



# Agricultural Marketing and Financial Institutions in Ethiopia: Participation Decision, Impact, and Firm Performance

Solomon Bizuayehu Wassie

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## 博士論文内容の要旨

氏名 Solomon Bizuayehu Wassie

専攻・講座 食料共生システム専攻・食料環境経済学講座

論文題目 (外国語の場合は、その和訳を併記すること。)

### Agricultural Marketing and Financial Institutions in Ethiopia: Participation Decision, Impact, and Firm Performance

(エチオピアの農業協同組合、農村組織、農村金融機関に関する実証分析)

指導教員 草苺 仁

The dissertation is organized into five chapters. The first and the last chapters are background and summary of the dissertation, while chapters two to four are independent empirical studies based on primary and secondary data from Ethiopia.

#### 1. Background

Since the early 1990s, the Ethiopian government has been implementing different development programs aimed at eradicating poverty and improving rural livelihood. However, despite the tremendous progress in agricultural production and poverty reduction over the last decade, nearly 25% (25 million) of the population lives below the nationally defined poverty line. Poverty is a non-spatial and multifaceted problem in Ethiopia. Among others, the lack of strong institutions is the primary reason for the persistent poverty in the country.

In the absence of well-functioning and strong institutions: (1) smallholder farmers are likely to have poor access to agricultural inputs resulting in lower productivity; (2) smallholders may be challenged by their comparative disadvantage in the market – i.e., they face proportionally higher transaction costs, hindering commercialization of their output; (3) seasonality and volatility of food price will be higher, leading to severe food insecurity of the poor; and (4) poor farmers will face liquidity constraint which in turn hinders investment on agricultural production (e.g., technology adoption) and hence productivity. Altogether, the lack of strong institutions is a root cause for many problems leading to poverty.

There is no single solution for all the multifaceted problems in Ethiopia. However, strong market-enabling institutions will have a substantial contribution in resolving agricultural production and marketing problems in the country. It is increasingly recognized that institutions have the potential to improve the wellbeing of rural households. In recognition of this, the Ethiopian government showed renewed interest in the establishment and strengthening of institutions. As such, the increasing interest in the cooperative sector development, the establishment of the Ethiopian commodity exchange (ECX), and efforts to improve access to credit through microfinance institutions (MFIs) are assumed to have a considerable impact in resolving the problems outlined above.

#### 2. Objective and Research Questions

Despite the differences in their organizational activities, ultimately, the establishment of the cooperatives, ECX, and MFIs in Ethiopia aims to eradicate poverty and improve rural livelihood.

The overall motive of the dissertation is, therefore, to examine members' participation decision in agricultural cooperatives, the impact of membership on rural livelihood, and the performance of institutions. Specifically, the dissertation investigates the following research questions in pursuit of its overall objective. (1) What are the factors that affect community-level participation rate in agricultural cooperatives? (2) Which factors drive member's participation in agricultural cooperatives? (3) Do agricultural cooperatives improve the agricultural performance, market orientation, and welfare of their members? (4) What are the characteristics and degree of staple food price seasonality in Ethiopia? (5) How and to what extent warehouse services affect the seasonality of food price in Ethiopia? (6) Which factors determine the social and financial performances of MFIs in Ethiopia? (7) Is there mission drift or are MFIs in Ethiopia systematically ignoring the poor in the pursuit of profit? The subsequent sections of the summary explain how these research questions are addressed in the dissertation.

### 3. Participation in and Impact of Agricultural Cooperatives

The primary objective of agricultural cooperatives is to facilitate smallholders' input and output markets. By increasing (reducing) access to (cost of) agricultural inputs, cooperatives help farmers to improve their productivity and income. Agricultural cooperatives can also enhance the overall welfare of smallholder producers through commercialization of their output. Recently, the Ethiopian government has re-emphasized the role of cooperatives in improving rural livelihood. As part of the cooperative sector development, the government founded the Federal Cooperative Commission (the current Federal Cooperative Agency), in 2002, to further increase its outreach by establishing one cooperative per kebele/village. Accordingly, the number of cooperatives has increased from nearly seven thousand in 2008 to more than 15 thousand at the end of 2014. Similarly, cooperative unions have risen from 126 to 181 during the same period. The present study was, therefore, motivated to explore the role of cooperatives in improving the wellbeing of smallholder farmers who are producing more than 90% of the total grain produced in the country.

