Research Journal of Finance and Accounting
ISSN 2222-1697 (Paper) ISSN 2222-2847 (Online)
Vol.9, No.1, 2019

Price Volatility Management of Urban Primary Consumer Cooperatives: A Correlation Analysis

Getachew Yitbarek[1*] Dhiraj Sharma[2]

[1] Ph.D. Candidate, Department of Commerce, Punjabi University, Patiala, Punjab, India

[2]Assistant Professor (Ph.D.), School of Management Studies, Punjabi University, Patiala, Punjab, India

*E-mail of corresponding author: getyitbarek@gmail.com

Abstract

This study investigates the factors influencing urban primary consumer cooperatives' management of price volatility of essential goods in Bahir Dar, Adama and Addis Ababa cities. Data was collected from 93 chairpersons and vice-chairpersons of these cooperatives. The study examines the relationship between management of price volatility, cooperative governance, supply chain management, financial access and capital constraint, technological innovations and digital tools, and regulatory and government support. Correlation analysis was employed to assess the strength of these relationships. The findings indicate that all the factors studied have a moderate to strong statistically significant correlation with the management of price volatility of essential goods in urban primary consumer cooperatives. This suggests that a comprehensive approach involving effective governance, efficient supply chain management, adequate financial resource and capital, technological and digital tools adoption, and supportive regulatory and government policies are crucial for urban primary consumer cooperatives to mitigate the impact of price volatility on their members and communities.

Key words: Consumer cooperative; Price volatility; Governance; supply chain; finance; technology; digital tools; regulatory and government support

DOI: 10.7176/RJFA/16-1-03
Publication date: January 30th 2025

1. Introduction

Cooperative societies are owned by member-owners. A cooperative is an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly-owned and democratically controlled enterprise (COPAC 2018). Member-owners fund the cooperative's assets and they are also responsible for providing financing based on their usage to sustain and expand the cooperative. They oversee the operations and activities of the cooperative and are the main beneficiaries based on their contributions (USDA 2001). Generally, the goal of cooperatives is to unite members in an economic and social community to provide market power and access to resources they may not have otherwise (Novkovic, Puusa, and Miner 2022).

According to Filley (1929) cooperatives have the potential to uplift us during times of social, economic, environmental, and political turmoil (Pritchard and Çalıyurt 2021). Similarly, Rodríguez-Oramas et al. (2022) suggested that cooperatives offer increased job security during crises. In Ethiopia the market price of basic goods and services is highly volatile that made lives of many urban dwellers tough. According to Ethiopian Statistics both annual and monthly prices of goods and services show regular inflation. A country report indicated the May 2023 Year-on-Year (YoY) CPI is increased by 30.80%. Similarly, the Month-on-Month (MoM) 12 months moving average CPI from May 2022 to May 2023 rose by 33%. A 32.50% CPI increase was recorded in the food and non-alcoholic drinks category (ESS 2023) . As a result, the number of primary consumer cooperatives all over Ethiopia had increased from 238 to 3,168[1] during 2007 to 2022 (Bernard, Taffesse, and Gabre-madhin 2008; Emana 2009). Emana (2009) indicated that the prime motivation for the rapid growth in the formation of these cooperatives was the rising high cost of goods and services and the need to supply consumer goods at fair prices. As Scherer, Voegtlin and Entenza (2024) discussed certain events lead people's willingness to cooperate which, in this case, the general and food hike led them to establish their own consumer cooperatives.

