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Private- Cooperatives Synergy in the Face of Agricultural Policy Changes: Moral Hazard Behavior Ameliorated? An Experience from Coffee Cooperatives in Southern Highlands, Tanzania

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Abstract: The private sector is essential for improving the coffee sector by supporting farmers through cooperatives and groups. The study objective is to assess the impact of policy changes on moral hazard and private-farmers investment synergy. The present study used data collected from coffee farmers and cooperatives in Mbeya, Songwe and Ruvuma in Tanzania. Analyses were achieved by using descriptive statistics and difference-in-difference (DiD) at both the farm level and cooperative level. The results indicate that the 2017/2018 government policy changes ameliorated moral hazard and free-riding behaviors among farmers, owing to repay loans. Cooperatives with contractual arrangements with private investors suffered from moral hazards attributable to policy changes whereby the decline in the coffee collection was 33,040 kg (with an average treatment effect on the treated (ATT)) of coffee parchment, whereas, at the farmers' level, farmers reduced the collection of coffee with an ATT of 24.6 kg. In addition, because of these changes, some central pulse units were found to be non-functional, while others were under-utilized. In this regard, such moral hazard behavior among coffee farmers destabilized cooperatives, as well as the existing synergy between private investors and cooperatives. It is recommended that before policy or any institutional change, it is important to consider strategies and paths to reduce the moral hazard and free-riding behaviors of any stakeholder to improve market efficiency. For the coffee sector, this would include farmers collecting coffee from member cooperatives only. The government must consider having an effective institutional/policy change mechanism, in particular having a preparatory stage for policy change, to ensure that all contracts that have to be affected by such changes are reinforced properly to reduce unnecessary losses for any actor in the value chain. The government can facilitate or mediate disputes related to investments in agriculture, provide administrative support, and help negotiate compensation.

Keywords: *Private- Cooperatives Synergy, Policy changes, moral hazard behavior, coffee marketing.*

1. Background

Coffee production is an important part of Tanzania's economy, with coffee output averaging between 30,000 and 40,000 metric tons per year, with Arabica accounting for 70% and Robusta accounting for 30% (Mavuno Technologies, 2022). This sector contributes approximately 1.7% of the total share of coffee production in the world (OEC, 2022). Coffee farming is dominated by subsistence farming and it provides direct income to more than 450,000 households and livelihoods for more than 2.5 million Tanzanians through marketing and value addition (TCB, 2017). Coffee is mainly grown in Kilimanjaro, Arusha, Mbeya, Songwe, and Ruvuma regions. Other regions included Kigoma, Mara, Rukwa, Tanga, and Kagera (Robusta). The current average production is 55, 000 tons annually, accounting for just 0.7% of the world output (TCB, 2017). The southern highland regions are endowed with suitable land for coffee production, with enormous potential for expansion of production in the zone. However, the major challenges in coffee production include low production of quality coffee and productivity, the inadequacy of extension services, high prices and low access to reliable agro-inputs, poor agronomic practices, instability of coffee prices in the market, and lack of financial institutions investing in the coffee value chain, which could have enabled farmers to access reliable loans (FAO, 2020).

Coffee production variation over the past 50 years (Figure 1) indicates that the maximum production was recorded in 2005 at 95,000 tons (FAO, 2020). The average coffee yield per hectare is 250 kg for Arabica and 750 kg for Robusta, which is relatively low compared to the global potential yield of approximately 1,250 kg/ha for Arabica and 1,500 kg/ha for Robusta (Andrew and Philip, 2014). The low yields were attributed to factors such as few old trees in most farms, poor agricultural practices (e.g., high intensity of intercropping with bananas, especially in the northern and western zones), insufficient use of inputs (fertilizers and pesticides), and climate-related problems such as drought and increasing temperatures. Since coffee production and primary processing are undertaken by smallholder farmers, this has a serious implication on coffee quality, unlike in estates where primary processing standards are followed, resulting in premium

quality coffee. The two most commercially important species grown in Tanzania are varieties of Arabica Coffee and Robusta Coffee, a larger part of which is exported as raw materials, while the remaining proportion is roasted mainly for local use.

