Impact of cooperative in market stabilization: The Case of Torban Anfilo Multi-Purpose Cooperative Union

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ABSTRACT

Recently, the Governments of developing countries have renewed their attention for cooperatives because of its role in social, political and economic development through enhancing food security, supplying agricultural inputs, marketing agricultural product, facilitating access to market and enhance access to credit for members and the community. However, the contributions of these cooperative are not without challenges. This research is entitled challenges of cooperative union in market stabilization in the case of Torban Anfilo multipurpose cooperative union. The main objective of the study is to assess challenges of cooperative union in market stabilization in Anfilo district. The survey method is used for the realization of this objective. The total population for the study is 4,017 primary cooperative members from which 314 individual members are determined using three stage sampling procedure in the collection of data from 314 randomly selected members based on list of member found in the cooperative using structured questionnaire. Data collected was analyzed by statistical package for social science version 20. The result of the study shows that there are different types of challenges that affect cooperatives in market stabilization. The study show that financial factor and cooperative infrastructure factors are the first and second most rated challenges of cooperative in market stabilization followed by organizational factor and cooperative members attribute on the 3rd and 4th respectively and the legal and regulatory factor become the least variable perceived challenges of cooperatives in market stabilization. The correlation analysis shows that cooperative members attribute organizational factor, financial factors, infrastructure factors and legal and regulatory factors shows statistically significant positive relations with the role of cooperatives in market stabilization. The regression analysis shows cooperative members attribute, organizational factor, financial factor and infrastructure factors shows significant positive effect on the role of cooperative in market stabilization. In order to enhance the role of cooperatives in market stabilization, researcher recommends that management of cooperatives union, management of cooperative promotion agency and Anfilo district administration has to work hard to facilitate the ground for improving members attribute, minimize organizational related challenges, improve access to finance, enhance infrastructure and foster the legal and regulatory issues of cooperatives. **Key Words:** *Multipurpose Co-operative, Market stabilization, Challenges, Anfilo,Python3*

INTRODUCTION

Agriculture is a source of food for world population operated by farmers. Almost half of world population is living in rural areas of developing countries and most of them are smallholder farmers whose livelihoods are fulfilled through agriculture and relevant activities(Masayebi & Maleki, 2013).Smallholder producers have represented two billion rural residents and producing 80 percent of world's food supply (Luna & Wilson, 2015).In countries like Kenya, Tanzania, Ethiopia and Uganda, over 75 percent of total agricultural output is produced by smallholder farmers (Katerere, et al., 2016). In most Sub-Sahara Africa countries, smallholder production accounts for 32 percent of GDP and 65 percent of employment (Kanu, et al., 2016).

However, they face different challenges in production and marketing as agriculture is increasingly knowledge intensive and involve many different actors like advisory services and staff that play convening, brokering and coordinating roles than simply passing on information for smallholders (Ojijo, Franzel, Simtowe, Madakadze, Nkwake, & Moleko, 2016).Improved access to information increases smallholder farmer resilience and enable them to take better decisions to improve their welfare in a sustainable way (Katerere, et al., 2016).Also, they faces high production and transaction costs because of underdeveloped basic infrastructure, such as all season roads, transport and market facilities, and limited access to productive resources (Barrett, 2009). Similarly, strengthening market access for smallholders is severely constrained due to pervasive market imperfections and coordination problems (Poulton, Kydd, & Dorward, 2006).

Regarding access to market, smallholder agricultural produces constraints of either farm input supplies such as improved seeds, fertilizers, pesticides, farm equipment or have no bargaining power to negotiate for price or inaccessibility of financial services (Kanu, et al., 2016), hurting farmers in improving their production.

In order to overcome such challenges of smallholder, farmers organized themselves in a more prevalent farmer organizations called cooperatives. Collective action in the form of a cooperative allows smallholder farmers to pool resources to overcome the risks and to realize economies of scale (Tefera, Bijman, & Slingerlan, 2016). Indeed, cooperative is a business model works as a mutual benefit

based on the service motive (not-for-profit) philosophy for long time over the world. Moreover, cooperative societies are organized and democratically controlled by members and primarily benefiting member in serving members with fair cost of services, accessing smallholders to market.

This is evident by that cooperatives have evolved significantly over the last 200 years and are of increasing importance to economies and societies throughout the world irrespective of their level of socioeconomic development worldwide (Altman, 2010).Through out of their life cooperatives help provide smallholder farmers with easy access to platforms through cost efficiencies obtained as a group and by pooling of resources which creates an opportunity to find new markets, improve management processes, train, and deliver information services to their members (Kanu, et al., 2016).

Furthermore, cooperative in any continents particularly, agricultural cooperative address marketing challenges by finding access to remunerative markets and link to modern value chains (Fischer & Qaim, 2012); reducing information asymmetries on prices, markets, product characteristics; collecting information and disseminating to members; reducing cost of selling farm products through provision of storage, facilitating transportation and enhancing members' bargaining power (Tefera, Bijman, & Slingerlan, 2016; Kodama, 2007).