Researches conducted showed that Ethiopian consumer cooperatives have been instrumental in stabilizing and

[1] This figure is obtained from FCA internal report memo

managing the effect of inflation (Yure, Deyganto, and Orkaido 2024). On the other hand, other research findings indicated that Ethiopian cooperatives are operating in a complex environment where there is no sufficient access to finance, supply of essential commodities is irregular, regulatory environment is complex and government support is not adequate (Deresa 2017). Teklemuz and Dawit (2022) studied that consumer cooperatives are obliged to pay all direct and indirect taxes despite cooperative societies proclamation 985/2016 which exempt them from any form of taxation. Further, study also suggested that small cooperatives have managed effective governance though in this regard consumer cooperatives perform less to both worker and producer cooperatives. Governance is designed to guide an organization towards its objectives in a manner that is consistent with its main mission and values (ICA 2015). Furthermore, the use of technological innovations and digital tools is important to improve communication with members, and efficiency and performance of cooperatives. Currently, cooperatives are using digital tools and technology not only to handle routine administration operations but also to sell goods and service online and to manage their communication with customers and suppliers (WCM 2022). Therefore, this study attempted to establish whether urban primary consumers management of price volatility of essential goods is related to cooperative governance, supply chain management, access to finance and capital constraint, use of technological innovations and digital tools, and regulatory and government support.

2. Literature review and hypothesis development

2.1. Cooperative Governance

Urban primary consumer cooperative societies play an essential role in managing inflation and reducing price volatility, especially regarding the supply of essential goods. Structured around the collective needs of urban consumers, consumer cooperatives work to stabilize prices and ensure consistent access to necessities such as food and household items. The governance structures within consumer cooperatives typically emphasize member-based decision-making. Members participate in the democratic governance structure by electing or being elected as members of the board of directors and/or other leadership entities. They are also involved in controlling and monitoring daily cooperative businesses through various structures. By pooling resources cooperatives build strong purchasing power that reduces reliance on intermediaries that allows them to buy directly from suppliers and negotiate fair prices. This structure enables them to buffer price fluctuations for essential goods thereby protecting urban consumers from inflationary pressures (WCM 2024).

Further, consumer cooperatives operate on a not-for-profit basis where surplus revenue is often reinvested into price stabilization funds or distributed as rebates to members. Research suggest that well-governed cooperatives contribute to price stability by absorbing some of the cost increases rather than directly inflating prices. Birchall (2013) showed that patronage refund by consumer cooperatives acts as a cost price mechanism that provides members at the lowest possible cost. Therefore, the following hypothesis was established:

Hypothesis 1 (H_{01}): Urban primary consumer cooperative societies' cooperative governance has no statistically significant relationship to their management of price volatility

2.2. Supply Chain Management

Urban primary consumer cooperative societies are instrumental in managing inflation and price volatility, particularly by stabilizing the supply chain for essential goods through efficient logistics and supply chain management. In urban areas cooperative societies act as intermediaries that prioritize stability over profit where consumers are especially sensitive to price fluctuations in everyday essentials allowing members to access goods at more predictable prices. Urban consumer cooperatives leverage direct sourcing and bulk purchasing to mitigate the impact of inflation on essential goods. By eliminating intermediaries and purchasing directly from producers, cooperatives secure favorable prices that buffer against sudden market increases. This approach allows them to build inventory and reduce the dependency on volatile markets which is critical during times of economic instability (WCM 2024).

Further, in urban areas maintaining a resilient supply chain is essential for ensuring the consistent availability of goods. Consumer cooperatives can prioritize the distribution of essential goods during periods of high demand or supply disruption. In India state consumers' cooperative federations procure consumer goods in bulk quantity and supply to member consumer cooperatives which sell quality essential goods to member at reasonable rates. As a result, they help in maintaining price stability and availability of essential goods (ICA-AP n.d.). This is particularly effective in shielding urban consumers from the more extreme effects of inflationary pressures that result from supply chain disruptions. Furthermore, as cooperatives are member-focused, they prioritize affordability by operating on a cost-plus model rather than a profit-maximizing model through absorption of a

portion of rising costs during inflationary periods. This governance model ensures that the cooperative's logistics and supply chain management decisions are aligned with the goal of price stabilization that helps urban consumers to manage their expenses for essentials. As a result, the following hypothesis was established:

Hypothesis 2 (H_{02}): Urban primary consumer cooperative societies' supply chain management has no statistically significant relationship to their management of price volatility.

