA) is negatively affected by the value of total assets owned by IPFCs. This indicates that small IPFCs with a low value of total assets yield higher returns than large IPFCs. The literature emphasizes that as co-operative size increases; the co-operative form of organizations becomes relatively less efficient because preferences become more heterogeneous among members (Hart & Moore, 1996). Lack of the required number of employees and valuable assets that characterize most IPFCs in the area is one of the challenges to meeting loan requirements and expanding their business. This problem is primarily due to the enforced and limited amount of shareholding among co-operatives in the study area. Findings also reported a positive and significant relationship between SCAP and ROA. This result concurs with the study by Rabirou *et al.* (2013). The greater the share capital held by a co-operative, the greater its ability to improve production and revenue, hence the increased ROA.

Table 3: Financial Performance (ROA)
 Hausman test: Chi²=5.17 (p-value = 0.2047)

ROA	Coef.	Robust Std. Err.	Z	P> z
LIQ	.04899	.0145465	3.37	0.001***
DEBT	-.1738274	.1602123	-1.08	0.278
AGE	-.0113764	.0276851	-0.41	0.681
MEM	-3.47e-06	.0000549	-0.06	0.950
EMP	-.0338348	.0259223	-1.31	0.192
SIZE	-1.61e-06	5.92e-07	-2.72	0.007***
SCAP	8.07e-06	4.87e-06	1.66	0.047**
_cons	.0014265	.1607565	0.01	0.993
R ²	Within (0.55)	Between (0.69)	Overall (0.60)	
Prob (F Statistic)	0.000			

* = Significant at 0.1, **= Significant at 0.05, ***= Significant at 0.01

The regression results in Table 4 indicate that the value of the overall R-square is 0.76, showing that all seven variables have described a 76% disparity in financial performance measured in terms of ROE. The estimated coefficients showed that LIQ, DEBT, EMP, and SCAP significantly affected ROE.

The estimated coefficients in the regression in Table 4 show a positive and significant relationship between LIQ and equity performance, indicating that IPFCs in the study area can respond to short-term obligations. This result supports the previous study by Zelhuda *et al.*



(2017) and Waleed *et al.* (2016), who reported a positive effect of LIQ and ROE. However, findings from this study do not conform to the study by Liargovas and Skandalis (2010) which indicates a negative effect between liquidity and ROE. Furthermore, the results indicate a significant and negative relationship between leverage measured by total liabilities to total assets (DEBT) and ROE, implying that leverage increases the potential reward to the co-operative members, but also increases financial distress and business failure (Ross *et al.*, 2003).

The results of this study are consistent with Strykova (2017) findings that leverage (Debt ratio) has a substantially negative effect on ROE. Minnema and Andersson (2018) study demonstrate that debt has a significant negative relationship with ROE, meaning that firms which use less debt are generally more profitable. The literature states that a high return on equity results from low indebtedness (Fryndenber, 2011). The pecking order theory predicts a negative relationship between debt and performance; the more profitable the firm, the better its self-financing capacity, and consequently, less debt will be needed (Mateos-Ronco & Guzman, 2018).

The positive coefficient of EMP indicates that co-operatives with an increased number of employees yield higher ROE. Furthermore, Rabirou *et al.* (2013) also reported that as a co-operative has the required staff, the co-operative increases its financial performance. However, it was observed from the study that most of IPFCs have only one employee, which is a big challenge to achieving desired performance. On the other hand, SCAP in (share capital) shows a positive significant relationship with ROE; this implies that IPFCs having higher members' share capital that is used efficiently improve their production and achieve higher ROE, compared to the IPFCs with lower members' share capital. The greater amount of share capital held by the co-operative, the greater its ability to make investments and other improvements to the running of the business. This study does not support Buluma *et al.* (2017) findings that found an insignificant effect of the value of share capital on financial performance measured by ROE. The above findings concur with what was hypothesized by RBT, implying that IPFCs with the required number of employees, large amount of members' share capital, and higher level of liquidity have a better return on their investment.

Table 4: Financial Performance Measured (ROE)

Hausman test: $\chi^2=5.3$ (p-value = 0.2703)

ROE	Coef.	Robust Std. Err.	z	P> z
LIQ	.0635955	.0193387	3.29	0.001***
DEBT	-.3731878	.2068385	-1.80	0.041**
AGE	-.0276797	.0187445	-1.48	0.140
MEM	.0000453	.0000526	0.86	0.389
EMP	.0537073	.0281201	1.91	0.056*
SIZE	-3.60e-07	3.80e-07	-0.95	0.343
SCAP	4.34e-06	2.55e-06	1.70	0.089*
_cons	.1146658	.2163748	0.53	0.596
R ²	Within (0.69)	Between (0.83)	Overall (0.76)	
Prob (F Statistic)	0.000			

* = Significant at 0.1, ** = Significant at 0.05, *** = Significant at 0.01



CONCLUSION AND RECOMMENDATIONS

This is used panel regression analysis to examine the co-operative specific characteristics that contribute to their financial performance (ROA and ROE). The results showed that LIQ, DEBT, EMP, SIZE, and SCAP are significant factors contributing to the financial performance of IPFCs in Northern and Western Provinces. The findings revealed a limited financial capacity for most IPFCs in the study area, challenging their growth. This issue is explained by the limited amount of members' share capital fixed by the local authority following mismanagement reported from different IPFCs. Consequently, most IPFCs cannot afford the required assets to improve their production, including improved farm infrastructure.