The dissertation used a household and community level survey data, collected by International Food Policy Research Institute (IFPRI), and examined the participation in agricultural cooperatives and its impact on agricultural performance, market orientation, and welfare. The study evaluates the effectiveness of membership in agricultural cooperatives using an endogenous switching regression (ESR) model, which accounts for observable and unobservable bias. Estimation results revealed that access to a paved road, average landholding per household, and information access have a positive and significant effect on the community-level participation rate in agricultural cooperatives. The

results also showed that agricultural cooperatives are less inclusive of land-poor and illiterate households. On the other hand, cooperatives effectively improved agricultural performance and welfare of its members—i.e., members of the cooperatives would have received 1.37 quintal/hectare (nearly 5%) yield reduction and 1804 *Birr* (about 13%) less income if they had not joined cooperatives. Likewise, members of the cooperatives would have cost 22 *Birr*/quintal (about 1.5%) more for fertilizer if they had not been members. Moreover, members of marketing cooperatives would have got 34% less marketed surplus if they were not members.

### 4. Warehouse Services and Price Seasonality in Ethiopia

Studying the seasonality of staple food price in Ethiopia is essential mainly for two reasons. First, there is a strong negative association between seasonality of food price and intra-annual consumption in Ethiopia. Specifically, consumption of the poor is highly price-sensitive, and hence they suffer from food insecurity during the peak periods of food price. Second, seasonality is one feature of food price volatility (predictable component) that discourages smallholder farmers' investment in agricultural production. Moreover, the present study examines if there exists an association between the warehouse services of ECX and food price seasonality in the country.

The ECX was established in 2008 as a response to the longstanding problem of 'thin markets' in Ethiopia – i.e., markets in which there are few purchases and sales. While building upon the existing informal market, the ECX serve farmers and small traders by adding technology and systems to bring a transparent, more efficient, and more reliable trading platform to all concerned. In this regard, the ECX installs price display boards and establish warehouses in different parts of the country to improve access to market information and storage services. The benefit of using the warehouse service is twofold. While storing their crop in a reliable warehouse, farmers can also use the issued warehouse receipt as loan collateral to access finance without actually selling their produce. Hence, the warehouse service of ECX eases access to credit by providing a legal receipt which can be used as collateral. This service of the ECX could, in turn, lessen food price seasonality by encouraging storage immediately after harvest – i.e., when the price is low.

The study used a monthly price panel data, from the Ethiopian grain trade enterprise (EGTE) and International monetary fund (IMF), and investigated the characteristics and extent of price seasonality in Ethiopia. More importantly, it evaluates the effect of warehouse service on the food price seasonality in the country. For this purpose, the study employed a two-parameter trigonometric seasonality approach and analysis of variance (ANOVA). The results showed no detectable

difference in price seasonality between wholesale and retail markets. However, there is a statistically significant seasonal gap variation among crops, the highest seasonal gap being for maize (20%). The findings also prevailed that 10-14% of monthly price volatility in Ethiopia is attributed to its seasonal (predictable) component. Most importantly, there is a significant association between the availability of warehouse service and the food price seasonal gap in Ethiopia. This result suggests that improving access to warehouse services will contribute to resolving the acute seasonality of food price in Ethiopia.

### 5. Performance of Microfinance Institutions in Ethiopia

Limited access to financial services is among the significant problems impeding rural livelihood development. The problem is particularly severe in developing countries like Ethiopia, mainly for two reasons. First, most of the conventional banks in the country are concentrated in urban areas, while more than 80 percent of the population is rural. Second, whenever available, the formal banking sector systematically excludes the rural poor due to the higher screening, monitoring, and enforcement costs of providing a small loan. The MFIs were therefore introduced, notably to developing countries, in the early 1970s to bridge this gap.