2.3. Financial Access and Capital Constraint

Urban primary consumer cooperative societies are pivotal in stabilizing the availability and pricing of essential goods. However, they often face financial constraints that limit their ability to maintain a steady supply and buffer against market fluctuations. One of the primary challenges is access to capital. Without access to sufficient funding cooperatives struggle to implement bulk purchasing strategies that could secure goods at stable prices that weakens their ability to protect members from inflationary spikes (WCM 2024). The main source of capital of all cooperatives including consumer cooperatives is capital raised through acquisition of share capital by members.

Limited financing options restrict their ability to invest in supply chain infrastructure such as warehouses and distribution networks which are essential in urban contexts where logistics efficiency directly impacts price stability. This lack of capital leaves them vulnerable to disruptions in supply chains and increases operational costs that potentially leads to price hikes that affect urban consumers. Access to financial resources can enable them to be more resilient. Resilient consumer cooperatives demonstrate solidarity and contribute to the resilience of the broader society while dealing with market failures (Scherer et al. 2024).

Some cooperatives seek financial support through government programs, cooperative banks or social investment partnerships that are specifically designed for cooperative entities. Since 2018, for instance, in Italy 188 cooperatives have been set-up through member training program and favored access to credit and subsidized financing (Scherer et al. 2024). Therefore, the following hypothesis was established:

Hypothesis 3 (H_{03}): Urban primary consumer cooperative societies' access to finance and capital constraint has no statistically significant relationship to their management of price volatility.

2.4. Technological Innovations and Digital Tools

Consumer cooperatives utilize digital platforms to streamline purchasing, track inventories and forecast demand more accurately to deal with the high demand and rapid price fluctuations seen in urban markets. Digital procurement systems enable cooperatives to directly access producers, minimizing intermediaries and reducing the costs that often inflate consumer prices. Cooperatives are better equipped to anticipate shifts in supply and demand through integrating supply chain data and price analytics that enables them to stabilize prices for their members even amid market volatility (WCM 2024).

The use of e-commerce and mobile applications has also allowed cooperatives to connect more effectively with urban consumers. Members can access information on product availability, price changes and purchasing options in real time through dedicated apps or online portals. This transparency supports price stability by allowing consumers to make informed choices while enabling cooperatives to adjust pricing based on real-time demand patterns. Additionally, cooperatives can reduce operational costs associated with traditional retail models by digitizing transactions that passes savings onto consumers and cushioning the impact of inflation on essential goods. Currently, retailers' cooperatives like use a common payment system or common marketing tools to settle transaction with end-users who are members (WCM 2024).

Digital innovations in urban primary consumer cooperatives ultimately contribute to their resilience in a dynamic market environment. The use of technology in supply chain management, inventory tracking, and consumer engagement empowers these cooperatives to fulfill their role in stabilizing essential goods' prices. As technology becomes more integrated regardless of external economic pressures cooperatives are better positioned to navigate the challenges of urban inflation that facilitates affordability and accessibility for their members (WCM 2024). Hence, the following hypothesis was established:

Hypothesis 4 (H_{04}): Urban primary consumer cooperative societies' use of technological innovations and digital tools has no statistically significant relationship to their management of price volatility.

2.5. Regulatory and Government Support

Urban primary consumer cooperative societies play a significant role in stabilizing the prices of essential goods and managing inflation. This makes the support of regulatory frameworks and government assistance crucial. In high-demand urban areas cooperatives face challenges related to price volatility and supply chain costs that makes government-backed programs essential for mitigating such pressures. Regulatory support including subsidies, tax breaks and preferential loan programs enables cooperatives to purchase essential goods in bulk that lowers per-unit costs and helps shield urban consumers from inflationary impacts (WCM 2024). Research showed that government support for primary consumer cooperatives in Ethiopia has improved over time (Kanagaraj 2012).

