

CREDIT ACCESS AS A NEXUS OF PROFITABILITY OF SMALLHOLDER BROILER CONTRACT FARMERS

Lisa Dwi Lestari^{*1}, Widyastutik^{***)}, Muladno^{****)}

^{*)}Program Study of Agricultural Economics, Post-Graduate School, IPB University
Jl. Kamper, Kampus IPB Dramaga Bogor 16680, Indonesia

^{**)}Department of Economics, Faculty of Economics and Management, IPB University
Jl. Agatis, Kampus IPB Dramaga Bogor 16680, Indonesia

^{***)}Center for Agriculture and Rural Development Studies (CARDS) IPB University
Jl. Raya Pajajaran No. 7, Bogor 16129, Indonesia

^{****)}Department of Animal Production and Technology, Faculty of Animal Science, IPB University
Jl. Agatis, Kampus IPB Dramaga Bogor 16680, Indonesia

Article history:

Received
26 August 2024

Revised
24 September 2024

Accepted
2 October 2024

Available online
30 November 2024

This is an open access
article under the CC BY
license



Abstract

Background: The unequal access to resources in the broiler industry hinders smallholders from competing effectively. To address this issue, farmers are being urged to engage in contract farming as a means to boost profits and improve access to credit. However, despite efforts to facilitate credit disbursement, empirical studies indicate that poultry farm loans are underutilized. These studies also demonstrate that not all farmers consistently benefit from increased profits and improved credit access.

Purpose: This research was conducted to answer the nexus between credit access and profitability. Furthermore, this study reviews the problems and the role of contract farming on farmers' credit access.

Design/methodology/approach: The investigation encompassed an analysis of 51 broiler plasma farmers affiliated with an integrator company in West Java. To elucidate the research objectives, a profitability analysis was conducted, employing both gross margin assessment and the Ordinary Least Squares (OLS) method within a multiple regression framework.

Findings/Result: The research findings elucidate that profitability among farmers is not guaranteed, with operational losses frequently attributed to negligence, adverse climatic conditions, and disease outbreaks. Consequently, some farmers must seek financial credit to sustain working capital and facilitate business expansion. Specifically, investment credit is allocated for the enhancement or construction of cages and equipment, whereas working capital credit aims to expedite the turnover of operational expenses. An Ordinary Least Squares (OLS) regression analysis revealed significant determinants of profit, including access to credit, flock size, ownership of cages and land, employment of hired labor, and the farmer's age. Parameter estimation further delineated that, *ceteris paribus*, farmers who engaged in credit utilization reported substantially higher profits, amounting to IDR11,949 million more than their counterparts who did not access credit. It is noteworthy that credit application processes that bypass integrator companies necessitate sufficient collateral to secure the loans, limiting access to bank credit strictly to farmers who possess adequate collateral. According to the survey data, a mere 13,7%. The role of contract farming in mitigating the asymmetry of information regarding credit access remains suboptimal.

Conclusion: The results rejected the hypothesis that credit access does not affect profit. However, farmers' utilization of credit access is relatively small and the distribution of credit access among plasma farmers engaged in contract farming is characterized by inequity.

Originality/value (State of the art): This study addressed the vital role of credit access toward farmers' profitability. This study combined Ricardo's theory and principal agency theory, applied to contract farming in the broiler industry. This sharpened the importance of the integrator company's role in providing capital and financing facilities to farmers based on the principle of risk sharing, thereby reducing the company's risk.

Keywords: contract farming, gross margin, credit access, broiler, smallholder

How to Cite:

Lestari LD, Widyastutik, Muladno. 2024. Credit access as a nexus of profitability of smallholder broiler contract farmers. *Jurnal Manajemen & Agribisnis* 21(3): 211–224. <https://doi.org/10.17358/jma.21.3.335>

¹ Corresponding author:
Email: lisa.dwilestari@gmail.com

INTRODUCTION

The broiler industry in Indonesia has undergone significant development since 1980, operating at micro, small, and commercial scales. As reported by FAO (2021), Indonesia has ascended to the third position among Asia's largest producers of broiler meat. Over the span from 2010 to 2021, the country has achieved a total production volume of 31 million tonnes, as depicted in Figure 1.

The industry is growing with positive expectations, making it attractive for new companies to join. Broiler businesses in Indonesia are divided into integrator companies, partner farmers, independent companies, and independent farmers. Inequality of resource access among businesses makes independent farmers unable to compete (Muladno, 2024). Independent farmers have low access to various resources, providing all production inputs with their capital and reaching them independently for sustainable and profitable business (Amam et al. 2019).

The broiler industry represents a capital-intensive sector wherein farmers anticipate securing external financing as a means to enhance productivity and income. This necessity arises due to insufficient personal funds to satisfy the business's financial requirements. However, Mukaila et al. (2023) found that only 34,5% of broiler farmers have access to credit, illustrating the need for higher access to credit. Therefore, smallholder farmers are encouraged to join contract farming to gain easy access to credit (Abebe et al. 2013; Rehber, 2019).

Smallholder farmers participating in contract farming benefit from income and welfare, making them viable (Ruml and Qaim, 2021; Wainaina et al. 2014; Saptana et al. 2017). They also have easy access to credit, which increases profits (Adebisi et al. 2021; Benjamin and David, 2020; Gelata and Han, 2024). However, according to Beets (2019), farmers only obtain minimal profits compared to the financial gains of the integrator company because farmers often struggle with financial problems such as large capital requirements, operational costs, and even business debts.

Empirical studies have shown that despite farmers participating in contract farming, their utilization of credit remains relatively low, at only 16% (Hoang, 2021). Constraints on credit access discourage farmers from making investments, leading them to rely on cash from harvest sales (Adjognon et al. 2017). Furthermore, unprofitability resulting from lower output prices and higher input costs has had a significant impact on their businesses (Fauzi and Lestari, 2024; Huang et al. 2018), and limited access to credit severely constrain farmers' capacity to invest in new technologies and production activities (Taylor and Lybbert, 2020).

The Ministry of Agriculture has reported that agricultural credit utilization in Indonesia has only reached 60,81% of the intended distribution target, with credit access for poultry farmers noted to be merely 2% (Figure 2). To ensure the resilience of smallholders and their ability to navigate challenges, it is imperative to establish a stable business environment and provide sufficient financial support. Access to credit stands as a critical form of financial assistance for farmers. To address this, the Indonesian government has implemented the Farm Business Financing Strategy outlined in Government Regulation Number 81 of 2020.