Coffee Production Potential in the Southern Highland: Coffee production was estimated to increase from 50,000 tons to reach 100,000 tons by the year 2021 (Figure 1) (TCB, 2017). It was envisioned to an increase in volume has to go hand in hand with the increase in quality from 35% premium coffee to at least 70% (TCB, 2017). Although vision is crucial, the northern coffee-producing zone in Tanzania has been declining as farmers consider coffee production no longer profitable compared to other fast crops such as bananas, tomatoes, and dairy farming (Makoye, 2015). Coffee production in the southern highlands has been increasing, requiring deliberate efforts to revive crop production by gap-filling. The southern highlands constantly increased to offset the decline in the northern highlands (Makoye, 2015). As indicated (Figure 2) the evolution of coffee production in Tanzania, whereby in the 1980s, the northern part contributed approximately 66% of the total coffee by 2008, but by 2015, its contribution was approximately 28%, while the total production remained the same (Craparo et al., 2015). Accordingly, the trend of coffee production has remained skewed to the Southern Highland, as its northern part has been experiencing an increase in temperature, as well as farmers shifting to other economic activities, largely horticulture.

Figure 1: Trend of Coffee Production in Tanzania

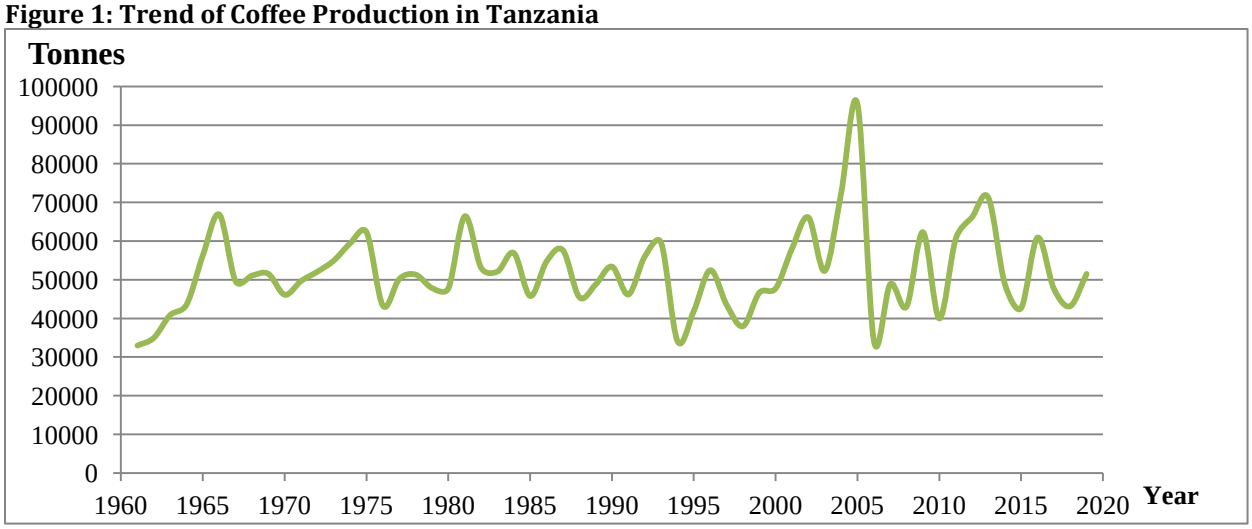
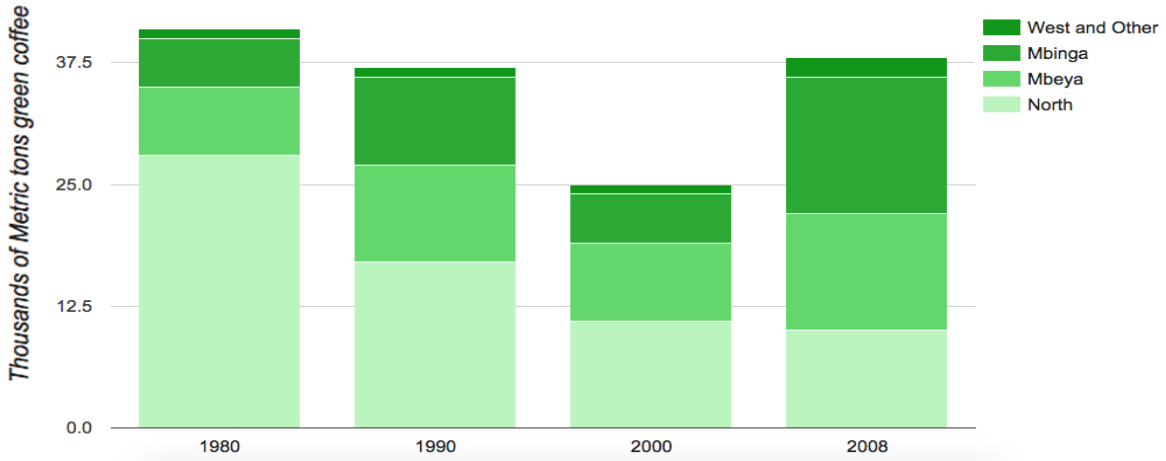