Ethiopia is one of African countries where cooperatives are again acquired large emphasis as organizational vehicles for enhancing food security and reducing poverty (Tefera, Bijman, & Slingerlan, 2016) through increasing the participation of smallholders. In order to facilitate, Government increased number of extension agents for the support of stallholder as compared to SSA countries (Ojijo,

Alternate Hypothesis-

1.There is an impact of **TINDF on CMS.**

2. There is an impact of **TOIRF on CMS.**

3.There is an impact of **TINDF on CMS.**

4.There is an impact of **TFRF on CMS.**

Independent variables includes the following:
 TINDF: is cooperative member attribute
 TOIRF: is cooperative related organizational factors

RESEARCH METHODOLOGY

Research Design
The study employed Descriptive and Explanatory research design to meet the objective. It was used to find facts about the study such as the relationship of study variables. The study also used survey design. Indeed, survey method facilitates the collection of original data which was

Sampling Procedure

Franzel, Simtowe, Madakadze, Nkwake, & Moleko, 2016),established Ethiopian Commodity Exchange (ECX) to enhance agricultural marketing of smallholders, facilitated market coordination where cooperative unions are engaged in coffee marketing as major actors in connecting smallholders to remunerative regional and global markets (Meijerink, Bulte, & Alemu, 2014)which reduce price dispersion (Chapoto, Demeke, Onumah, & Ainembabazi, 2016).

Despite, cooperatives have significant role in market stabilization; their contribution was not as expected for various reasons. For instance, the survey by (Bernard & Spielman, 2009) among primary cooperatives revealed that the share of cooperatives in input supply and output marketing was about 70 percent and 10 percent respectively. Also, (Kodama, 2007) identified the biggest challenges for unions and cooperatives was shortage of funds for bulk purchase. Similarly,(Emana, 2009)identified cooperatives face constraints of technical skills and capital shortages. Furthermore, cooperative particularly in Ethiopia faced a challenge of low capacity of cooperative leadership and management and literacy gap from the cooperative leaders; Unsuitable lending policy of commercial banks coupled with limited (only one cooperative bank) and lack of comprehensive cooperative policy and strategy(Bezabih, 2012)

Cooperative unions operating in Kellem Wollega zone are also expected to experience those challenges. Torban Anfilo multipurpose cooperatives unions established by farmers to serves them in agricultural production and marketing there by stabilizing agricultural inputs and output markets. Hence, understanding challenges of cooperative in market stabilization is essential. Thus, this study designed to assess challenges of Torban Anfilo multipurpose cooperative union in market stabilization.

5.There is an impact of **TLRF on CMS.**

Null Hypothesis-Independent Variable have no impact on DV.

Where: CMS: is the Role of cooperative in market stabilization and the

 TFRF: is financial factors related to cooperative
 TCBEF: is cooperative business-related environmental factors
 TLRF: is cooperative legal and regulatory factor

necessary for realizing the research objectives. It is also appropriate for collecting useful data that reports as a representation of the real situation or characteristic in the study population for the investigation of challenges that Primary Cooperatives faces in market stabilization.

Anfilo district was purposely selected for the fact that the union is operating in district which is the highest coffee producers where Torban Anfilo cooperative union is organized and operated with affiliated 23 primary cooperatives are performing marketing function. Stratified random sampling procedure was used to sample primary cooperatives and then sample respondents for the study.

At first stage, the total 23 primary cooperatives affiliated to Torban Anfilo cooperative union are categorized in to three strata based on marketing potential and transaction. Accordingly, first stratum, 9 high market transacting primary cooperatives, second stratum 7 medium market transacting primary cooperatives and third stratum 7 low market transacting primary cooperatives.

In the second stage, three primary cooperatives from high market transacting cooperatives; two primary cooperatives from medium market transacting cooperatives and two primary cooperatives from low market transacting cooperatives totally seven primary cooperatives were

Sampling Size Determination

The total members of sample primary cooperative which are affiliated to Torban Anfilo are 4,017 which is considered as study population. From this study population sample size is determined using sample size determination formula by (Watson, 2001). The motive behind using this formula is that it provides the appropriate sample size by clearly applying the possible variation that exists among coffee producers in the study areas.

$$n = \frac{\left(\frac{P[1-P]}{\frac{A^2}{Z^2} + \frac{P[1-P]}{N}}\right)}{R}$$

Where:

n= Sample size required for the study from the total population.

selected using simple random sampling technique. Lastly, individual respondents were sampled from sample primary cooperative proportionally using systematic sampling procedure.

Focus group discussion (FGD): This was conducted in such a way that after having the necessary data from the key informants through interview, unclear ideas and information related to the subject under study were further reviewed. The researcher conducted one focus group discussion with participants from (Employees of Torban Anfilo cooperative union and management of cooperative promotion agency of the district) to gather relevant and updated data towards the subject under study. Therefore, 18 participants were selected for focus group discussion because of the closeness to the issue under study. The participants were selected through judgmental method because of their closeness to execute the issues and day to day activities of the organization was supervisor by employees of union and management of cooperative promotion agency.

N= study population (Number of members of sample primary cooperatives (4, 017)

P= Estimated variance in a population as a decimal of 0.3 for 70-30;

A= Precision desired, expressed as decimal of 0.05 for 5 percent (95 percent confidence interval)

Z= 1.96 for 95 percent confidence level of and

R= Estimated response rate, as decimal of 0.95 for 95 percent response to be returned.

Accordingly, sample size can be

$$n = \frac{\left(\frac{P[1-P]}{\frac{A^2}{Z^2} + \frac{P[1-P]}{N}}\right)}{R} = \frac{\left(\frac{0.3[1-0.3]}{\frac{0.05^2}{1.96^2} + \frac{0.3[1-0.3]}{4017}}\right)}{0.95} = 314 \text{ respondents}$$

Table 1 below summarizes the sample primary cooperatives and respective sample individual respondents

Table 1: Proportionate distribution of sample size among primary cooperatives

No	Primary cooperative	Strata	Population	Proportion	Sample size
1	Ashi Sudi Duli	High transaction PC	585	0.0782	46
2	DollaYaliWolal		751	0.0782	59
3	Koli Filfil Dawo Tobi		1323	0.0782	103
4	Shebel Fana	Medium transaction	376	0.0782	29
5	Lalistu Gudina Sudi		462	0.0782	36
6	Malka Gudina Ubar Shola	low transaction	346	0.0782	27
7	Gudatu Fandacha		174	0.0782	14
Total			**4,017**	**0.0782**	**314**

Method of Data Collection

Closed-ended questionnaire was used to collected primary data from respondents. This was in the form of structured interview schedule in which set of prepared questions designed to be asked exactly as worded in same manner to all responds by data collector. In this case the data collector only assists the respondents to understand the question and only write the response of the respondents. This data

collection method was used indeed, most of the respondents are farmers and they may be with low or no education to understand the question if distributed and allowed to fill by themselves.