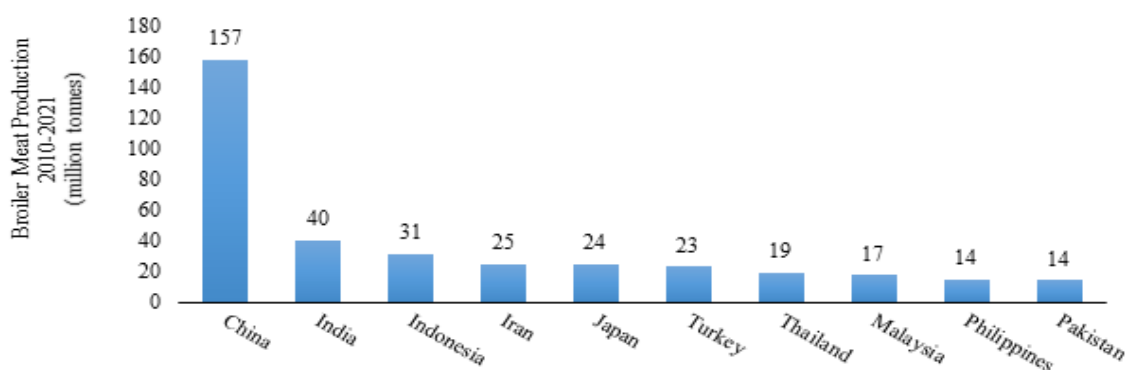


Figure 1. Broiler meat producers in Asia (FAO, 2021)

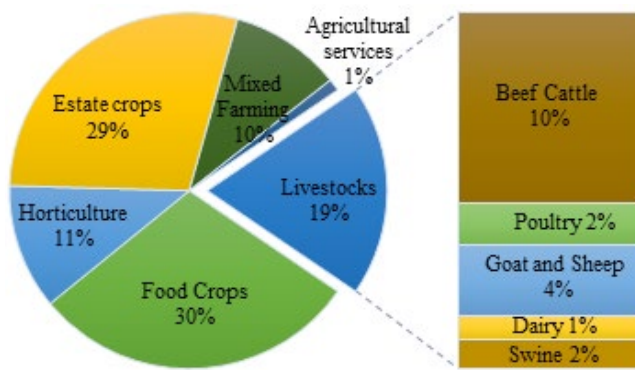


Figure 2. Indonesia agricultural credit disbursement (Ministry of Agriculture, 2023)

The challenges arising from environmental, production, and market risks in small-scale broiler farming, as highlighted by Darjanto (2022), often result in difficulties in meeting the collateral requirements stipulated by financial institutions (Balana et al. 2022). Consequently, smallholder farmers are frequently perceived as higher-risk clients and may encounter challenges in securing financing (Choudhury et al. 2022). Ruml and Parlasca (2022) have demonstrated that transparency through the disclosure of contracts to banks and financial institutions can effectively mitigate the perceived financial risks associated with smallholder farmers, potentially enhancing their prospects of obtaining a loan.

The concept of contract farming is closely intertwined with the principal agency theory, which elucidates the dynamics of ownership rights exchange, risk sharing, and the cooperative relationship between integrator companies (principals) and farmers (agents), ultimately influencing economic performance (Saptana and Daryanto, 2013).

Under the contractual agreement, farmers receive credit for production and input supplies from integrator companies at predetermined prices (Eaton and Shepherd, 2001), which are repaid through a portion of their harvest. Given the capital-intensive nature of broiler farming, farmers require long-term credit for investment, often spanning multiple production cycles, with repayments coordinated in collaboration with formal banking institutions (Ruml and Parlasca, 2022). The investment decision-making process leverages the pecking order theory, which considers both internal and external sources of credit access (Bakare et al. 2023).

Profitability, a pivotal factor in economic performance, is frequently assessed using the gross margin value. This metric, derived from gross margin analysis, signifies the profit generated by a business utilizing variable inputs in the production cycle. Ricardo's theory, which posits that profit remains after the determination of wages and rent, is pertinent in this context. In the realm of agriculture, profit represents the surplus that farmers retain after disbursing land rent and labor wages (Benjamin and David, 2020; Djokoto and Zigah, 2021).

Analyzing profit maximization for contract farmers in the broiler vertical-integrated industry can be intricate, given that the integrator dictates the price and harvest weight of live birds (Flinn, 1971). Consequently, Flinn formulated a model explicating the profitability of the broiler business based on determining variables. In conjunction with the evolution of research about profitability, several antecedent studies have utilized variables such as age, education, gender, flock size, mortality, medicine cost, feed cost, farming experience, farm ownership, credit access, participation in farmer organizations, and broiler-rearing training to measure profitability (Phiri et al. 2023; Olutumise et al. 2023; Mdletshe and Obi, 2023; Adeyonu and Odozi, 2022; Onumah et al. 2023; Gharib et al. 2023; Mukaila et al. 2023).

In this study, the variables of price and volume of inputs and outputs, incentive income, and other income were considered as components of profit value. Conversely, variables such as farmer age, education, hired labor, cage type, flock size, cage and land ownership, partnering experience, cage positioning, and credit access were deemed determinants of profit.

Prior research has shown that contract farming can facilitate access to credit for small-scale farmers (Tuan, 2012) and reduce instances of credit defaults (Dossou et al. 2020). Furthermore, studies have indicated that credit utilization significantly affects farmers' profitability (Benjamin and David, 2020; Phiri et al. 2023; Mersha and Demeke, 2017). However, the specific impact of contract farming on credit access for smallholder broiler plasma farmers has not been thoroughly explored. This study seeks to address this gap by examining the relationship between credit utilization and the profitability of broiler plasma farmers. Additionally, the study will explore the role of contract farming in facilitating credit access

for smallholder farmers, specifically the role of the integrator company as an intermediary in managing asymmetric information between banks and farmers, particularly in situations where one party possesses more comprehensive information than the other.