Government policies that prioritize cooperatives also enhance their ability to maintain stable supplies of essential goods. Some governments have established policies that allow cooperatives to purchase goods directly from government reserves or from local producers at controlled prices bypassing intermediaries that might otherwise increase costs. In Ethiopia the government supports urban primary consumer cooperatives through one prohibiting entry of multinational retailers into the Ethiopian food market. In addition, consumer cooperatives are provided the opportunity to purchase essential goods from government warehouses at subsidized prices. Primary consumer cooperatives distribute 75% wheat, 72% sugar and 54% edible oil imports of the government at subsidized prices (Woldu et al. 2013). Therefore, the following hypothesis was established:

Hypothesis 5 (H_{05}): Urban primary consumer cooperative societies' regulatory and government support has no statistically significant relationship to their management of price volatility.

3. Research methodology

3.1. Study procedure

The study was undertaken based on data collected through questionnaire distributed to the chairpersons and vice-chairpersons of urban primary consumer cooperatives in Ethiopia. Respondents were the persons who are responsible to running these cooperative societies. Correlational research design was used to analyze data. A correlational research design is used to study the relationship between study variables. The strength of relationship is measured through the use of statistical tests. Correlation coefficients range ±1 where -1, 0, and +1 show negative perfect association, no association and positive perfect association between study variables respectively. Therefore, correlation coefficients near to ±1 show strong correlation whereas coefficients close to zero exhibit existence of no relationship between study variables. Existence of correlation does not guaranty presence of causative relationship between study variables.

3.1.1. Population of the Study

Research questionnaires were directly distributed to respondents who completed them independently. 114 questionnaires were distributed to chairpersons and vice-chairpersons of 57 urban primary consumer cooperative societies operating in Bahir Dar, Adama and Addis Ababa cities. Bahir Dar is the largest city and the capital of the Amhara region while Adama ranks as the second-largest city in the Oromia region. Addis Ababa serves as the capital of Ethiopia. Adama was chosen because the regional government of Oromia relocated its capital to Addis Ababa. But only 93 (81.58%) completed questionnaires were returned. M. Kamel and C. H. Lloyd (2016) discussed that for business and management research a response rate can be anywhere between 50% to 80%. Further, the study indicated that various research methods text books suggest varying response rates from 60% to 80%. Therefore, the response rate achieved is adequate.

Data analysis showed that 83% of urban primary consumer cooperatives operating in the above cities are led and managed by men. Similarly, across all ages the highest educational status of 75% of respondents is a university bachelor degree of which women constitute 12% only. In addition, data indicated that 61% of them are between 35 and 50 years of age followed by respondents who are between 18 and 35 years of age who accounted 24%. Therefore, it is summarized that urban primary consumer cooperatives operating in study cities are predominantly men who did their bachelor degree and below 50 years of age.

Table 1. Gender, Age and Highest Educational Status of Respondents

Highest Education Status of Respondent			Age						Total	
			18 to 35 Years		35 to 50 Years		More than 50			
			Freq-uency	%	Freq-uency	%	Freq-uency	%	Freq-uency	%
College Diploma or TVET Level IV Certificate	Gender	Man	-	-	5	5	4	4	9	10
		Woman	1	1	1	1	1	1	3	3
		Total	1	1	6	6	5	5	12	13
Bachelor Degree	Gender	Man	18	19	38	41	8	9	64	69
		Woman	1	1	9	10	1	1	11	12
		Total	19	20	47	51	9	10	75	81
Masters Degree Holder	Gender	Man	1	1	3	3	-	-	4	4
		Woman	1	1	1	1	-	-	2	2
		Total	2	2	4	4			6	6
Total	Gender	Man	19	20	46	49	12	13	77	83
		Woman	3	3	11	12	2	2	16	17
		Total	22	24	57	61	14	15	93	100

Author: Author

3.1.2. Study Instrument

In order to study the role of urban primary consumer cooperatives a 43 items questionnaire was employed. The questionnaire comprises 19 multiple choice and 24 Likert-scale items. Multiple choice item questions were used to assess their role in managing inflation and price volatility whereas the Likert-scale items were employed to study the association of cooperative governance (GOVR), supply chain management (SCM), Financial Access and capital constraints (FACC), Use of technological innovations (TIDT), and regulatory and government support (RGS) with cooperatives management of inflation and price volatility. Each Likert-scale item was measured on a 5-point scale that ranges from 'strongly disagree =1' to 'strongly agree = 5'.