To ensure the understanding of the data collector and to equip with research data collection skill one-day training

was given on the objective of the study, relevance of the study, confidentiality of information, respondent's right, informed consent and techniques of interview in the process of data gathering.

Methods of Data Analysis
The data collected was sorted and checked for completeness of the responses, coded and then entered in Statistical Package for Social Science (SPSS) version 20 software. Descriptive analysis, correlation and regression analysis was employed in data analysis. The descriptive

For checking the relevance, the research instrument was tested with small representative for the sample whether the tool would collect the necessary data to facilitate the realization of the research objectives

parts analyzed using frequency, percentages and cross tabulation was used to check the significance of association between dependent and independent factors. Following figure shows the Conceptual Framework.

Figure: 1 Conceptual Framework
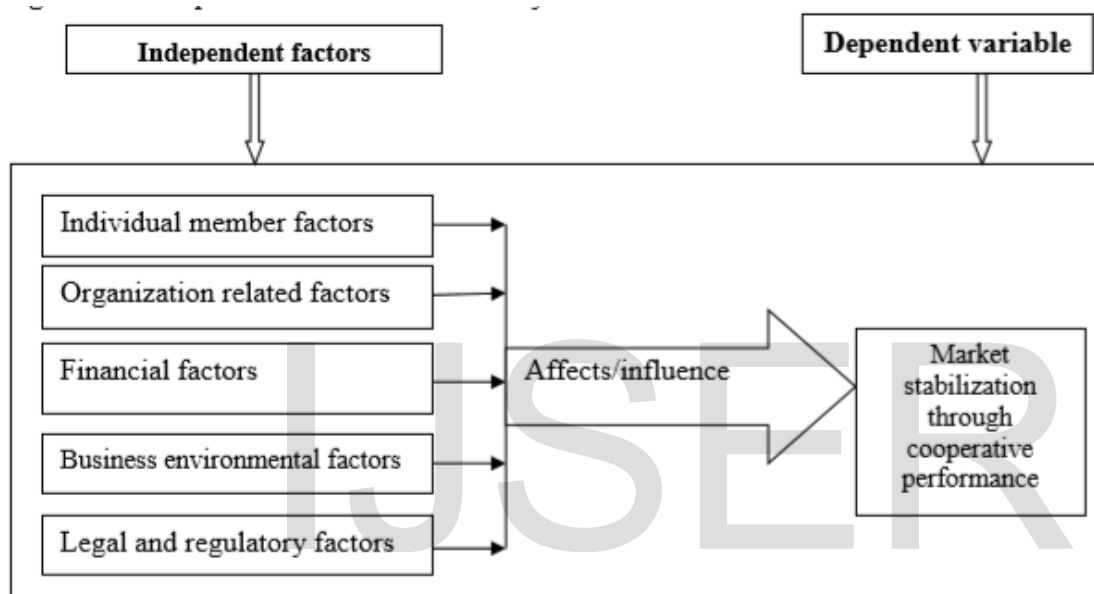
Source: Own modification based on (Dejene, 2014; Azadi, Hosseininia, Zarafshani, Heydari, & Witlox, 2010; Ravensburg, 2009) and literature review.

Following the necessary diagnostic tests, regression analysis was conducted and the interpretation of the estimated model

was done based on the coefficient of correlation and regression results.

Model specification
The model is specified based on previous studies conducted by (Dejene, 2014; Muthyalu, 2013; Azadi, Hosseininia, Zarafshani, Heydari, & Witlox, 2010; Amini & Ramezani, 2008)and others which used cooperative member attribute, organizational factors, financial factors, business environmental factors, legal and regulatory frame work to assess challenges of cooperative union in market stabilization and analyzed using correlation and regression model. The summation from the results of variables found in five-point likert scale question of each independent variables of the survey tool is used for analysis. The model specified takes the following specific form:

$$CMS = a_0 + \sum b(TINDF) + \sum c(TOIRF) + \sum d(TFRF) + \sum e(CBEF) + \sum f(TLRF) + \varepsilon \ldots \ldots \ldots \ldots \ldots \ldots \ldots (1)$$

Where: CMS: is the Role of cooperative in market stabilization and the
Independent variables includes the following:
 TINDF: is cooperative member attribute
 TOIRF: is cooperative related organizational factors
 TFRF: is financial factors related to cooperative
 TCBEF: is cooperative business-related environmental factors
 TLRF: is cooperative legal and regulatory factor

a_0 :is the constant values of the effect of dependent variables on CMS

b, c, d, e, and f are coefficient estimated values of each factors

$\varepsilon =$ is the stochastic error of the study.