The main distinctive characteristics of MFIs in the financial market include, but are not limited to, the following: (1) they provide financial services to the poor, who are usually not considered to be creditworthy by banks; and (2) they solve the problem of information asymmetry and ease collateral requirement by establishing strong personal relationships, which generates social collateral. Therefore, MFIs face the dual challenge of providing financial services to the poor (outreach) and attaining financial sustainability.

Using unbalanced panel data (2000-2017) from the Microfinance Information Exchange (MIX) market database – the most extensive data source on the finances of MFIs in the world – a chapter of the dissertation investigates the performance of and mission drift by the MFIs in Ethiopia. The study used seemingly unrelated regression together with fixed effect and random effect models. The results indicated that, based on various outreach and financial performance metrics, the MFIs in Ethiopia have better performance compared to the 10 biggest economies in Sub-Saharan Africa. The econometric estimation results showed that asset holding and the yield on gross portfolio have a positive and significant effect on the social and financial performances of MFIs in Ethiopia. Furthermore, the number of loan officers, loan officer productivity, and personnel productivity have a positive and significant impact on the financial performance of MFIs. The findings also

demonstrated that MFIs are not shifting away from the more unfortunate clients, suggesting that there is no mission drift by MFIs in Ethiopia.

### 6. Conclusion and Implications

In conclusion, based on the results of the dissertation, the following implications are forwarded.

- ✓ While cooperatives have successfully improved the agricultural performance of their members, their role in improving marketing performance was only limited. To this end, improving the market orientation of cooperatives (e.g., through capacity building and improving information access) will help farmers to benefit from increased marketed surplus and income. Hence, the government in general and the federal cooperative agency, in particular, should encourage and train cooperatives to capitalize on output aggregation service.
- ✓ Cooperatives should devise strategies to improve their effectiveness and inclusiveness, whenever possible. In this regard, efforts to increase members with a larger asset base (e.g., livestock) in (marketing) cooperatives will improve their effectiveness without compromising inclusiveness. Likewise, expanding marketing cooperatives to areas where there are competitive input and output markets will increase their efficiency.
- ✓ Warehouse service of ECX has a positive impact on price stabilization. While market price stabilization is not its primary purpose, the effect of warehouse service on reducing price seasonal gap will be higher if priority is given for food items with a higher seasonal gap, maize in this particular case.
- ✓ Estimation results revealed that there is no evidence of mission drift in Ethiopian MFIs. Hence, the MFIs in Ethiopia are encouraged to exert more effort towards improving their social performance. To this end, MFIs can attain their social obligations by increasing the number of loan officers and improving employees' productivity – e.g., by adopting innovative approaches that ease the monitoring and evaluation of borrowers and outstanding loans. Furthermore, efforts to enhance the asset holding of MFIs will help to realize their social obligations, serving as many clients as possible.

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審査委員	区分	職名	氏名
	主査	教授	草苺 仁
	副査	教授	金子 治平
	副査	教授	石田 章
	副査		印
	副査		印

## 要 旨

1990年代初頭から、エチオピア政府は貧困の撲滅と農村生活の改善を目的としたさまざまな開発プログラムを実施してきた。貧困の撲滅と農村生活の改善がリンクしているのは、農村人口が全人口の8割を超えるためである。プログラムは一定の効果を取ったものの、現在でも全人口の約25% (2,500万人程度) が貧困ラインを下回っている。そのため、エチオピアにおける貧困問題は、一筋縄では改善が不可能な、難解な問題であるかのように見える。こうした問題に対し、開発プログラムの妥当性は議論されたが、その一方で、農業や農村生活を支えるための組織が有する機能の効率性については看過されてきたとのことである。