METHODS

The research incorporates cross-sectional primary and secondary data. Primary data was acquired through survey methods employing questionnaires and in-depth interviews. Secondary data was sourced from farmers' rearing records provided by the integrator company, encompassing details on production volume, output price, input volume and price, incentives, and reductions in farmer income.

The survey encompassed 51 broiler plasma farmers participating in the vertical integration program of Company X. These farmers were located in various districts within West Java Province, specifically Bogor, Cianjur, Bandung, Purwakarta, Garut, Subang, Indramayu, Majalengka, and Cirebon. The selection of these locations was based on the criteria of the micro-small business category, and access was granted within the confines of Company X's limited permission. Data collection was carried out between March and May 2024.

The purposive sampling technique was employed to select micro-small businesses within the broiler farming category with a maximum cage capacity of 50.000 birds per production cycle. The scale category of broiler farm businesses is determined by Minister of Agriculture Regulation Number 15 of 2021, which stipulates Business Activity Standards and Product Standards for the implementation of Risk-Based Business Licensing in the Agricultural Sector.

The term "gross margin" denotes the measure of profitability specifically associated with production activities. In the computation of gross margin, capital and fixed costs are not factored in. This metric is commonly applied in the realm of agricultural production to assess profitability over a specified timeframe, such as a year or a production cycle (Mersha et al. 2017). In this study, the researchers derived the average rearing data from the last 3-6 production cycles. Notably, other scholars such as Mdletshe and Obi (2023), Phiri et al. (2023), Zimunya and Dube (2021), and Djokoto and

Zigah (2021) have also utilized gross margin (GM) as a variable to measure the variance between total revenue (TR) and total variable cost (TVC). The equation employed for this purpose is as follows:

$$GM=TR-TVC \dots (1)$$

TR comprises proceeds from live bird sales, incentive income, and, if applicable, revenue generated from the sale of by-products. In contrast, TVC is derived from the aggregate of input expenses including feed, day-old chick (DOC) acquisition, pharmaceuticals and vaccinations, labor remuneration, and operational outlays such as water and electricity. Labor remuneration is categorized within TVC due to its correlation with production output, specifically relative to the quantity of DOC and harvest volume.

The collection of data pertinent to the profitability analysis of live bird sales encompassed both secondary and primary sources. Revenue from live bird sales, incentive income, and input costs was extracted from secondary data sources, recapitulating the outcomes of each farmer's poultry-rearing activities. Concurrently, primary data regarding by-product sales revenue, labor wages, and operational costs were meticulously gathered through comprehensive interviews with the farmers involved. The analysis of this data was meticulously conducted employing Microsoft Excel software.

To examine how credit access and other external factors affect profitability, this study utilized the Ordinary Least Squares (OLS) technique, forming the basis for multiple regression models. A multiple regression model was developed through this method, incorporating external factors believed to impact profit, the dependent variable. This model aimed to clearly explain the factors influencing farmer profitability in the studied context, ensuring it met the best-fit criteria.

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \beta_4 X_{4i} + \beta_5 X_{5i} + \beta_6 X_{6i} + \beta_7 X_{7i} + \varepsilon_i \dots (2)$$

Where Y_i is the endogenous variable of profit of the i -th farmer (million IDR); X_{1i} is the exogenous variable of the age of the i -th farmer (years); X_{2i} is the number of hired labor of the i -th farmer (people); X_{3i} is the flock size of the i -th farmer (head); X_{4i} is the ownership of cage and land of the i -th farmer (1 owned, 0 rented); X_{5i} is the cage type of the i -th farmer (1 semi-closed

house, 0 opened house); X_{6i} is the credit access of the i -th farmer (1 utilizing credit, 0 not utilizing credit); X_{7i} is the partnering experience of the i -th farmer (years); β_0 is a constant; $\beta_1 - \beta_7$ is the parameter estimation of the 1st to 7th variable; ε_i is the error term of the i -th equation; i is the 1st to 51st farmer. Expected regression coefficient values $\beta_1, \beta_2 < 0$ (negative); $\beta_3, \beta_4, \beta_5, \beta_6, \beta_7 > 0$ (positive). Table 1 provides a detailed overview of the exogenous variables included in the analysis.

The classical assumption test is critical in validating the integrity of a linear regression model, ensuring it does not violate fundamental assumptions such as heteroscedasticity, multicollinearity, and normality. The detection of heteroscedasticity was conducted employing the Breusch-Pagan-Godfrey test, yielding an F-statistic of 1.56 with an associated Probability F of 0.17. For assessing normality, the Jarque-Bera test was utilized, revealing a Jarque-Bera statistic of 3.55 with a probability of 0.16. Given that the probability values associated with both the heteroscedasticity and normality tests were above the conventional significance threshold of 0.05 (p-value > 0.05), the data does not exhibit heteroscedasticity and is normally distributed. The evaluation of multicollinearity was performed through the examination of variance inflation factors (VIF), with all variables displaying VIF values below the threshold of 10 (VIF < 10), indicating the absence of multicollinearity among the exogenous variables. The model (equation 2) passed the classical assumption test and is considered the best linear unbiased estimator (BLUE). The analysis was performed using the OLS method in Eviews 12 software.

Considering the emphasis of this research on the utilization of credit, it has been observed in numerous studies that access to credit serves as a critical nexus to the profitability of broiler farmers (Gharib et al. 2023; Mukaila et al. 2023; Phiri et al. 2023). Conversely, some research contradicts this finding (Adeyonu and Odozi, 2022). Therefore, the hypothesis proposed is :

- H_0 : Credit access does not have a positive effect on farmers' profitability.
- H_1 : Credit access has a positive effect on farmers' profitability.

As implemented through contract farming systems within the broiler industry, the vertical integration model is posited to act as a pivotal solution amidst the challenges posed by the industry's growing concentration (Daryanto, 2021). Numerous small-scale farmers have experienced significant benefits from their engagement in commercial contract farming, including credit facilities. The agribusiness companies have expanded their activities, mainly through credit access from formal financial institutions i.e. banks (Marks et al. 2024). Numerous investigations have been conducted on the determinants of profitability. The present study hypothesizes that variables such as the age of the farmer, hired labor, type of cage utilized, flock size, cages and land ownership, partnerships experience, and access to credit significantly influence profitability. In this context, profitability is assessed through the calculation of gross margin, total revenue, and total variable costs. Figure 3 in the document illustrates the conceptual framework adopted for this research.