RESULTSAND DISCUSSIONS

Market stabilization by the cooperative union

Preceding to explore challenge of Torban Anfilo cooperative union in stabilizing marketing, it is decisive to assess in what issues the cooperative union stabilize member markets. It is found that the leaders of the cooperative union are committed to work in market stabilization (89.5%); the union has mobilized finance to take part in marking of member needs (91.7%) and the respondents agree that cooperative marketing operation is transparent (88.2%). The respondents responded positively that the cooperative supply and distributed agricultural input with lower price than other actors (89.8%) and collected and marketed farm produces with relatively higher price than market price (93.6%), table 2)

Table 2: Market stabilization of the cooperative union

Statement	Response	Frequency	Percent
Leaders of the cooperative union are dedicatedly working to stabilize members farm input and output marketing	Yes	281	89.5
	No	33	10.5
	Total	314	100
The cooperative union has financial capacity to participate in member related marketing	Yes	288	91.7
	No	26	8.3
	Total	314	100
The cooperative union is transparent in its marketing operation	Yes	277	88.2
	No	37	11.8
	Total	314	100
Agricultural input price supplied by cooperatives are cheaper than others	Yes	282	89.8
	No	32	10.2
	Total	314	100
Agricultural product price paid by cooperatives was better than price paid by other traders	Yes	294	93.6
	No	20	6.4
	Total	314	100

Source: Own survey, 2017

The result show that the cooperative union of the case strive its effort in stabilizing market in its operational area through planning towards member needs, mobilize capital to perform marketing function and provide fair price which assumed to benefit its members. The views of the key informant and focus group discussant agree with the results in such a way that the cooperative union was established to serve member in marketing farm inputs and outputs so as stabilize marketing with respect to member needs.

Challenges of stabilizing market

Member related challenges

Individual members of the cooperative maters the contribution of their cooperative in stabilizing market. individual attributes of members as a challenge of cooperative in stabilizing market is assessed and found that 95.3% (56.4% strongly agree and 38.9% agree) perceive that technical skill of member is challenge for cooperative to stabilize market; 88.8% (58.9% strongly agree and 29.9% agree) member participation level in decision and also 89.5% (55.7% strongly agree and 33.8% agree) member knowledge about cooperative is a challenge for cooperative to contribute to market stabilization.

Table 3: Members related challenges in market stabilization

Variables	Rating	Frequency	Percent
Technical skill of member is challenge	Strongly Agree	177	56.4
	Agree	122	38.9

	Neutral	10	3.2
	Disagree	3	0.9
	Strongly Disagree	2	0.6
	Total	**314**	**100.0**
Member involvement level in cooperative marketing is low	Strongly Agree	185	58.9
	Agree	94	29.9
	Neutral	19	6.1
	Disagree	12	3.8
	Strongly Disagree	4	1.3
	Total	**314**	**100.0**
Member awareness about cooperative marketing is challenge	Strongly Agree	175	55.7
	Agree	106	33.8
	Neutral	22	7.0
	Disagree	7	2.2
	Strongly Disagree	4	1.3
	Total	**314**	**100.0**

The results reveal that Technical skill of member, the extent to which member involvement in decision making of the cooperative and knowledge member about their cooperative are members' attributes challenging the contributes of the cooperative to stabilize market in study area. Key informant and focus group discussion also confirm these findings. This finding of study is in harmony with study by Azadi et.al. (2010), that revealed individual members' participation in decision and their knowledge of the cooperative are significantly explain the variations in market success of cooperatives

Organizational challenges

Whether organizational factors challenging cooperative to contribute to market stabilization of cooperative was evaluated. It was come up with that respondents agree transparency of cooperative management (81.8%); organizational communication (84.8%); mutual trust among individual leaders (86.6%) and cooperative dependency on government (67.9%) are challenges of the cooperative under study to stabilize market.

Table 4: Organizational issues challenging cooperative market stabilization

Variables	Rating	Frequency	Percent
Transparency of cooperative management	Strongly Agree	136	43.3
	Agree	121	38.5
	Neutral	41	13.1
	Disagree	12	3.8
	Strongly Disagree	4	1.3
	Total	**314**	**100.0**
Organizational communication	Strongly Agree	149	47.5
	Agree	117	37.3
	Neutral	33	10.5
	Disagree	13	4.1
	Strongly Disagree	2	0.6
	Total	**314**	**100.0**
Mutual trust among individual leaders	Strongly Agree	163	51.9
	Agree	109	34.7
	Neutral	29	9.2
	Disagree	10	3.2
	Strongly Disagree	3	1.0
	Total	314	100.0
Cooperative dependency on government	Strongly Agree	182	58.0
	Agree	79	9.9
	Neutral	31	9.9
	Disagree	18	5.7
	Strongly Disagree	4	1.3
	Total	314	100.0

These results of the study depict that non-transparency of cooperative management, poor organizational communication, lack of mutual trust among individual leaders and cooperative dependency on government organizational matters that hindering the contribution of the cooperative union of the case to stabilize market to the best advantage of members and then the community in the study area. The result of the study was supported by the work of Dejene (2014) that showed positive and significant association between cooperative leader' mutual trust and cooperative contribution to market stabilization. Furthermore, it is in accord with finding by Chambo (2009) that indicated leadership, organization management and

general governance of cooperatives are challenges of survival of agricultural cooperative in Africa to stabilize

Financial challenges

Financial status is determinant for cooperative to stabilize market in its operation area. Based on this, respondents were asked about issues that affect financial status as challenges of cooperative in stabilizing market. Respondents agree that size of credit for cooperative

market to benefit members

(88.5%); accessibility of cooperative long-term credit (93.0%); Government support for accessing bank loan (93.2%) and Income generating capacity of cooperative (94.9%) are perceived to be challenges of the cooperative union to stabilize market.

