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SURVEY RESEARCH

Blockchain-Secured Warehouse Receipts and Trade Finance Access

A Price Premium Analysis for Sesame Farmers in Humera, Ethiopia

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ABSTRACT

Smallholder farmers in developing economies often lack access to formal trade finance due to issues of trust, collateral, and post-harvest price volatility. Warehouse receipt financing offers a potential solution, but its efficacy is hampered by risks of fraud and document tampering. This study investigates whether the introduction of blockchain-secured warehouse receipts generates a measurable price premium for farmers by improving their access to and terms of trade finance. It specifically analyses the impact on sesame seed farmers in a major Ethiopian production zone. A cross-sectional survey was administered to a stratified random sample of sesame farmers utilising a blockchain-secured warehouse system. Data on sale prices, financing terms, and perceived trust were collected and analysed against a control group using conventional receipts. Econometric techniques, including hedonic price modelling, were employed to isolate the blockchain effect. Farmers using blockchain-secured receipts achieved a statistically significant average price premium of 8.7% compared to the control group. This was directly correlated with enhanced lender confidence, leading to a 15% average reduction in interest rates on advance payments and greater willingness from formal financial institutions to provide credit. The integration of blockchain technology into agricultural warehouse receipt systems demonstrably improves trade finance access and final sale prices for smallholders by mitigating counterparty risk and enhancing transactional integrity. Policymakers and development finance institutions should support the scaling of blockchain-based digital collateral platforms. Further research should examine the long-term sustainability and operational costs of such systems for wider staple and cash crop value chains. agricultural finance, distributed ledger technology, collateral, smallholders, Ethiopia, price differential This paper provides the first empirical evidence quantifying the price premium attributable to blockchain-secured warehouse receipts in a sub-Saharan African agricultural context, offering a novel mechanism for enhancing financial inclusion.

Keywords: *Warehouse receipt financing, Agricultural finance, Price premium, Sub-Saharan Africa, Smallholder farmers, Trade credit, Commodity markets*

Article Highlights

- Blockchain-secured receipts generated an 8.7% average price premium for sesame farmers.
- Enhanced lender confidence led to a 15% average reduction in interest rates on advances.
- The system improved formal financial institutions' willingness to provide trade credit.
- Technology mitigates counterparty risk and enhances transactional integrity in value chains.

Study Context

Cross-sectional survey of sesame farmers in Humera, Ethiopia, comparing blockchain-secured warehouse receipts against conventional systems using econometric analysis.

This study provides first empirical evidence of blockchain's price premium effect in sub-Saharan African agriculture.