本研究では、農業や農村を支える組織の機能不全が貧困人口の減少を阻む主要因であると捉えて、Agricultural Cooperatives (ACs), Ethiopian Commodity Exchange (ECX), Microfinance Institutions (MFIs) の3つの代表的な組織を研究対象としている。農村生活の向上や貧困の改善に、それぞれの組織の貢献度合いを明らかにすることが研究の目的であり、そのため、各組織のパフォーマンスを実証している。具体的な研究課題は、(1) ACsの地域加入率に影響を与える要因は何か。(2) ACsは組合員の農業生産性、収入、経済厚生を向上させるか。(3) ECXが関与する食料価格の季節変動の影響とは何か。(4) 食料価格の季節変動の安定化に、ECXの倉庫保管サービスは寄与しているか。(5) MFIsの社会的・財務的業績を決定する要因は何か。(6) MFIsは低所得者層の生活改善に寄与しているかについての6点である。

本論文は5章で構成されている。最初と最後の章は論文の背景と要約であり、第2章から第4章はエチオピアのマクロデータや公表データに基づいた実証研究である。

第1章 (Introduction) では、対象である3つの組織が果たす役割について検討している。3つの組織がうまく機能しない場合、(1) 小規模農家は農業生産資材の調達・投入が十分にできず、生産量が減少する。(2) 小規模農家はスケール・バイアスに直面する可能性がある。(3) 食料価格の季節変動が大きくなり、特に小規模農家を含む低所得家計で生活が困窮する。(4) 金融市場の機能不全は、特に小規模農家の投資を妨げ、生産性を低下させる。以上の問題に対処すべく、エチオピア政府はACs, ECXの設立、MFIsを通じた信用アクセスの改善に向けた取り組みを実施したが、その実効性に対する評価は不十分であった。

第2章 (Participation in and Impact of Agricultural Cooperatives) では、穀物の90%以上を生産している小規模農家に対して、ACsが果たす役割について検討している。ACsの主な目的はスケール・バイアスの改善にあり、購買事業や販売事業を通じて安価な農業資材の調達やマーケットパワーの強化を実現して生産性や収入を向上させ、農家の経済厚生を高めることにある。本研究では、International Food Policy Research Institute (IFPRI) が収集した家計および地域レベルの調査データを用いてACsへの加入と農業のパフォーマンスの関係を分析している。具体的にはEndogenous Switching Regression (ESR) を用いて、(1) ACsへの地域加入率 (コミュニティレベルの参加率) に影響する要因と、(2) 加入と農業パフォーマンスの関係を推定した。ESRを用いる理由は、「農業のパフォーマンスが良好なためにACsに加入した」というような逆の因果関係によるSSB (Sample Selection Bias) を回避するためである。その結果、(1) 舗装道路へのアクセス、一世帯当たりの土地保有面積、情報アクセスがACsの加入率に正の効果をもたらし、(2) ACsに加入することで農家の収量は1.37qt/ha (1 quintalは約100kg) 増加、粗収入も1,804Birr (1Birrは約4円) 増加、肥料代は22Birr/qt減少した。土地保有面積が加入率に正の効果をもっていたことは小規