Table 5: Financial matters challenging cooperatives in market stabilization

Variables	Rating	Frequency	Percent
Size of credit for cooperative	Strongly Agree	184	58.6
	Agree	94	29.9
	Neutral	20	6.4
	Disagree	12	3.8
	Strongly Disagree	4	1.3
	Total	**314**	**100.0**
Accessibility of long-term credit	Strongly Agree	177	56.4
	Agree	115	36.6
	Neutral	19	6.1
	Disagree	3	0.9
	Strongly Disagree	0	0.0
	Total	**314**	**100.0**
Government support for accessing bank loan	Strongly Agree	191	60.8
	Agree	99	31.5
	Neutral	18	5.7
	Disagree	4	1.3
	S. Dis	2	0.6
	Total	**314**	**100.0**
Income generating capacity of cooperative	Strongly Agree	180	57.3
	Agree	118	37.6
	Neutral	12	3.8
	Disagree	3	0.9
	Strongly Disagree	1	0.3
	Total	**314**	**100.0**

Source: Own survey, 2017.

The indicates that financial issues of the cooperative union such as size of credit obtain to run the business; accessibility of the cooperative union to long term loan; government support to access the cooperative union to bank loan and internal income generating capacity of the cooperative union are hindering the contributions to

stabilize market in the study area. The result of the study was supported by the work of (Mande & Kamaldeen, 2014) that revealed inadequate funding and limited access to credits are the main challenges that cooperatives are facing.

Infrastructure Challenges

With respect to the prevailing infrastructure (road, telephone, transport, etc) for a cooperative as a challenge in market stabilization, the result of the study on table 6

shows that 50% (49.0% of strongly agree and 32.8% agree) respondents agree that infrastructure is a challenge in market stabilization.

Table 6: Prevailing infrastructure is challenge

PERCEPTION	FREQUENCY	PERCENT
Strongly agree	154	49.0
Agree	103	32.8
Neutral	38	12.1

Disagree	12	3.8
Strongly disagree	7	2.2
Total	314	100.0

Source: Own survey, 2017.

The result reveals infrastructure is challenging Torban Anfilo Multipurpose cooperative union to stabilize market with respect to member benefit. Key informant also agree with the result in that the infrastructure in the operational area of the cooperative union is very poor so that it hindering the contribution of the cooperative union to stabilize market.

Legal and regulatory challenge

The existence of weak a legal and regulatory environment makes cooperatives vulnerable to operate properly in market sphere   (Nyoro, 2007) and (Asfaw, 2016). Accordingly, the study confers that 88.2% (59.2% strongly agree and 29.0% agree); when the level Government interference in cooperative administration is challenging market stabilization of the cooperative union, 88.3% of the respondents are perceive that prevailing cooperative legal and environment is a challenge to stabilize market. 54.7% (26.7% strongly agree and 28.0% agree) of respondent notice that inadequate technical support from cooperative promotion is a challenge of cooperative union.

Table 7: Legal and regulatory issues are challenges of Cooperative to market stabilization

VARIABLES	Rating	Frequency	Percent
Government interference cooperative management	Strongly Agree	186	59.2
	Agree	91	29.0
	Neutral	22	7.0
	Disagree	12	3.8
	Strongly Disagree	3	1.0
	Total	314	100.0
Prevailing cooperative legal and environment challenging cooperative marketing	S. Agree	182	58.0
	Agree	95	30.3
	Neutral	20	6.4
	Disa.	13	4.1
	S. Dis	4	1.3
	Total	314	100.0
Inadequate technical assistance provided to cooperative	S. Agree	178	26.7
	Agree	88	28.0
	Neutral	25	8.0
	Disa.	21	6.7
	S. Dis	2	0.6
	Total	314	100.0
Policy affecting price of product is challenge	S. Agree	168	53.5
	Agree	104	33.1
	Neutral	21	6.7
	Disa.	17	5.4
	S. Dis	4	1.3
	Total	314	100.0

Source: Own survey, 2017. Values are in numbers (percentages) unless otherwise stated

The result confirms that government interference in the cooperative management; legal environment and limited assistant from cooperative promotion office are challenges to stabilize market to serve members advantage in the market place.

Table: 8 Mean and standard Deviation of the dependent and independent variable

```
              CMS        TINDF       TOIRF        TFRF       TCBEF        TLRF
count   314.000000  314.000000  314.000000  314.000000  314.000000  314.000000
mean     18.076433   18.197452   17.786624   18.006369   17.974522   18.171975
std       1.817703    1.518531    1.950427    1.819303    1.682266    1.762870
```

All the variables in the above table are below 2 standard deviation which means that variance is within the acceptable limits.

Heat Map below shows that Highest correlation in Dependent Variable (CMS) that is-'role of cooperative in market stabilization' is with TOIRF (Independent Variable)- 'cooperative related organizational factors'.

Table: 9 Correlation Analysis between Dependent and independent Variable.

Reliability Statistics

Cronbach's alpha coefficient. We are looking for a score of over .7 for high internal consistency. In this case, α = .917, which shows the questionnaire is reliable.

Validity-We have used natural validity. We had done pilot study and our results matched with the expected acceptable results .

Table: 10 Reliability StatisticsResult

Cronbach's Alpha	N of Items
.917	6

Regression analysis

Following Python commands and outputs help us to analyze the Model. One variable is added to the model at a time to check variability explained by Independent variables-

Model = sm. OLS.from formula ("CMS ~ TINDF", data=df

Table 11: OLS Regression Results

```
==========================================================================
Dep. Variable:        CMS  R-squared:        0.407
Model:                OLS  Adj. R-squared:   0.405
```

```
Model = sm.OLS.from_formula ("CMS ~ TINDF+TOIRF", data=df)
OLS Regression Results
============================================================================
Dep. Variable:          CMS  R-squared:              0.598
Model:                  OLS  Adj. R-squared:         0.596
Model = sm.OLS.from_formula ("CMS ~ TINDF+TOIRF+TFRF", data=df)

OLS Regression Results
============================================================================
Dep. Variable:          CMS  R-squared:              0.625
Model:                  OLS  Adj. R-squared:         0.621
Model = sm.OLS.from_formula ("CMS ~ TINDF+TOIRF+TFRF+TCBEF", data=df).

 OLS Regression Results
============================================================================
Dep. Variable:          CMS  R-squared:              0.637
Model:                  OLS  Adj. R-squared:         0.632


Model = sm.OLS.from_formula ("CMS ~ TINDF+TOIRF+TFRF+TCBEF+TLRF", data=df)

OLS Regression Results
============================================================================
Dep. Variable:          CMS  R-squared:              0.640
Model:                  OLS  Adj. R-squared:         0.634
```

From the above tables we can conclude that TLRF has no impact on R square.(From 63.7 to 64 which is negligible).