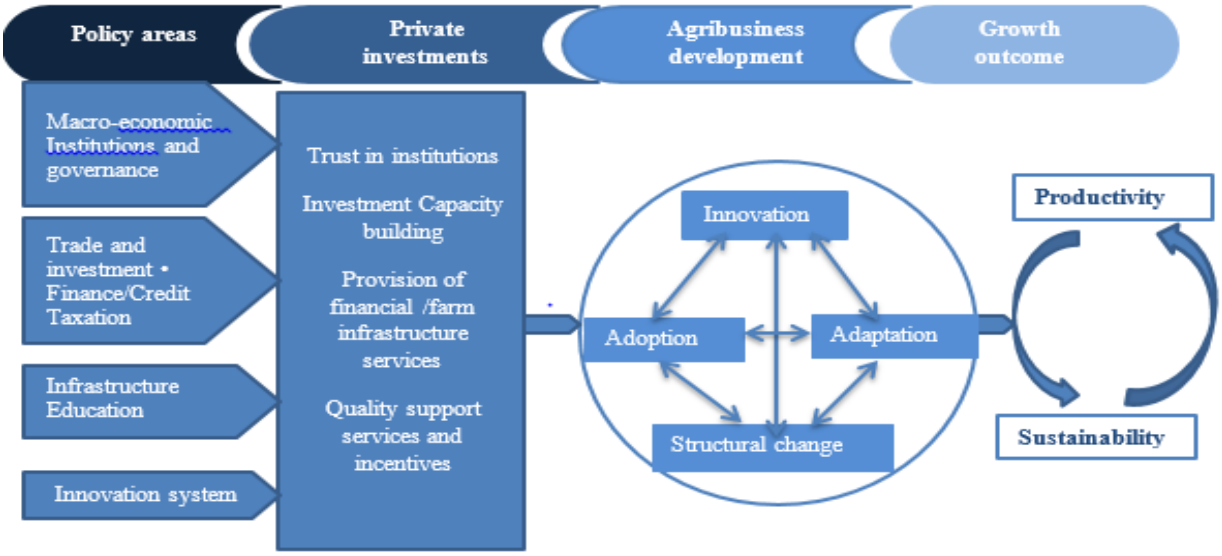
Figure 2: Changes in Coffee Production across Zones in Tanzania



Source: TCB (2017).

Public Policy, Private Investment, and Smallholder Producers' Synergy: The government makes policies to improve the marketing of a specific crop, although this is not always the case. Public policy is a regulatory measure, courses of action and funding priorities concerning a given topic promulgated by a governmental entity (Kilpatrick, 2010). Public policies are set forth for both short-term and long-term benefits and across different groups and the economy at large (Marwa, 2015) and it is therefore important to understand how public policy changes affect cooperative–private investment synergy.

Figure 3: Policy, Private Investment, Productivity and Sustainability in Agriculture



In the context of policies (Figure 3), private investment and smallholder farmers' production and productivity synergy, cooperatives, and farmer groups have been instrumental (Harwig, 2019; Hanns R. Neumann Stiftung, 2018; Ruben et al., 2018; IDH the sustainable trade initiative, 2015; Technoserve, 2015; IFAD, 2013). Beyond the normal functions of cooperatives in supporting farmers, to strengthen the synergy between them and private investors, they have the so-called collective reputation in contracts to deliver services acquired from private investors, such as financial services, inputs, machinery, and equipment to their members. Accordingly, performing agricultural cooperatives address the challenges facing their members, and one of the ways has been securing loans from private investors for which repayment depends largely on deductions from earnings in the following season (FAO, 2012). Farmers have been securing services from private investors through their cooperatives, largely because of the collective reputation of strong contracts governed by governmental legal frameworks, policies, regulations, laws, and laws. For example, more than seven regulatory frameworks govern the coffee sector in Tanzania. These include the 2001 Tanzania Coffee Industry Act, 2013 National Agriculture Policy, Tanzania Coffee Industry Development Strategy (2011-2021), Coffee Industry Regulations of 2013, District Council by-laws, and onset policy changes.