Table 2. Descriptive Statistics and Cronbach's Alpha

Variable	Mean	Std. Deviation	Cronbach's alpha
Cooperative Governance (GOVR)	3.258	0.1414	0.935
Supply Chain Management (SCM)	3.086	0.1183	0.878
Financial Access and Capital Constraint (FACC)	3.180	0.0000	0.838
Technological Innovation and Digital Tools (TIDT)	2.943	0.0632	0.872
Regulatory and Government Support (RGS)	2.882	0.0548	0.910
Management of Inflation and Price Volatility (MIPV)	3.400	0.0447	0.869
Overall	3.159	0.1871	0.935

Source: Author

Descriptive statistics (means and standard deviations) and Cronbach's alpha of each construct is presented in Table 2. Instrument reliability was measured using Cronbach's alpha which is a prominent statistical tool employed to test internal consistency of research instruments. Cheung et al. (2023) highlighted that although a Cronbach's alpha of 0.70 is generally considered the standard for reliability, a coefficient of 0.80 is recommended for ensuring adequate reliability in most research studies. Thus, it is confirmed that the study instrument measured adequate reliability.

4. Data analysis

4.1. Preliminary analysis

Prior to proceeding study analysis data was subjected to sample adequacy and validity tests. Data validity test is used to test whether observed items in a construct variable adequately measure the underlying latent variable. Principal Component Analysis (PCA) and Confirmatory Factor Analysis (CFA) were undertaken to determine convergent and discriminant validity. The objective of factor analysis is to reduce the large number of factors to better describe and understand existing relationship among observed variables (Tabachnick and Fidell 2013). Sampling adequacy was also checked using Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity. Results showed KMO value of 0.865 was significant indicating data is suitable for factor analysis. The Bartlett's test of sphericity was also significant (χ^2 (276) = 1557.465, $p < 0.01$) that confirmed correlations between variables are sufficiently large for factor analysis (Table 3). KMO values as measures of sampling adequacy for factor analysis are categorized as mediocre (0.5 to 0.7), good (0.7 to 0.8), great (0.8 to 0.9), and superb (above 0.90) (Field 2009). For Bartlett's test of sphericity a significant result ($p < 0.05$) rejects the null hypothesis that states correlation matrix (Σ) is an identity matrix ($\Sigma = I$) demonstrating sufficient correlations to justify using factor analysis to identify latent factors (Bruce Thompson 2004). Data analysis is undertaken using IBM SPSS Statistics 23.

Table 3. Kaiser-Meyer-Olkin (KMO) and Bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.865
Bartlett's Test of Sphericity	Approx. Chi-Square	1557.465
	df	276
	Sig.	.000

Source: Author

Net, PCA analysis was conducted using varimax rotation with Kaiser normalization. Based on Kaiser's criterion six factors were retained. Kaiser's criterion suggests that factors are considered reliable and meaningful if their eigenvalues exceed one (Kaiser 1960) (table 4). The cut-off point for item-factor loading was set at ±0.40. Hair et al (2014) stated that factor loadings within the range of ± 0.30 to ±0.40 meet the minimal level for interpretation of factor structure and loadings equal to or greater than ±0.50 are considered practically significant. In addition, there was no item-factor cross loading.

Table 4. Rotated Principal Component Matrix[a]

	Component					
	1	2	3	4	5	6
GOVR1	.856					
GOVR2	.819					
GOVR4	.806					
GOVR5	.809					
GOVR7	.854					
SCM1				.661		
SCM3				.704		
SCM5				.703		
SCM6				.803		
FACC2			.776			
FACC3			.724			
FACC6			.713			
FACC8			.784			
TIDT2						.680
TIDT5						.777
TIDT6						.825
RGS2					.861	
RGS4					.871	
RGS7					.845	
MIPV1		.765				
MIPV2		.801				
MIPV3		.790				
MIPV4		.737				
MIPV5		.715				

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

Source: Author

In addition, PCA revealed that retained factors explained 76.15% of the total variance. Cited in Matore, Khairani and Adnan (2019), Pett et al (2003) stated that for social science studies a total explained variance as high as 60% is adequate. Furthermore, all item-factor communality coefficients are greater than 0.50 which are regarded adequate (Bruce Thompson 2004).