In order to make the study complete, regression analysis of independent variables on the role of cooperative in market stabilization was paramount important as the relationship between dependent and independent variables can successfully be explained with regression analysis. In addition to this, the regression is a powerful tool for summarizing the nature of relationship between variables and for making predictions of likely values of the dependent variable (Bryman & Cramer, 2005). Accordingly, the result of the regression analysis on table 12 shows that the adjusted R^2 of 0.634 implies that all the explanatory variables used in the study explain for about 63.4 percent of the variations level of challenges affecting cooperatives in market stabilization. Also, the result of the study on table 12 shows that the values of the degree of freedom df $(5, 313)$ with the F value of 109.318has significant level of $p < 0.000$ which implies that all the independent variables are jointly significant in explaining variation of factors that affect cooperatives in market stabilization in the study area. Similarly, the coefficient of regression analysis show that four out of five variables shows statistically significant positive effect on the role of cooperatives in market stabilization in the study area. The independent variable of individual cooperative member attribute, organizational factor, financial factor and cooperative business environmental factor were the main variables that significantly affect the role of cooperative in market stabilization at 1 percent significance level whereas the legal and regulatory factor is one that shows insignificant positive effect on the role of cooperatives in market stabilization in the study area.

Table: 12 Coefficient of regression analysis

```
                    OLS Regression Results
==============================================================================
Dep. Variable:                     CMS   R-squared:                       0.640
Model:                             OLS   Adj. R-squared:                  0.634
Method:                  Least Squares   F-statistic:                     109.3
Date:                 Thu, 28 May 2020   Prob (F-statistic):           4.17e-66
Time:                         13:49:49   Log-Likelihood:                -472.46
No. Observations:                  314   AIC:                             956.9
Df Residuals:                      308   BIC:                             979.4
Df Model:                            5
Covariance Type:             nonrobust
==============================================================================
                 coef    std err          t      P>|t|      [0.025      0.975]
------------------------------------------------------------------------------
Intercept      0.9223      0.818      1.128      0.260     -0.687       2.532
TINDF          0.1872      0.063      2.954      0.003      0.062       0.312
TOIRF          0.2988      0.054      5.568      0.000      0.193       0.404
TFRF           0.2201      0.063      3.499      0.001      0.096       0.344
TCBEF          0.1668      0.052      3.177      0.002      0.064       0.270
TLRF           0.0810      0.056      1.457      0.146     -0.028       0.190
==============================================================================
Omnibus:                        47.152   Durbin-Watson:                   2.163
Prob(Omnibus):                   0.000   Jarque-Bera (JB):              115.651
Skew:                           -0.722   Prob(JB):                     7.70e-26
Kurtosis:                        5.599   Cond. No.                        533.
==============================================================================
```

Note: * shows the variables are significant at 95 percent Confidence level.

The regression equation formulated from the result of regression model is explained as:

$$CMS = .922 + 0.187 TINDF + 0.299 TOIRF + 0.220 TFRF + 0.167 TCBEF.$$

Out of five independent variables four independent variables are shows significant level, but legal and regulatory factors is not significant. We can also remove Legal and regulatory factor (TLRF) and run the model again for better Model fit. TLRF   P value (0.146) is >Alpha (.05) so we F.T.R (Fail to Reject) null hypothesis Confidence intervals are of the form "point estimate" plus/minus the "margin of error".

Legal and regulatory challenge is insignificant may be because of weak implementation of the law and which can also be inferred from the confidence interval(-0.028 , 0.190) which has zero in the range ,meaning that there is possibility of Independent variable having zero impact on Dependent variable ,in other words it is insignificant with 95% confidence in the process of constructing the levels.
One unit change in TOIRF: (cooperative related organizational factors) leads to 29.9% change in CMS(Role of cooperative in market stabilization) keeping all other Explanatory variables constant, which is the maximum positive impact among all Independent variables. P value(0.000) is < Alpha(.05) so we reject null hypothesis and accept alternate(Claim)hypothesis.

So we accept all alternate hypothesis except Legal and regulatory factor.

1. **Assumption of Linearity-**

Below plot shows Linearity between Dependent variables and Z-value of all Independent Variables collectively(Also known as standardized values).The graph is also showing confidence   interval   ban