2. Relationship between Set Policy Change and Moral Hazard

The purpose of the government regulatory framework in cooperative-private investment synergy is to ensure that cooperative members and investors comply with the agreed conditions for continued synergy (World Bank, 2021; International Cooperative Alliance, 2020; Urassa, 2014). With specific to agriculture and cooperative development, government formulates policies for supporting members, improving marketing efficiency, and eliminating barriers to improved marketing (Ruete, 2014). The regulations also play the function of ensuring that a level playing field with other types of business organizations is guaranteed and maintained. The synergy between private investors and cooperatives and hence smallholder farmers can be particularly positive only when ethical and sustainable business principles are followed (OXFAM, 2012). Cooperatives' performance is based on collective reputation among members. Megyesi and Mike (2016) explain that a collective reputation among members is an important type of collective action to stabilize cooperative relationships among members and external stakeholders.

Reputation has long been recognized as a market force that may ensure contractual performance (Klein and Leffler, 1981). Accordingly, collective reputation assumes that the farmers in the cooperative share a common reputation, which is based on the group's past average quality and depends on the reputation of the individual (Tirole, 1996). However, moral hazard and free-riding behavior exist among farmers and hence require a regulatory framework to control such behavior. A remedy to the moral hazard and free-riding behavior problems is to invest resources in monitoring actions by using contracts that penalize dysfunctional behavior (and use the information in the contract (Holmstrom, 1979). However, onset changes in the regulatory framework may ameliorate moral hazard behavior among farmers, resulting in the collapse of cooperatives because the reputation of these cooperatives sits on the collective thoughts and feelings of the members (Deloitte, 2016). In addition, private investors may incur losses because cooperatives fail to pay back loans or any services provided. This study postulates that on-set changes in the regulatory framework of the coffee sector in Tanzania in 2017/2018 created loopholes for coffee farmers to practice moral hazard in a prior-established synergy between cooperatives and private investors, which aimed to enhance productivity and sustainability among smallholder farmers. After the 2017/18 coffee season, the government of Tanzania declared a new regulation for coffee marketing aimed at improving marketing efficiency.

One of the key parameters was cooperative, being the sole collector of coffee from farmers, unlike in the previous season, where cooperatives, farmer groups, and individual traders were equally allowed to collect or buy coffee directly from farmers, the policy change mandated cooperatives to collect coffee from farmers solely. In this regard, the study aimed to answer the following policy questions: Do changes in the regulatory framework ameliorate moral hazard behavior among coffee farmers? Second, to what extent do changes in policies and regulations destabilize private-farmers investment synergy? In particular, moral hazard is defined as a situation in which a contractual relationship suffers from an onset regulatory framework due to the behavior of one or both contractual parties being able to shirk the contract in a way that alters the expected payout (Liang and Coble, 2009). According to Holmstrom (1979), moral hazard results in the worst performance when collective rents depend on individuals' hidden actions. Moral hazard arises when monitoring is not fully implemented to detect who fails to comply with contracts because there is no longer a lawful path to monitoring or reforms made to some organizations changing their structures (Liang and Coble, 2009; Ozanne et al., 2001). For example, one of the changes was that all farmer groups operated as a cooperative, and no private trader was allowed to buy coffee directly from farmers. Such changes may create opportunistic behavior among coffee farmers because of the possibility of being obliged to comply with the prior contractual arrangement.

Opportunistic behavior due to an incomplete contract enforcement environment, such as policy change, is a risk in many economic transactions leading to unfulfilled contracts (De Janvry and Elisabeth, 2007). Scholars have identified sources of moral hazard and free-riding behaviors in farmers/cooperative and private investors relationships including asymmetric information and idiosyncratic (Arouna et al., 2021; Bonroy et al., 2018; Merel et al., 2015; Castriota and Delmastro, 2015; Fares and Orozco, 2014; Ashraf et al., 2009; Fares, 2009**;** Cinyabuguma et al., 2004). To our knowledge, little is known about the extent to which changes in the regulatory framework promote moral hazards among farmers. Under the 2017/18 government directives towards coffee marketing, existing farmer groups were obliged to change their structures and became cooperatives with no transformation process. Private investors who had invested in coffee quality improvement by establishing central pulpery units for selected farmer groups were prohibited from buying coffee directly from farmers. Prior to changes, some of the investor-farmer groups' synergy was as follows: first, supplying inputs to farmers through their groups and deductions to be made in the following harvest season. Second, farmer groups and cooperatives secured coffee processing units on contractual arrangements that allowed farmers to pay back the next coffee sales. Third, private investors provided other support, such as transportation of inputs to reach farmers, with the expectation that cooperatives will process coffee at their processing plants.