Table 1. Description of exogenous variables in the model

Exogenous variable	Notation	Measurement	Expected value	Source
Farmer age	X1	Ratio	$\beta_1 < 0$	Field survey
Hired labor	X2	Ratio	$\beta_2 < 0$	Field survey
Flock size	X3	Ratio	$\beta_3 > 0$	X Company
Cage and land ownership	X4	Dummy (1 owned; 0 rented)	$\beta_4 > 0$	Field survey
Cage type	X5	Dummy (1 semi-closed house; 0 opened house)	$\beta_5 > 0$	Field survey
Credit access	X6	Dummy (1 utilizing credit; 0 not utilizing credit)	$\beta_6 > 0$	Field survey
Partnering experience	X7	Ratio	$\beta_7 > 0$	Field survey

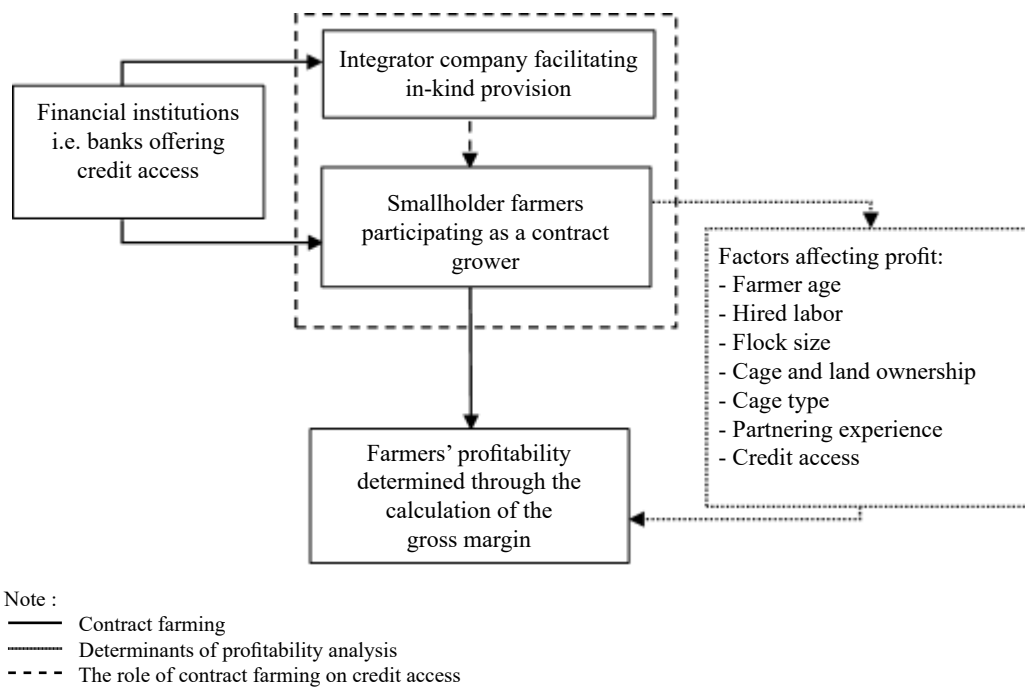


Figure 3. Research framework

RESULTS

Profitability

The profitability metric in this analysis is derived by computing the total revenue after the subtraction of total variable costs, excluding capital and fixed costs to arrive at the gross as elucidated in Table 2, the distribution of profit, total revenue, and total variable costs among the sampled agricultural practitioners is detailed.

The data elucidates that the profit spectrum ranges from a minimum of IDR -8.88 million to a maximum of IDR136.07 million, with a mean profit value of IDR33.85 million. This average value underscores the relatively modest profitability experienced by the sampled cohort, as evidenced by the mean's proximity to the minimum profit value. Moreover, the standard deviation recorded at IDR26.09 million, suggests a relatively narrow variance in the dataset, further highlighted by the close alignment between the mean and standard deviation values.

The manifestation of negative profit values within the descriptive statistical analysis underscores the occurrence of operational losses among a subset of the farmers. Specifically, empirical data indicate that approximately 3.92% (2 out of 51) of the sampled farmers encountered financial losses. This finding

is congruent with the broader literature, notably the research conducted by Zimunya and Dube (2021), who reported operational losses among 12.96% of broiler plasma farmers in the Chegutu district, Zimbabwe. Parallely, Phiri et al. (2023) also reported similar findings, highlighting the prevalence of losses among farmers, as evidenced by the distribution of profit data touching negative values. Additional insights from their study point to livestock mortality, driven by disease and adverse climatic conditions, as a critical factor contributing to these losses.

Field observations, coupled with in-depth interviews and analysis of farming records, have identified the high feed conversion ratio (FCR) levels and diminished live bird harvest volumes as principal factors underpinning the profit losses among farmers. A heightened FCR denotes increased feed consumption, which, in turn, escalates feed costs and total variable costs. Concurrently, elevated mortality rates, attributable to disease, precipitate a reduction in harvest volumes, thereby diminishing sales revenue.

Within the framework of the X Company contract, FCR and depletion rates constitute pivotal metrics for calculating farmers' performance incentives. Lower FCR and depletion metrics correlate with diminished performance incentive earnings for farmers, in some instances nullifying such earnings. This dynamic precipitates a reduction in total revenue for farmers,

rendering them incapable of covering total variable costs, thereby culminating in profit losses. In instances where the farming records reflect a negative balance, X Company assumes a portion of the financial burden, effectively nullifying the loss debt owed by farmers to the integrating company. Under such circumstances, farmers are solely responsible for the operational cost losses.

Determinants of profitability

The profitability of farmers is expected to be influenced by factors such as farmer age, hired labor, flock size, cage and land ownership, cage type, credit access, and partnering experience. The results of the multiple regression analysis using the OLS method presented in Table 3 reveal that credit access and flock size are statistically significant at the 5% level, while hired labor and cage and land ownership are significant at the 10% level. Additionally, farmer age is found to be significant at the 15% level.

In addition to the common utilization of 1% and 5% significant levels, other researchers have also used a 10% significant level (Mukaila et al. 2023; Zimunya and Dube, 2018; Phiri et al. 2023; Mdletshe and Obi, 2023) and 15% significant level (Adjognon et al. 2016).