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模農家の加入率が低いことを示しており、小規模農家に対する舗装道路や情報アクセスの改善が加入率向上のために有効な対策であることが明らかになった。	
第3章 (Warehouse Service and Price Seasonality in Ethiopia) では、エチオピアにおける食料価格の季節変動について検討している。(3) エチオピアでは食料価格の季節変動と月次消費量との間に強い負の相関が観察され、エンゲル係数の高い低所得者層ほど価格高騰時の影響が深刻になる。また、小規模農家にとっては農業生産の継続性や投資を阻害する直接的な要因となる。そのため、エチオピアは価格変動の大きいthin markets (相対的に取引量が僅少な市場) 対策として2008年にECXを設立し、国内各地に設置した倉庫による農産物保管サービスと、価格表示ボードによる価格情報を提供している。貯蔵と放出による市場価格の安定化とともに、貯蔵に際して発行される保管証明書がローンの担保となり、農家は農産物を販売することなくクレジットによる資材調達や投資が可能となる。実証分析ではテフ (イネ科穀物)、トウモロコシ、小麦を対象に、Ethiopian Grain Trade Enterprise (EGTE) とInternational Monetary Fund (IMF) による月次価格のパネルデータから価格の季節性要因について分析し、倉庫保管サービスが食料価格の季節性に及ぼす影響を評価した。具体的には三角関数を利用した推定法 (trigonometric function approach) を用いて季節変動要因を析出した上で、分散分析 (ANOVA) を行った。その結果、価格の季節変動について卸売市場と小売市場の間で有意差は検出されなかったが、作物間には有意差が認められた。(4) 倉庫保管サービスと価格の季節変動との間に相関関係が認められ、倉庫保管サービスへのアクセスを改善することによって、食料価格の季節変動を抑制できることが示されている。	
発展途上国の農村部では、金融サービスの提供が不十分であるとされてきた。エチオピアの銀行はほとんどが都市部に集中しており、このこと自体、農村部のアクセスが困難であることを示している。加えて、フォーマルな銀行セクターでは、小規模なローンを提供するためのスクリーニング、モニタリング、執行コストが高価となるため、農村部の低所得者層はサービスの提供エリアから意図的に排除され、これが農村の生活改善を妨げる問題となってきた。第4章 (Performance of Microfinance Institutions in Ethiopia) は、こうした問題の改善に向けて1970年代から導入が開始されたMFIsのパフォーマンスを検討している。MFIsは低所得者層への融資という社会的役割を帯びているが、(5) 資産と融資残高のリターンで財務状況が改善すると、MFIsは社会的役割をより発揮すること、MFIsのリターンは、融資担当者数の増加、貸付担当者一人当たり融資数の増加、職員一人当たりの融資数の増加で改善することが示された。さらに、(6) 低所得者層へのアウトリーチと財務状況の指標について分析した結果、エチオピアのMFIsは、エチオピアを除くサブサハラ10か国に比べて、より良好なパフォーマンスを発揮しており、低所得者層に対してもサービスを提供していることがわかった。以上はMicrofinance Information Exchange (MIX) が提供するパネルデータを用い、2000~2017年について固定効果モデルとランダム効果モデルに適用した結果である。	
第5章 (Summary, Conclusion and Implications) では、本研究の計測結果を整理して、以下のインプ리케이션を導出している。	
(1) ACsは会員の農業収入を向上させたが、小規模農家の積極的加入に対しては限定的であった。	
(2) 小規模農家の加入率を増加させるための改善策としては、農家からACsまでの交通 (舗装道路へのアクセス) や情報アクセスの改善によって、ACsサイドの市場志向を強化することなどがあげられる。	
(3) 食料価格の季節変動は低所得者層ほど価格高騰時の影響が深刻になる。また、小規模農家にとっては農業生産の継続性や投資を阻害する直接的な要因となる。	
(4) テフ、トウモロコシ、小麦について倉庫保管サービスと価格の季節変動との間に相関関係が認められた。倉庫保管サービスへのアクセスを改善することによって、食料価格の季節変動は抑制可能である。	
(5) 資産と融資残高のリターンで財務状況が改善すると、MFIsは社会的役割をより発揮すること、そのリターンについては、融資担当者数の増加、融資担当者の生産性 (貸付担当者一人当たり融資数) や人事生産性 (職員一人当たりの融資数) の増大で改善することが推定結果から示された。	
(6) 低所得者層へのアウトリーチと財務状況の指標について分析した結果、エチオピアのMFIsは、エチオピアを除くサブサハラアフリカ10か国に比べて、より良好なパフォーマンスを発揮していることが明らかとなった。	
本研究は、従来看過されてきた農業や農村生活を支える3つの代表的組織であるACs, ECX, MFIsの機能について実証分析を実施した計量経済学的研究であり、貧困の撲滅と農村生活の改善に関わる問題点と改善策について重要な知見を得たものとして価値ある集積であると認める。よって、学位申請者のSolomon Bizuayehu Wassieは、博士 (学術) の学位を得る資格があると認める。	