3. Methodology

Setting and Data: Data collection and analysis hinge on the government policy changes on coffee marketing in the 2017/2018 coffee season by considering before and after the changes. In 2017/18, the government of Tanzania changed its coffee marketing policy whereby it was meant to improve coffee marketing efficiency.

Such changes provided a plausible variation that helped identify before and after data useful in analyzing the impact of such changes on moral hazard and private investors-cooperatives synergy. Data for the coffee collection were collected through registers as all cooperatives keep records for several years for each farmer, and farmers have solid record keeping. Cooperatives were categorized into two groups: those with contractual arrangements and those without contracts. For this, it was possible to make a clear cut-off for the two groups. Accordingly, random assignment of treatment has become more common in social sciences, such as pilot studies of policy interventions; most real-life situations involve non-random assignment (Fredriksson and de Oliveira, 2019). Group one contains cooperatives and farmers with contractual arrangements that were hypothesized to be subjected to policy changes, creating rope holes for farmers and cooperative leaders to breach the contract because of moral hazard and free-riding behavior.

Group two included farmers whose cooperatives had no contracts and were referred to as control groups. for purpose of identifying the extent to which other factors affect selling decisions by farmers, social-economic characteristics such as age, gender, annual earnings, household size, the main source of income, religion, household size, coffee farming experience, location, extension services received, coffee variety, and access to financial services other than private companies for control factors were also collected. For the rigorous selection of the groups, matching was applied to have two groups with similar characteristics, except having a contract with private investors, denoted as 1, otherwise 0. Researchers took the precaution of having an unclear group that the choice of a comparison group may be unclear due to an ambiguous functional form in the pre-treatment trend, lack of balance in the distribution of covariates between the treatment and comparison groups, or lack of overlap (Clair and Cook, 2015). Cooperatives and farmers were purposively selected, and a total of 46 cooperatives were found to have rich data useful for analyzing the impact of public policy changes on coffee. Based on whether a cooperative had a contractual arrangement, forty-six cooperatives (25 controls and 21 treatments) were identified. Within the identified cooperatives, about 1236 (562 farmers from cooperatives with contracts with private investors and 674 from cooperatives without contracts) were selected and interviewed.

Theoretical and Empirical Framework: Let cooperatives of N members seek to gain from collective action by acquiring services from their cooperatives. To support its members, the cooperative may decide to have contractual arrangements with private investors annually. If cooperatives accept contracts with investors, it is necessary to enforce contracts and rights; (Offe, 2000) thus, synergy is established. In the coffee sector, there are two types of cooperatives: cooperatives with a contractual arrangement (CCP) and cooperatives without a contractual arrangement (CWP). To achieve DiD analysis, the level of production was assumed to be constant on average years with quantity (Q) and they are allowed to collect coffee at a cooperative regardless of whether they are members or nonmembers. The total coffee collected (Q) is the summation of coffee collected from the own cooperative (OC) and non-membership cooperative (NOC) (Q=OC +NOC). With moral hazard and free-riding behaviors, if OC provided services to her farmers in the base year, farmers would deliver less (OC) and more to NOC. However, because of trust, some farmers will maintain collecting coffee from their cooperative (OC) as per harvest (Action A), and others will deviate by collecting coffee from other cooperatives NOC (Action B).

Farmers decided that action B would cause cooperatives to fail to repay loans; hence, synergy is weakened and both cooperative and private investors may incur losses. Because of the change in coffee marketing policy, creates loopholes for farmers to not collect coffee from their respective cooperatives as the bidding principle has changed, and hence moral hazard and free-riding behavior. This study measures moral hazard behavior in terms of farmers' declined supply of coffee to their cooperatives from which they received loans in terms of inputs conditioned to payback due to coffee collection, and these cooperatives had secured funding from private investors. Following the theoretical framework stated above, the empirical strategy focuses on testing whether changes in the coffee marketing policy caused moral hazard behavior among coffee farmers, given covariates (X= (X1……..Xn)). The proxy for policy change outcome is whether a particular cooperative contracts with a private investor or not. It is assumed that these changes created a loophole for farmers to reduce the quantity of coffee collected through cooperative services.