It is important to note that the choice of significance level depends on the sample size, with larger samples typically leading to the use of smaller significant levels (Verbeek, 2004). Therefore, this study opted for a higher significance level due to the relatively smaller sample size.

The model estimation results reveal an R² (goodness of fit) value of 0.746, signifying that 74.6% in the variation of exogenous variables can account for the variation in endogenous variables. Conversely, the remaining 25.4% is attributed to factors outside the model. The F-stat value of 0.000 provides substantial evidence to assert that farmer age, hired labor, flock size, cage, and land ownership, credit access significantly impact profitability at the 5% level.

Farmer age has a significant positive effect on profitability at the 15% level, with a coefficient of 0.318. This indicates that, ceteris paribus, for each additional year of age, the profit generated increases by more than IDR 318 thousand. Additionally, over 50% of the sampled farmers in this study are above the age of 41 (mean). Older farmers tend to have a strong rapport with the integrator company and exhibit greater diligence and prudence in managing their businesses.

Table 2. Descriptive statistics of profitability

Descriptive	Profit	Total Revenue	Total Variable Cost
Minimum	-8.88	106.87	98.56
Maximum	136.07	1.539.52	1.403.45
Mean	33.85	480.74	446.89
Standard Deviation	26.09	322.29	299.75

*in a million IDR

Table 3. Estimation of multiple regression model

Exogenous variables	Notation	Coefficient	Std. Error	t-value	p-value	Result
Farmer age	X1	0.318	0.204	1.557	0.126*	Significant
Hired labor	X2	5.611	3.089	1.816	0.076**	Significant
Flock size	X3	1.358	0.530	2.560	0.014***	Significant
Cage and land ownership	X4	13.525	7.573	1.785	0.081**	Significant
Cage type	X5	1.875	6.171	0.303	0.762	Insignificant
Credit access	X6	11.949	5.911	2.021	0.049***	Significant
Partnering experience	X7	0.434	0.346	1.253	0.216	Insignificant
R-squared		0.746				
Prob. F		0.000				

Note: ***significant at 5% level; ** significant at 10% level; * significant at 15% level

Prior research on the impact of farmer age on profitability has yielded inconsistent findings. Gharib et al. (2023) reported a negative association between farmer age and profitability, indicating that younger tend to experience increased productivity and higher profits. In contrast, Zimunya and Dube (2021) discovered a positive relationship between farmer age and profit, attributing it to the extensive experience, investment capacity, and time allocation of older farmers. Other studies have suggested that age has no significant effect on profit (Adeyonu and Odozi, 2022; Phiri et al. 2023).

The employment of hired labor exerts a significantly positive influence on profitability at a 10% significance level, evidenced by a coefficient value of 5,611. This indicates that *ceteris paribus*, the inclusion of an additional unit of hired labor is associated with an increment in profit amounting to IDR5,611 million. This empirical finding aligns with the research outcomes presented by Tuncel and Kara (2022), Saidah et al. (2019), and Zimunya and Dube (2021), who collectively assert the positive and significant impact of hired labor on profit margins.

Moreover, the pivotal role of farm management in the oversight of rearing activities cannot be overstated, given that these activities fall within the purview of labor responsibilities. The necessity for rigorous supervision is underscored by the potential technical risks, including the improper setting of cage temperatures and the inadequate provision of feed or water. Such oversights can compromise the health and condition of the broilers, ultimately leading to mortality and financial losses not covered by the integrator company. Field observations have revealed that individuals appointed as head of the cages often share a familial relation with the farm owner and possess prior experience in broiler rearing. Additionally, it has been observed that some farmers elect to share a portion of the performance-based incentives received from the integrator company with their laborers, contingent upon achieving favorable performance index scores. This incentive mechanism serves to cultivate discipline and enhance the sense of responsibility among hired labor, thereby contributing to improved operational outcomes.

The status of cage and land ownership demonstrably exerts a significant positive influence on profitability, evidenced by a coefficient of 13,525. This suggests

that *ceteris paribus*, farmers possessing their cages and land accrue a profit increment of IDR13,525 million in comparison to their counterparts who operate under rental agreements. This empirical observation aligns with the findings articulated by Ton et al. (2017), who posited that land ownership catalyzes income augmentation. In a similar vein, Olutumise et al. (2023) elucidated that land ownership plays a pivotal role in broiler health management, which, in turn, contributes to profitability enhancements.

The apprehension regarding long-term land rights among farmers devoid of property ownership corroborates the hypothesis that such farmers exhibit a reticence towards investing in the enhancement of supporting facilities. This is manifest in their proclivity to persist with open-house cages or eschew the construction of new facilities due to concerns over lease termination or the denial of permissions by landowners.

Moreover, the size of the flock is significantly correlated with profitability, as indicated by a coefficient of 1,358. Specifically, an augmentation of the flock by 1,000 heads, assuming all other variables remain constant, results in a profit increase of IDR1,358 million. This finding is buttressed by the scholarly contributions of Mukaila et al. (2023), Adeyonu and Odozi (2022), Aryemo et al. (2019), and Yusuf et al. (2016), which collectively assert that an expansion of the chicken population correlates with profit escalation. Nonetheless, it is imperative to underscore the necessity of adept maintenance management to actualize the potential revenue benefits of flock expansion. This is evidenced by the study conducted by Zimunya and Dube (2021), which highlighted a scenario wherein an increment in the chicken population paradoxically precipitated a decline in profits due to suboptimal maintenance management, culminating in the failure to satisfy the production demands of integrator companies.

Through comprehensive interviews with 51 farmers, it was revealed that there is a significant interest among these farmers to expand their livestock populations. This ambition, however, is hindered by insufficient capital for the construction and operational expenses associated with additional or upgraded enclosures. Consequently, a minority, specifically 7 out of the 51 sampled farmers, have sought investment credit as a means to finance the enhancement or expansion of their cage facilities.