Furthermore, given limited financial capacity, most IPFCs are challenged by the small number of management staff. Given the challenges mentioned above, IPFCs are not able to face competition from better-prepared private traders. This is, therefore, a big worry to provide the expected services to their members. Unless co-operatives' financial performance is healthy, it may be difficult for co-operative societies to sufficiently serve their members.

In the endeavour to improve the financial performance of IPFCs, a joint effort from both the co-operatives and the Government is required. Based on research findings, IPFCs is recommended to mobilise their members to increase their shareholding, to raise capital for their co-operatives and thus improve performance level. IPFCs are also recommended to diversify their sources of revenue by investing in selling agricultural inputs. Furthermore, given that the size of most of IPFCs in terms of total assets is small, the Ministry of Agriculture and Animal resources should provide support by providing improved storage facilities and farm infrastructure to help IPFCs expand their business and improve their production for better performance.

Due to the limitation of the study, it is recommended that future studies consider other factors like legal, political factors, technological and cultural factors influencing the performance of farmer co-operatives. This study generates facts to inform stakeholders such as policymakers and non-governmental organizations. In addition, the recommendations will mainly assist IPFCs in achieving desired financial performance and provision of expected services to members.

Funding acknowledgement

This study was supported by the German Academic Exchange Service or DAAD (Deutscher Akademischer Austauschdienst).

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ISSN: 2408-7920

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Appendix

Table A1: Correlation Matrix and Variance Inflation Factor

	ROA	ROE	LIQ	DEBT	EGE	MEM8	EMP	SIZE	SCAP	VIF	1/VIF
ROA	1										
ROE	0.732**	1									
LIQ	0.681**	0.742**	1							4.02	0.165
DEBT	0.635**	0.714**	0.711**	1						4.02	0.166
EGE	-0.265*	-0.125	0.042	-0.050	1					2.03	0.248
MEM	-0.186	-0.060	0.004	0.016	0.543**	1				1.74	0.574
EMP	0.033	0.125	0.329**	0.303*	0.533**	0.439**	1			1.77	0.564
SIZE	-0.305*	-0.104	0.029	-0.043	0.737**	0.581**	0.408**	1		1.84	0.260
SCAP	0.219	0.218	-0.190	0.220	0.562	0.507**	0.329**	0.569**	1	1.83	0.547

** . Correlation is significant at the 0.01 level (2-tailed); * . Correlation is significant at the 0.05 level (2-tailed).

Table A2: Skewness/Kurtosis tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob>chi2
ROA	64	0.0000	0.0011	23.91	0.0000
ROE	64	0.0000	0.0024	21.11	0.0000
LIQ	64	0.3039	0.0123	6.70	0.0351
DEBT	64	0.0713	0.0795	5.96	0.0508
AGE	64	0.0000	0.0000	45.31	0.0000
MEM	64	0.0001	0.0417	15.66	0.0004
EMP	64	0.0000	0.0417	18.05	0.0001
SIZE	64	0.0000	0.0000	50.92	0.0000
SCAP	64	0.0000	0.0000	43.71	0.0000

Table A3: Skewness/Kurtosis tests for Normality after robustness

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob>chi2
Resid	64	0.8139	0.1767	1.96	0.3759



Table A4: Co-operative Financial and non-financial characteristics

Variable	Year 2018		Year 2019		
		Frequency	Percentage	Frequency	Percentage
Share capital	Less than \$5,000	26	81.25	21	65.62
	\$5,000-10,000	04	12.50	07	21.87
	\$10,001-20,000	02	6.25	03	09.38
	Over \$20,001	00	0.00	01	03.13
	Total	32	100	32	100
Total Assets	Less than \$20,000	25	78.12	11	34.37
	\$20,000-40,000	05	15.62	4	12.50
	\$40,001-60,000	02	06.26	13	40.62
	Over \$60,001	00	0.00	04	12.50
	Total	32	100	32	100
Current ratio	≤ 3.1	00	0.00	00	0.00
	3.1-6.0	08	25.00	09	28.12
	6.1-9.0	11	34.38	09	28.12
	9.1-12.0	13	40.62	14	43.75
	12.1-15.0	00	0.00	00	0.00
	15.1≤	00	0.00	00	0.00
	Total	32	100	32	100
Leverage	≤ 0.11	06	18.75	04	12.50
	0.11-0.20	06	18.75	06	18.75
	0.21-0.30	03	09.38	05	15.62
	0.31-0.40	09	28.12	09	28.12
	0.41-0.51	01	3.12	00	0.00
	0.51≤	07	21.88	08	25.00
	Total	32	100	32	100
Co-operative Age	Less than 3 years			00	0.00
	3-7			31	96.87
	Over 7			1	3.13
	Total			32	100
Membership size	Less than 200	11	34.38	12	37.50
	201-400	10	31.26	09	28.12
	401-600	05	15.62	05	15.62
	601-800	01	3.12	01	3.12
	Over 800	05	15.62	05	15.62
	Total	32	100	32	100
Number of employees	1	27	84.38	22	68.75
	2	04	12.50	06	18.75
	3	01	3.12	04	12.50
	Total	32	100	32	100