Table 5. Total Variance Explained

Principal Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumu-lative %	Total	% of Variance	Cumu-lative %	Total	% of Variance	Cumu-lative %
GOVR	9.850	41.040	41.040	9.850	41.040	41.040	4.176	17.402	17.402
SCM	2.426	10.110	51.150	2.426	10.110	51.150	3.518	14.657	32.059
FACC	1.965	8.186	59.336	1.965	8.186	59.336	2.881	12.003	44.062
TIDT	1.700	7.084	66.421	1.700	7.084	66.421	2.707	11.278	55.340
RGS	1.188	4.949	71.370	1.188	4.949	71.370	2.693	11.221	66.561
MIPV	1.148	4.783	76.152	1.148	4.783	76.152	2.302	9.591	76.152

Extraction Method: Principal Component Analysis.

Source: Author

4.1.1. Convergent and Discriminant validity

Validity tests evaluate whether a research instrument measures what it is intended to measure (Field 2009). There are two types of validity tests: convergent and discriminant validity. Convergent validity measures whether observed items converge to measure the intended latent variable whereas divergent validity tests whether evaluates whether latent variables of the study are adequately distinct and not highly correlated. Results showed that both convergent and discriminant validity are valid (Table 6). Convergent validity is usually evaluated by analyzing factor loadings, the average variance extracted (AVE), and composite reliability (CR). Common guidelines indicate acceptable convergent validity when factor loadings exceed 0.5, the average variance extracted (AVE) is greater than 0.5, and composite reliability (CR) is above 0.7 (Anderson and Gerbing 1988; Diamantopoulos and Siguaw 2000; Fornell and Larcker 1981). In addition, according to Fornell and Larcker (1981) discriminant validity is established when the square root of each construct's AVE is higher than its correlations with other constructs. Thus, the results demonstrated both convergent and discriminant validity showing that the measures accurately reflect the intended latent variables and clearly distinguish them from one another. Therefore, further analysis of the study is recognized.

Table 6. Convergent and Discriminant Validity

	CR	AVE	MSV	TIDT	GOVR	MIPV	SCM	FACC	RGS
TIDT	0.872	0.695	0.402	**0.834***					
GOVR	0.936	0.745	0.407	0.541	**0.863***				
MIPV	0.862	0.556	0.402	0.634	0.428	**0.746***			
SCM	0.878	0.643	0.407	0.617	0.638	0.502	**0.802***		
FACC	0.856	0.598	0.353	0.591	0.492	0.372	0.594	**0.774***	
RGS	0.911	0.773	0.350	0.430	0.395	0.416	0.592	0.414	**0.879***

CR- Composite Reliability; AVE- Average Variance Explained; MSV- Maximum Shared Variance; *- Square-root of AVE

Source: Author

4.2. Correlation Analysis

Correlation analysis is a type of statistical tool which used to evaluate whether there is a statistically significant association between variable. But it should be emphasized that the presence of a statistically significant relationship does not ensure the presence of causative association between them (Sekaran and Bougie 2016). Before conducting correlation analysis assessment of underlying assumptions of normality and linearity should be tested. Normality tests help determine whether the data follows a normal distribution which is crucial for the

validity of parametric correlation methods like Pearson's correlation. Similarly, linearity tests are necessary to verify whether a linear relationship exists between the variables under study (Kothari 2004).

4.2.1. Normality Test

The Kolmogorov-Smirnov (K-S) and Shapiro-Wilk (S-W) tests along with skewness and kurtosis assessments are key tools for evaluating the normality of data in statistical analysis. The Kolmogorov-Smirnov test compares the observed distribution of the data to a specified reference distribution such as the normal distribution to detect any significant differences. Whereas, the Shapiro-Wilk test examines the correlation between the sample data and the normal distribution which provides a more direct test of normality (Deshpande, Naik-Nimbalker, and Dewan 2018).