The examination of the utilization of credit access, as indicated by the estimations derived from a multiple regression model, elucidates a significant and positive correlation with profitability at a confidence level of 5%, boasting a coefficient of 11.949. This delineates that, holding other variables constant, farmers leveraging credit facilities accrue an enhanced profit margin of IDR11,949 million in comparison to their counterparts who abstain from credit utilization. This observation is in alignment with the findings presented by Phiri et al. (2023), Gharib et al. (2023), and Abebe and Birhanu (2017), underscoring the pivotal role of credit access in amplifying profitability. Consequently, the analytical scrutiny concerning the influence of credit access on profitability unequivocally refutes the null hypothesis, thereby providing substantial evidence to affirm the hypothesis that credit access exerts a positive impact on the profitability of farmers.

Credit access issues for contract smallholder farmers

The broiler sector is characterized by a rapid production cycle, with an average of 6–7 cycles per annum, necessitating a swiftly rotating working capital. Payments under Service Level Agreements (SLAs) typically occur within one to two weeks post-harvest, contingent on the efficiency of the administrative process. Despite this relatively quick turnaround, farmers experiencing liquidity constraints have voiced concerns, attributing these to immediate post-harvest financial obligations such as labor remunerations, maintenance of cages, and other miscellaneous expenses. Internationally, the practice of contract farming across various commodities harbors inherent disadvantages, notably disputes over payment and contract terms, alongside the challenges posed by ex-post-contract negotiations. These factors collectively contribute to the risk profile of contract farming engagements, with specific reference to delayed payments by contractors, a concern echoed by farmers in Turkey, India, and Vietnam (Rehber, 2019; Anh et al. 2019).

According to data from X Company, the integrator entity previously extended a capital loan facility to farmers, albeit this initiative was subsequently discontinued due to heightened risk exposure. Presently, the company's support to production is limited to business advisory services and the provision of in-kind credit, which is to be repaid through revenue generated from live

bird sales. Additionally, farmers are advised to seek credit facilities from banking institutions to augment their operational capacities. The credit schemes recommended include investment credit, designated for infrastructural enhancements such as cage upgrades or new constructions, and working capital credit aimed at expediting operational cost turnover. Notably, the working capital credit is facilitated through the Kredit Usaha Rakyat (KUR) program. Previous research underscores the imperative to bolster the sustainability of contract farming arrangements through mechanisms such as bank-financed group lending and government-backed funding, to directly support farmers (Mutambara, 2000).

The process of applying for credit from the bank does not involve the integrator company. Farmers seeking loans from the bank must provide collateral of sufficient value to secure the credit they need. Consequently, only farmers with adequate collateral can obtain bank credit. Gharib et al. (2023) also highlight the issue of insufficient credit support, stating that only 22.5% of farmers have access to credit, which is a significant problem. According to a field survey with similar challenges, only 13.7% of sampled farmers were able to access credit.

The role of contract farming in credit access for smallholder farmers

The equilibrium of the credit market is influenced by asymmetric information, leading to credit rationing by lenders. Taylor and Lybbert (2020) highlight that this lack of information regarding credit access gives rise to adverse selection and moral hazard issues. Consequently, institutions play a crucial role in facilitating credit access by providing information about the eligibility of potential borrowers and ensuring that the credit is used for its intended purpose. In the context of contract farming, the integrator company should act as an intermediary, providing essential information to connect banks as credit providers with farmers in need of credit to support their agricultural activities. Ruml and Parlasca (2022) discovered that smallholders engaging in contract farming stand a better chance of obtaining credit approval when banks are informed about their existing contracts and outstanding credit. Failure to provide this information diminishes the likelihood of credit approval, resulting in information asymmetry in the credit market. Purwono et al. (2019) propose that tighter monitoring and the requirement

for collateral significantly impact the moral hazard variable. This underscores the importance of embedded supervision and collateral submission as precautionary measures against the lending risks faced by banks. In micro and small business financing, the nature of the collateral is not the primary factor but rather a form of assurance; at times, the value of the collateral is smaller than the debtor's obligation to the creditor. Therefore, creditors assess the debtor's business cash flow, which directly reflects their ability to meet their obligations. The integrator company can provide certainty regarding cash flow as it is authorized to calculate and record the results of the rearing activities.

Managerial Implications

The farmers in the study accessed credit through a regular scheme with banks, without involvement from the integrator company. This financial arrangement mandates the provision of collateral as a prerequisite for securing credit, effectively excluding micro and small-scale farmers who lack adequate assets to fulfill this requirement. Consequently, lending institutions are placed in a vulnerable position when seeking to recuperate loan balances from these clients. Predominantly, smallholder farmers in developing regions do not possess land ownership, nor do they hold assets that could be leveraged as collateral, rendering them a higher-risk and less appealing client demographic for financial services (Choudhury et al. 2022).

The implementation of a credit policy in the agricultural sector could involve contractual agreements that recognize contracts as a form of collateral. This approach suggests a collaborative arrangement between banks and corporations. Under this model, the bank would extend credit to the integrator company, which would then be responsible for financing input receivables and meeting payment obligations for rearing products to plasma farmers. Such a credit arrangement would facilitate the transfer of financial risk from the company to the bank, allowing the company to improve the service level agreement regarding payment for rearing results. This, in turn, would have a positive impact on the cash flow conditions for farmers. The main benefit of this credit scheme is its potential to strengthen the economic resilience of smallholder farmers, thereby contributing to the financial stability of all entities involved in the food supply chain, while ensuring the maintenance of adequate profit margins (Darjanto, 2022).

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The research shows that contract farming doesn't always make farmers more profitable. The main reasons for this are the high number of broiler deaths from non-epidemic diseases and lack of proper care. When these losses are accounted for, it creates a negative financial impact for the contracting company. This means that the company has to bear the financial burden of these losses, creating a system where risk is shared between the company and the farmers.

The study's evidence confirms that having access to credit helps farmers be more economically stable. Other factors that affect profitability include the size of the flock, whether the farmers own cages and land if they hire labor and the age of the farmers.

Even though contract farming theoretically should help farmers get credit, the study found that this isn't the case. Farmers who have assets they can use as collateral can get credit for their needs, but those who don't have assets are left out. This means that credit access for farmers in contract farming is unfair.

Recommendations

Broiler farmers require fair access to credit in order to maintain profitability. Integrator companies should take more initiative in assisting farmers to obtain credit from banks. This would contribute to the overall success of broiler farming. Companies could offer support by providing information and guidance, as well as monitoring the credit available to farmers. Collaboration between banks and integrator companies could lead to the development of specialized credit plans for farmers. This would reduce the companies' risk and contribute to the financial stability of farmers. The government and other relevant entities should establish regulations to ensure that farmers have access to credit. Emphasis should be placed on establishing fair interest rates and plans that align with the risky nature of broiler farming without imposing excessive hardship on farmers. It's important to note that the study only focuses on one type of contract farming with integrator companies. Future studies should encompass a broader range of integrator models and contract farming agreements.