Formalizing the Counterfactual Approach

Notation: The difference-in-differences (DID) method was found to be appropriate for impact evaluation in this study. DID explores the time dimension of the data to define the counterfactual. Data for both the treated and control groups before and after treatment are required. It estimates the impact of the intervention by comparing the difference in outcomes between the treated and control groups in some periods after the participants had completed the program with the difference that existed before the program (Wooldridge, 2005 and Gibbons et al., 2018). Compared to cross-section estimators, it has the advantage of controlling for differences in unobservable characteristics over time, that is, a specific form of selection on unobservable characteristics. For this case, two groups are indexed by treatment status T=0,1, where 0 indicates coffee farmers/cooperatives who/which are not likely to be affected by a change in policy on coffee marketing (control group) and 1 indicates farmers/cooperatives who/which are affected by the decree (treatment group).

Several scholars have applied DiD to assess the impacts of policy changes in different economic sectors (Flammer, 2014; Lemmon & Roberts, 2010). DiD follows that farmers and cooperatives data is observed in two time periods, t=0,1, where 0 is a time period before the policy change (pre-treatment) and 1 is a time period after changes (post-treatment). Let $\overline{Y}_0^T$ and $\overline{Y}_1^T$ be the average outcomes for the treatment group before and after, respectively, and $\left(\overline{Y}_1^C\right)$ and $\overline{Y}_0^C$ be the corresponding outcomes for the control group. The subscripts correspond to the time and treatment status. The difference in difference (or "double difference") estimator is defined as the difference in average outcome in the treatment group before and after treatment minus the difference in average outcome in the control group before and after treatment: it is literally a "difference of differences.

$$"\widehat{ATT} = (\overline{Y}_1^T - \overline{Y}_0^T) - \left(\overline{Y}_1^C - \overline{Y}_0^C\right) \quad (1)$$

The difference estimator for the pre-period; â which is then subtracted from the post-period estimator to obtain δ.

Modeling the Outcome: Policy changes of the year (2017/18) when new directives started to be implemented, and the variable of interest was cooperative coffee collected at both the cooperative level and farmers affected by the policy.

$$\text{Government policy on coffee marketing} \begin{cases} 0 = \text{before policy change (2017/18)} \\ 1 = \text{after policy change} \quad (2018/19) \end{cases} \quad (2)$$

$$\text{Government decree on coffee marketing} \begin{cases} 0 = \text{cooperatives not affected} \\ 1 = \text{cooperatives affected} \end{cases} \quad (3)$$

The outcome Yi is modeled by the following equation

$$Y_i = \alpha + \beta T_i + \gamma t_i + \rho(T_i * t_i) + \sum_{i=2}^{n} \beta_i X_i + \varepsilon_i \quad (4)$$

Where the coefficients given by α, β, γ and ρ are all unknown parameters and $\varepsilon_i$is a random, unobserved "error" term which contains all determinants of Yi which our model omits. By inspecting the equation, you should be able to see that the coefficients have the following interpretation

α = constant term

β_1 = treatment group-specific effect (accounting for average permanent differences between treatment and control).

β_{2-6} =, where Xi denotes other observable factors (control variables) affecting the farmers' decision to default from selling coffee to the cooperatives where they obtained inputs on loans.

γ = time trend common to the control and treatment groups

ρ = true effect of policy change

Main Assumptions

A. The "parallel trends" assumption; Difference-in-difference (DiD) estimators assume that in absence of treatment the difference between control (B) and treatment (A) groups would be constant or 'fixed' over time. Identification based on DiD relies on the parallel trends' assumption, which states that the treatment group, without the reform, would have followed the same time trend as the control group (for the outcome

variable of interest)(Fredriksson & de Oliveira, 2019). The parallel trend assumption, following Lechner (2010), can be expressed in terms of the potential outcomes:

$$E(Y_1^0 \mid D = 1) - E(Y_0^0 \mid D = 1) = \alpha + \sigma^0 + Y - \alpha - Y = \sigma^0 \quad (5)$$

$$E(Y_1^0 \mid D = 0) - E(Y_0^0 \mid D = 0) = \alpha + \sigma^0 - \alpha = \sigma^0 \quad (6)$$

That is, the pre and post-period differences in baseline outcomes were the same (δ^0) regardless of whether individuals were assigned to the treatment group (D=1) or control group (D=0).

B. The unobserved heterogeneity is time-invariant and is canceled out by comparing the before and after situations (Wooldridge, 2005).