In addition, skewness and kurtosis offer valuable insights into the shape of the data distribution. Skewness measures the degree of asymmetry in the data to indicate whether the data is more concentrated on one side of the mean. Kurtosis, on the other hand, assesses the tailedness of the distribution or how much the data deviates from a normal distribution in terms of outliers or extreme values (Hair et al. 2014).

In all cases, the null hypothesis assumes that the data follows a normal distribution. A p-value greater than the chosen significance level (typically $p<0.05$) suggests that the data does not significantly deviate from normality that allows parametric tests. However, a p-value below 0.05 indicates significant deviations from normality that signals the need for alternative methods that do not assume normality (Corder and Foreman 2014). These tests help to ensure that the underlying assumptions for many statistical methods are valid thereby enhancing the reliability of the results.

Table7. Kolmogorov-Smirnov and Shapiro-Wilk tests of Observed Variables

	Kolmogorov-Smirnov[a]			Shapiro-Wilk				Kolmogorov-Smirnov[a]			Shapiro-Wilk		
Variable	Statistic	df	Statistic	df	df	Sig.	Variable	Statistic	df	Statistic	df	df	Sig.
GOVR1	.275	93	.000	.842	93	.000	FACC8	.313	93	.000	.832	93	.000
GOVR2	.260	93	.000	.862	93	.000	TIDT2	.270	93	.000	.874	93	.000
GOVR4	.272	93	.000	.847	93	.000	TIDT5	.222	93	.000	.908	93	.000
GOVR5	.290	93	.000	.839	93	.000	TIDT6	.241	93	.000	.896	93	.000
GOVR7	.278	93	.000	.837	93	.000	RGS2	.340	93	.000	.809	93	.000
SCM1	.254	93	.000	.889	93	.000	RGS4	.356	93	.000	.793	93	.000
SCM3	.235	93	.000	.888	93	.000	RGS7	.362	93	.000	.774	93	.000
SCM5	.233	93	.000	.903	93	.000	MIPV1	.208	93	.000	.892	93	.000
SCM6	.226	93	.000	.900	93	.000	MIPV2	.229	93	.000	.860	93	.000
FACC2	.293	93	.000	.844	93	.000	MIPV3	.214	93	.000	.892	93	.000
FACC3	.292	93	.000	.823	93	.000	MIPV4	.223	93	.000	.885	93	.000
FACC6	.264	93	.000	.858	93	.000	MIPV5	.217	93	.000	.873	93	.000

a. Lilliefors Significance Correction

Source: Author

Table 8. Kurtosis and Skewness of Observed Data

Variable	skew	kurtosis	Variable	skew	kurtosis	Variable	skew	kurtosis
GOVR7	-0.276	0.932	SCM6	-0.148	-0.450	RGS2	-0.452	0.600
GOVR5	-0.366	0.810	FACC3	-0.406	1.019	RGS4	-0.489	0.601
GOVR4	-0.265	0.794	FACC2	-0.119	0.829	RGS7	-0.32	0.551
GOVR2	-0.279	0.518	FACC8	0.503	0.089	MIPV3	-0.503	-0.187
GOVR1	-0.342	0.687	FACC6	-0.215	0.334	MIPV2	-0.682	0.352
SCM1	-0.218	-0.160	TIDT6	0.044	-0.048	MIPV1	-0.393	-0.056
SCM3	-0.223	-0.093	TIDT5	-0.097	-0.406	MIPV5	-0.536	0.164
SCM5	-0.102	-0.322	TIDT2	0.021	0.324	MIPV4	-0.544	0.113

Source: Author

The results from the normality tests present mixed insights regarding the distribution of the data. The Kolmogorov-Smirnov test (Table 7) shows a p-value less than 0.05 that indicates the data significantly deviates from the normal distribution. Similarly, the Shapiro-Wilk test (Table 7) reports a p-value below 0.05 which reinforces the conclusion that the data does not follow a normal distribution. Similarly, the skewness and kurtosis values (Table 8) fall beyond the acceptable range of -0.5 to +0.5. Therefore, it is reasonable to proceed with Spearman correlation analysis.