FUNDING STATEMENT: This research is funded by the Endowment Fund for Education Agency (LPDP).

CONFLICTS OF INTEREST: The author declares no conflict of interest.

REFERENCES

- Abebe GK, Bijman J, Kemp R, Omta O, Tsegaye A. 2013. Contract farming configuration: Smallholders' preferences for contract design attributes. *Food Policy* 40:14–24. <https://doi.org/10.1016/j.foodpol.2013.01.002>
- Abebe MM, Birhanu DL. 2017. Analysis of factors affecting potato farmers' gross margin In Central Ethiopia: The Case Of Holeta District. Munich Personal RePEc Archive
- Adebisi L, Adebisi O, Owolabi M, Henshaw E, Asiyanbi O. 2021. Economic analysis of contract farming and technical efficiency of broiler farmers. *Cercetari Agronomice in Moldova* 53(4):426–433. <https://doi.org/10.46909/cerce-2020-036>
- Adeyonu Ag, Odozi Jc. 2022. What are the drivers of profitability of broiler farms in the north-central and south-west geo-political zones of Nigeria? *Sage Open* 12(1). <https://doi.org/10.1177/2158244021107107>
- Adjognon SG, Liverpool-Tasie LSO, Reardon TA. 2017. Agricultural input credit in Sub-Saharan Africa: Telling myth from facts. *Food Policy* 67:93–105. <https://doi.org/10.1016/j.foodpol.2016.09.014>
- Amam A, Fanani Z, Hartono B, Nugroho BA. 2019. The Power of Resources in Independent Livestock Farming Business in Malang District, Indonesia. IOP Conference Series: Earth and Environmental Science, Volume 372, The 1st Animal Science and Food Technology Conference (AnSTC) 2019 6–8 August 2019, Purwokerto, Indonesia
- Anh NH, Bokelmann W, Thuan NT, Nga DT, Minh NV. 2019. Smallholders' preferences for different contract farming models: Empirical evidence from sustainable certified coffee production in Vietnam. *Sustainability* 2019(11): 3799. <https://doi.org/10.3390/su11143799>
- Aryemo Ip, Akite I, Kule Ek, Kugonza Dr, Okot Mw, Mugonola B. 2019. Drivers of commercialization: a case of indigenous chicken production in Northern Uganda. *African Journal Of Science, Technology, Innovation And Development* 11(6):739–748. <https://doi.org/10.1080/20421338.2019.1573957>
- Bakare AY, Ogunleye AS, Kehinde AD. 2023. Impacts of microcredit access on climate change adaptation strategies adoption and rice yield in Kwara State, Nigeria. *World Development Sustainability* 2. <https://doi.org/10.1016/j.wds.2023.100047>
- Balana BB, Mekonnen D, Haile B, Hagos F, Yimam S, Ringler C. 2022. Demand and supply constraints of credit in smallholder farming: Evidence from Ethiopia and Tanzania. *World Dev* 159. <https://doi.org/10.1016/j.worlddev.2022.106033>
- Beets SD. 2019. Business ethics in the broiler industry. *Business and Society Review* 124(2):239–260. <https://doi.org/10.1111/basr.12170>
- Benjamin S, David A. 2020. The effect of credit-use on the profitability of smallholder maize-farming in Ghana. *Global Scientific Journal* 8(5).
- Choudhury A, Jones J, Opere-Addo M. 2022. Perceived risk and willingness to provide loan to smallholder farmers in Ghana. *Journal of African Business* 23(1):23–40. <https://doi.org/10.1080/15228916.2020.1773732>
- Daryanto A. 2021. *Akselerasi Industrialisasi Perunggasan*. Jakarta: Poultry Indonesia.
- Darjanto A. 2022. Strategi peningkatan daya saing dan rantai nilai inklusif industri perunggasan di Indonesia [Orasi Ilmiah]. Bogor: IPB University.
- Djokoto JG, Zigah DE. 2021. Gross margin of smallholder palm fruit processors with non-allocable inputs in Assin north and south districts in Ghana. *Journal of Agriculture and Food Research* 5: 1–7. <https://doi.org/10.1016/j.jafr.2021.100177>
- Dossou SAR, Aoudji AKN, Houessou AM, Kaki RS. 2020. Microfinance services for smallholder farmers: an assessment from rice farmers' expectations in Central Benin. *Agricultural and Food Economics* 8(1). <https://doi.org/10.1186/s40100-020-00165-1>
- Eaton C, Shepherd A. 2001. Contract Farming: Partnership for Growth. Issue 145 of FAO Agricultural Services Bulletin. Food and Agriculture Organization of the United Nations. [FAO] Food and Agriculture Organization of The United Nations. 2021. FAOSTAT. <https://www.fao.org/faostat>. [2023 Oct 3].
- Fauzi A, Lestari RD. 2024. Studi kelayakan usaha ternak ayam broiler pada pola mandiri dan pola kemitraan di Kabupaten Klaten. *Agricultural Socio-Economic Empowerment and Agribusiness Journal* 2(2):83. <https://doi.org/10.1080/20421338.2019.1573957>