Graph 1: Linearity between Dependent variables and independent variable-The band around the line shows Confidence Interval. Confidence interval Band is Narrowest around its Mean.
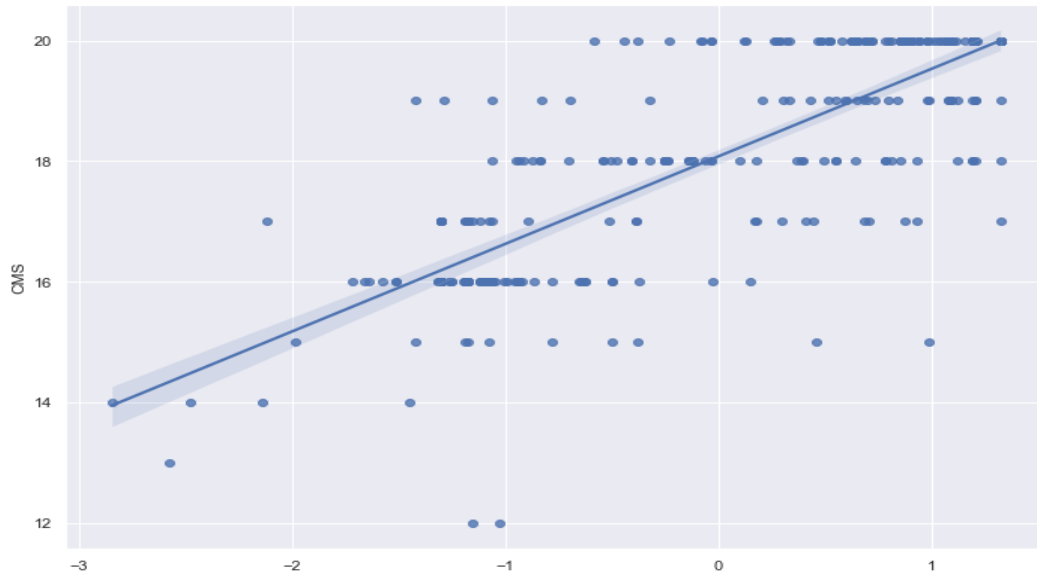
2.   Assumption of -Independence of residuals/Lack of Autocorrelation-

If Durbin Watson is between 1.5 to 2.5 then we can say that residuals are not correlated. If we see our OLS summary our Durbin Watson test value is 2.163. Therefore, we can

3.   Assumption of-Homoscedasticity of errors-

Distribution of error term should be Homogeneous. All the error terms of our regression model in the below plot are evenly distributed above the line and below the line of fit.

say that residuals are not correlated and error terms are independent. We can conclude In our model this assumption is met.

So, we can say that error terms in our model meet the assumption of Homoscedasticity

Graph2: Assumption of-Homoscedasticity
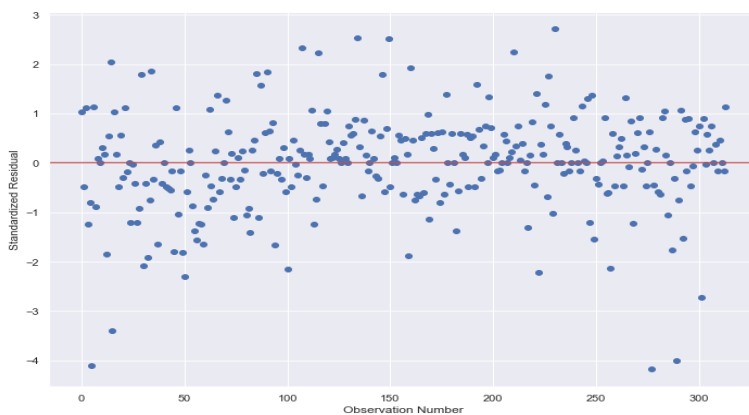
Variable inflation factor (VIF) test has been conducted to check multi-collinearity of independent variable.   For all

4.   Assumption of-Multi-collinearity tests of cooperative union in the market stabilization.

independent variables VIF is between 1 and 10 shows there is no multi-collinearity effect among the independent

variables. Consequently, it is possible to go for regression analysis to the challenges on the role of cooperative Union in the market stabilization. Table showing Variable inflation factor (VIF) test results-
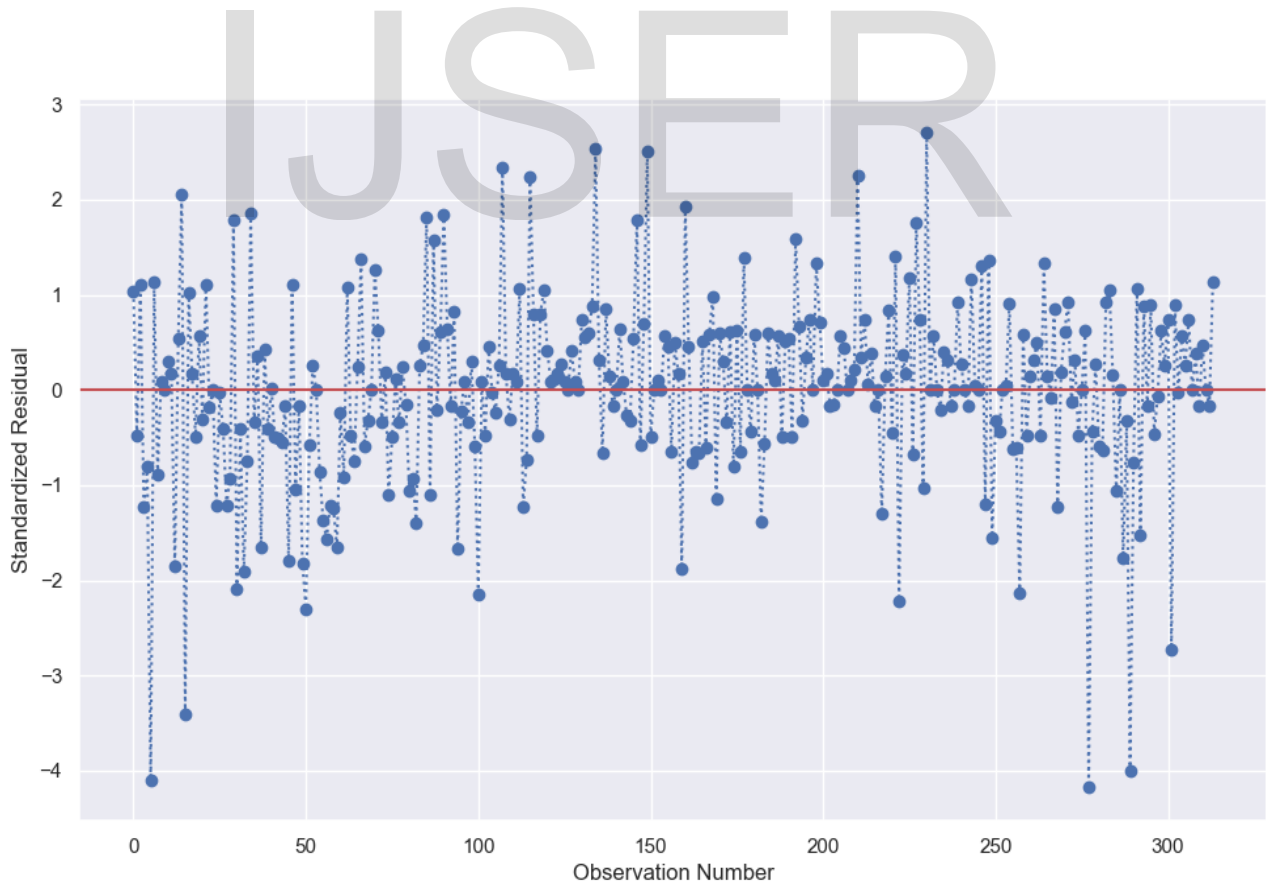
Table: 13 Variable inflation factor (VIF) test results