4. Results and Discussion

Impact of Government Policy Change on Coffee Farmers' Reputation to Cooperatives Coffee Collection at Cooperative: The review revealed that before 2018, coffee marketing was largely dominated by farmer groups, who sold coffee to private traders. After the 2017/2018 coffee season, the cooperatives became the sole collectors of coffee from farmers, resulting in the dissolution of all farmer groups, and private investors were restricted from direct contact with coffee farmers. In this regard, private investors who had provided loans and other production and marketing facilities remained uncertain, as farmers with moral hazard behavior were considered to have good chances of loan repayment, which was set to be done during coffee collection. In the early season of coffee farming, different companies and financial institutions contracted farmer groups and supplied different services such as inputs and money for operations. Subsequently, farmers received such inputs and were obliged to collect and sell coffee through groups. Results (Table 2) reveal the coffee collection trend of some cooperatives that experienced a huge decline in coffee collection compared to previous years and the projection. Table 2 indicates that changes in the coffee collection at the cooperative level were observed with an increase in the quantity of coffee at the cooperative that had no contract with private investors, whereas cooperatives that had contractual arrangements experienced a decline in the coffee collection. For confirming the parallel trends assumption, before policy changes, the coffee collection was not statistically different from zero. As it is indicated in Table 2, cooperatives with contractual arrangements used to collect more coffee compared to cooperatives without contractual arrangements.

With a mean difference of approximately 5,143 kg before baseline (first point for parallel trends assumption) and 4,766 kg (at baseline). However, after the policy changes, coffee collection at cooperatives with contractual arrangements declined significantly, reducing the capacity of these cooperatives to pay back loans from private investors. As indicated (Table 2), coffee collection declined by 43%, whereas cooperatives without contracts experienced an increase in the coffee collection by 25%. Generally, the onset of changes in coffee marketing created a moral hazard among coffee farmers, whereby cooperatives that had served their members with inputs and other services, such as processing, experienced a huge decline in the collection of coffee on an average of 21,826 kg. Cooperatives that had not provided inputs experienced an average increase in the coffee collection of 11 and 215 kg. This implies that farmers with loans from their respective cooperatives decided to sell coffee through other cooperatives, leading to their cooperatives failing to pay back loans from private investors. Based on the DID approach, policy changes negatively impacted cooperatives with contracts with private investors by an average treatment effect on the treated (ATT) of 33,040 kg. This has resulted in these cooperatives failing to repay loans from private companies and other financial institutions. For example, it was found that cooperatives had planned to deduct TZS 256 per kilogram for loan repayment and other operations costs, then, given ATT of 33, 040 kg, it implies such cooperatives lost about TZS 8, 458,240. The results are in line with those of Bachmann et al. (2019), who found that because of moral hazard behavior, farmers supplied low-quality milk due to adulteration stemming from the malpractices of some upstream milk producers.

Table 1: Difference in Difference Results at Cooperative Level

	2016/17 (Parallel trend point	2017/18 Before the enactment of the decree	After change	Difference	% Change in coffee collection	P Value (DID)
Treated	61,488	50,150	28,325	-21,826	-43.	
Control	56,345	45,385	56,600	11,215	25	
Difference	5,143	4,766	-28,275	**-33,040**		0.000***
P Value (parallel trend pre and baseline data 0.1842						

Impact of Change in Coffee Marketing Policy on Central Pulpery Unit (CPU): In Arabica coffee processing, central pulse units (CPU) have the potential to increase quality and hence price. Table 2 indicates that approximately 47% of the survey cooperatives were found to have CPUs. However, some cooperatives processed less coffee at their CPUs, as farmers-maintained processing coffee at their homes. For example, one of the cooperatives in the Mbinga district in the Ruvuma region, in the 2019/2020 season, processed only approximately 11% of coffee at the CPU. Key informant interviews revealed that, in the Rungwe district in the Mbeya region, all available CPUs were functional. According to the Rungwe district coffee inspector, there were nine redundant CPUs before 2018; six CPUs were functioning and owned by private companies. After the decree by the government prohibiting these companies from buying coffee at the farm gate, all the CPUs were grounded. In Mbeya DC, 13 CPUs were available, all functioning; in Ileje in Songwe district, six CPUs were available, two functional, and four CPUs required maintenance. In Mbozi District, approximately 108 CPUs were largely owned by private traders. Cooperatives hire them during harvest. However, approximately 60% of CPUs were not used because cooperatives failed to agree with their owners.