- org/10.20961/agrisema.v2i2.80752
- Gelata FT, Han J. 2024. Rural credit access and contract farming nexus in Ethiopia: A meta-analysis. *Heliyon* 10(1). <https://doi.org/10.1016/j.heliyon.2023.e23154>.
- Gharib Hb, El-Menawey Ma, Hamouda Re. 2023. Factors affecting small-scale broiler chicken farm profitability and challenges faced by farmers in egyptian rural. *Tropical Animal Science Journal*. 46(2):261–268. <https://doi.org/10.5398/Tasj.2023.46.2.261>.
- Hoang V. 2021. Impact of contract farming on farmers' income in the food value chain: A theoretical analysis and empirical study in Vietnam. *Agriculture (Switzerland)* 11(8). <https://doi.org/10.3390/agriculture11080797>.
- Huang Z ying, Xu Y, Zeng D, Wang C, Wang J min. 2018. One size fits all? Contract farming among broiler producers in China. *Journal of Integrative Agriculture* 17(2):473–482. [https://doi.org/10.1016/S2095-3119\(17\)61752-0](https://doi.org/10.1016/S2095-3119(17)61752-0).
- Marks D, Baird IG, Jirasatthumb N. 2024. Thailand's contract farming act at a crossroads: impacts, shortfalls, and the need to better protect smallholders. *Critical Asian Studies* 56(3): 350–370. <https://doi.org/10.1080/14672715.2024.2365872>
- Mdletshe Stc, Obi A. 2023. Investigating the profitability of government-funded small-scale broiler projects in Northern Kwazulu-Natal, South Africa. *Agriculture (Switzerland)* 13(12). <https://doi.org/10.3390/Agriculture1312226>.
- Mersha M, Demeke L, Birhanu A. 2017. Analysis of Factors Affecting Potato Farmers' Gross Margin in Central Ethiopia: The Case of Holeta District. MPRA Paper., siap terbit. <https://mpra.ub.uni-muenchen.de/92828/>. [2024 Jan 25].
- Mukaiila R, Folorunso Dk, Falola A. 2023. Drivers of Profitability of Commercial Broiler Production: Empirical Evidence From Nigeria. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis* 71(4):213–223. <https://doi.org/10.11118/actaun.2023.016>.
- Muladno. 2024. Tanggung Jawab Pemerintah dalam Melindungi Keberlangsungan Hak Usaha Perunggasan Nasional. Di dalam: Seminar Perunggasan. Bogor: PSP3-IPB.
- Mutambara J and Mujeyi K. 2020. Enhancing competitiveness of Zimbabwe's cotton production under contract farming. *African Journal of Science, Technology, Innovation and Development* <https://doi.org/10.1080/20421338.2020.1744270>
- Olutumise Ai, Oladayo To, Oparinde Lo, Ajibefun Ia, Amos Tt, Hosu Ys, Alimi I. 2023. Determinants Of Health Management Practices' Utilization And Its Effect On Poultry Farmers' Income In Ondo State, Nigeria. *Sustainability (Switzerland)*. 15(3). <https://doi.org/10.3390/Su15032298>.
- Phiri PT, Ruzhani F, Madzokere F, Madududu P. 2023. Factors affecting the profitability of smallholder broiler production in Mutare district, Manicaland Province, Zimbabwe: A quantile regression approach. *Cogent Economics and Finance* 11(2). <https://doi.org/10.1080/23322039.2023.2242660>.
- Purwono R, Nugroho RYY, Mubin MK. 2019. Response on New Credit Program In Indonesia: An Asymmetric Information Perspective. *Journal of Asian Finance, Economics and Business* 6(2): 33–44. <https://doi.org/10.13106/jafeb.2019.vol6.no2.33>
- Rehber E. 2019. Contract Farming in Practice: An Overview. Volume ke-33. Connecticut. <http://ageconsearch.umn.edu/>. [2023 Nov 17].
- Ruml A, Parlasca MC. 2022. In-kind credit provision through contract farming and formal credit markets. *Agribusiness* 38(2):402–425. <https://doi.org/10.1002/agr.21726>.
- Ruml A, Qaim M. 2021. Smallholder Farmers' Dissatisfaction with Contract Schemes in Spite of Economic Benefits: Issues of Mistrust and Lack of Transparency. *Journal of Development Studies* 57(7):1106–1119. <https://doi.org/10.1080/002220388.2020.1850699>.
- Saidah Z, Harianto H, Hartoyo S, Asmarantaka RW. 2019. Transaction cost analysis on revenues and profits of red chili farming. *Jurnal Manajemen & Agribisnis* 16(1): 66. <https://doi.org/10.17358/jma.16.1.66>
- Saptana, Daryanto A. 2013. *Dinamika Kemitraan Usaha Agribisnis Berdayasaing dan Berkelanjutan*. Rusastra IW, Syahyuti, editor. Bogor: Pusat Sosial Ekonomi dan Kebijakan Pertanian, Kementerian Pertanian.
- Saptana S, Maulana M, Ningsih R. 2017. Produksi dan pemasaran komoditas broiler di Jawa Barat. *Jurnal Manajemen & Agribisnis* 14(2): 152. <https://doi.org/10.17358/jma.14.2.152>
- Taylor Je, Lybbert Tj. 2020. *Essentials Of Development Economics Third Edition*. Third Edition. Oakland, California: University Of California

- Press.
- Ton G, Desiere S, Vellema W, Weituschat S, D'haese M. 2017. The effectiveness of contract farming for raising income of smallholder farmers in low- and middle-income countries: a systematic review. *Campbell Systematic Reviews*. 13(1):1–131. <https://doi.org/10.4073/Csr.2017.13>
- Tuan NP. 2012. Contract farming and its impact on income and livelihoods for small-scale farmers: case study in Vietnam. *Journal of Agribusiness and Rural Development* 4(26):147–166.
- Tuncel S, Kara Ek. 2022. Determination Of Factors Affecting Profit By Quantitative Methods In Broiler Enterprises. *Arquivo Brasileiro de Medicina Veterinária e Zootecnia* 74(3):549–558. <https://doi.org/10.1590/1678-4162-12599>
- Verbeek M. A Guide to Modern Econometrics. 2004. 2nd ed. *Erasmus University Rotterdam*. John Wiley & Sons Ltd, England.
- Wainaina P, Okello Julius Juma, Nzuma JM, Wainaina PW, Okello Julius J. 2014. Blessing or evil? contract farming, smallholder poultry production and household welfare in Kenya. *Quarterly Journal of International Agriculture* 53(4):319–340.
- Yusuf T, Tihamiyu S, Aliu R. 2016. Financial Analysis Of Poultry Production In Kwara State, Nigeria. *African Journal of Agricultural Research* 11(8):718–723. <https://doi.org/10.5897/Ajar2015.10690>
- Zimunya Kt, Dube L. 2021. Profitability of broiler contract growers in chegutu district of zimbabwe. *Scholars Journal of Agriculture And Veterinary Sciences* 8(9):87–94. <https://doi.org/10.36347/Sjavs.2021.V08i09.002>