VARIABLE NAME	VIF
const	173.588339
TINDF	2.395472
TOIRF	2.833446
TFRF	3.388107
TCBEF	2.017267
TLRF	2.479816
dtype: float64	

5.Assumption of Multivariate Normality-

Following plot shows residuals of our model plotted on an can conclude that Assumption of Multivariate Normality is

Graph: 5 Leverage plot showing the effect of the residuals on model Result

Influence Plot
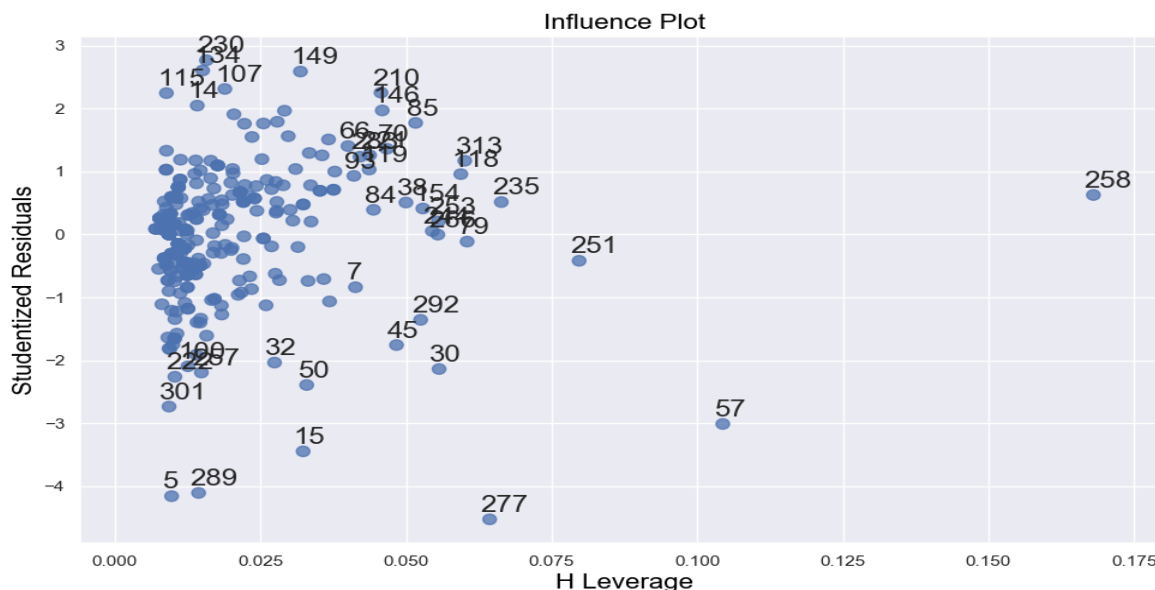
We can see the above Leverage plot showing the effect of the residuals on our model. For example 258 ,251,277 are having high value.251 and 258 are within one standard deviation so they are not outliers and therefore do not impact the model adversely.277 is outlier as it is beyond 4 standard deviations but as it is near 0.000 it does not have significant effect on the model so it can be ignored.

Conclusion

The study shows that there are different types of challenges that affect cooperatives in market stabilization among which cooperative member attributes, cooperative related organization factors, financial factors, and cooperative business environmental factors that have statistically significant positive correlation and impact on the role of cooperatives in market stabilization in primary cooperatives found under Torban Anfilo multipurpose cooperative union. The result of this study was in line with existing literature and previous studies conducted within the country and outside of the country on challenges that cooperatives face in market stabilization. Recognizing these challenges of primary cooperatives and considering such kind of issues for improvement for the purpose of market stabilization need the collaborative effect of cooperative organization and strong support from different sectors of government that have direct and indirect association with the cooperatives organization.

Recommendation
This study tried to identify challenges of cooperatives in market stabilization which can be solved by strong effort and commitment of cooperative organization and their unions along with government sector. In order to enhance the role of cooperatives in market stabilization, researcher recommends that management of cooperatives union, management of cooperative promotion agency and Anfilo district administration has to work hard to facilitate the ground for improving members attribute, minimize organizational related challenges, improve access to finance, enhance infrastructure and foster the legal and regulatory issues of cooperatives.

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