Table 2: Availability and Status of Central Puperly Unit (CPU)

Region	District	Total CPUs	Functioning
Mbeya	Rungwe	9	0
	Mbeya TC	13	13
Songwe	Mbozi	108	43
	Ileje	6	2
Ruvuma	Mbinga	24	24
	Nyasa	27	27

Furthermore, during 2017/2018, when the government restricted private buyers from purchasing coffee directly from farmers, farmers did not realize the price differences between coffees processed at CPUs and those processed at home. As a result, farmers have opted to process coffee at home. Other contributing factors include the fact that some cooperatives had a few members, and hence, per day collection of cherry is not sufficient to support the utilization of available CPUs. The challenges remain in the modality taken by cooperatives in terms of disaggregating prices according to whether coffee is CPUs or HP and cooperative leaders had been mixing in paying farmers, which means farmers were paid blanket prices, regardless of where they had processed their coffee.

Econometrics Results on the Impact of Policy Change on Moral Hazard Behavior: The results for DiD OLS model (Table 3) reveal the estimate of DID (Average Treatment effect on the Treated (ATT) is -24.6 kg of coffee parchment and is significant at 5% level. In other words, changes in coffee marketing policy caused the moral hazard behavior of decreasing the quantity of coffee collected from the respective cooperatives by 24.6 kg of coffee parchment over 1 year. Further, the interaction between treatment on treated and time significantly influenced farmers to reduce the quantity of coffee collected to their respective cooperatives by -8.4 kg coffee parchment relative to coffee farmers whose cooperatives had no contract private investors. However, some covariates, such as a cooperative with a CPU for coffee processing and average distance to the cooperative office, were cofounders. This implies that such covariates were found to influence farmers' decisions to default, from collecting their coffee to the respective cooperatives. This implies that the availability of CPU influenced farmers to be more morally obligated to their cooperatives relative to their counterparts.

Table 3: Econometric Results: Impact of Government Decree on Moral Hazard among Coffee Farmers

Variables	Coefficients	Pr(>|t|)
A: Impact of policy change on moral hazard among coffee farmers		
Average Treatment Effect on the Treated (ATT)	-24.6	0.000***
Time	-2.3	0.6204
Policy change*Time	-8.4	0.0585*
B: Farming practice		
Coffee farm size	-0.025	0.1625
Cost of input used	0.174	0.157
Coffee varieties	0.361	0.414
Cooperative own Central Pulpery Unit (CPU)	0.046	0.000***
C: Socioeconomic variables		
Household head education level (years)	0.167	0.445
Marital status	−0.011	0.183
Household size	0.024	0.873
Age of the household head	0.309	0.334
Distance to the coffee collection center	−0.003	0.852
Distance to Cooperative office	−0.002	0.011*
Income from other sources (TZS)	0.026	0.438
Relative/friend with cooperative leaders	0.037	0.344
Constant	-57.14	0.000***

*p < 0.10, **p < 0.05, ***p < 0.01, R^2=63, F-statistic: 18.23 p-value: 0.000***

5. Conclusion and Recommendations

Coordination of economic activities can be achieved through different means, and one is a collective reputation in coffee marketing. Through an in-depth econometric analysis of cooperative-based data and household survey data, it was found that the 2017/2018 government decree on coffee marketing ameliorated the moral hazard among farmers due to repayment loans. At the cooperative level, the decree impacted the decline in coffee collection with an average treatment effect on the treated (ATT) of about 33,040 kg, while at the farmer level; farmers reduced the collection of coffee with ATT of around 24 kg. In addition, because of these changes, some central pulpery units were found to be non-functional, while others were under-utilized. In this regard, such moral hazard behavior among coffee farmers destabilizes cooperatives as well as the existing synergy between private investors, since the reputation of these cooperatives sits on the collective thoughts and feelings of the members. It is recommended that before policy or any institutional change, it is important to consider strategies and paths to reduce the moral hazard and free-riding behaviors of any stakeholder to improve market efficiency. For the coffee sector, this would include restricting cooperatives from receiving coffee from non-member farmers. The government must consider having an effective institutional/policy change mechanism, in particular having a preparatory stage for policy change, to ensure that all contracts that have to be affected by such changes are reinforced properly to reduce unnecessary losses for any actor in the value chain. The government can facilitate or mediate disputes related to investments in agriculture, provide administrative support, and help negotiate compensation.

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