4.2.2. Linearity Test

A linearity test examines whether the relationship between two variables follows a straight line which is a key assumption for Pearson's correlation. One of the most effective ways to visually assess linearity is through the use of scatterplots. In scatterplots, each point represents paired values of the two variables under study. If the points tend to cluster around a straight line, it suggests a linear relationship that shows Pearson's correlation is appropriate tools of correlation analysis. Based on the scatterplots shown in Figures 1 to 5 that relationships between the variables are generally scattered around the straight line in each plot. Particularly, the visual patterns in figures 1, 3 and 5 exhibited are variables are related in a non-linear manner making data suitable for non-parametric correlation analysis. Therefore, in this study the use of Spearman's correlation is more appropriate to evaluate the strength and direction of the relationships among variables. Summing up, the results of the normality and linearity tests provided sufficient evidence to proceed with non-parametric correlation analysis using Spearman's correlation.

Figure 1. Scatter Plot of Cooperative Governance and Management of Inflation and Price Volatility

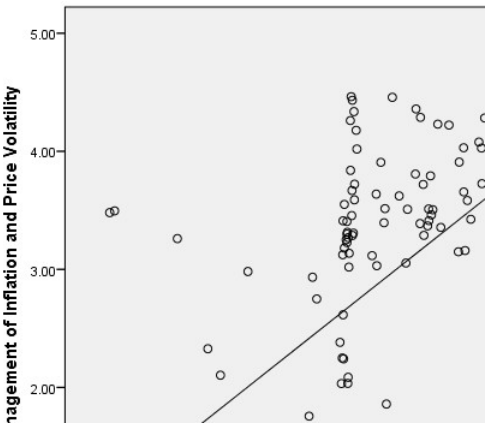


Figure 2. Scatterplot of Supply Chain Management and Management of Inflation and Price Volatility

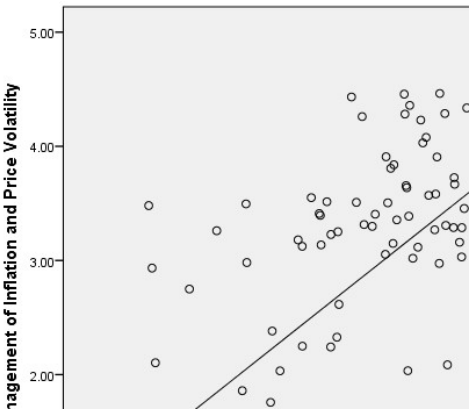


Figure 3. Scatterplot of Financial Access & Capital Constraint and Management of Inflation and Price Volatility

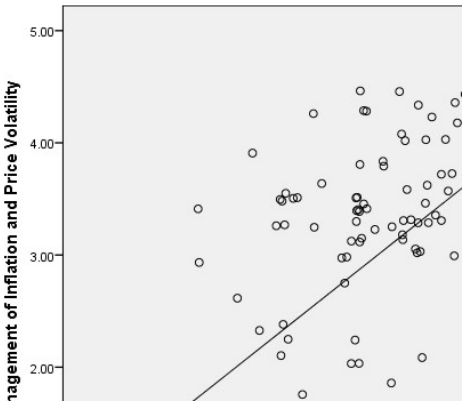


Figure 4. Scatterplot of Technological Innovations & Digital Tools and Management of Inflation and Price Volatility

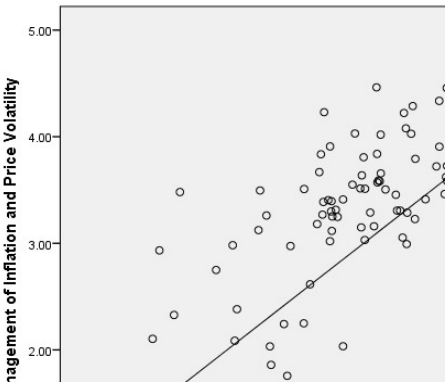
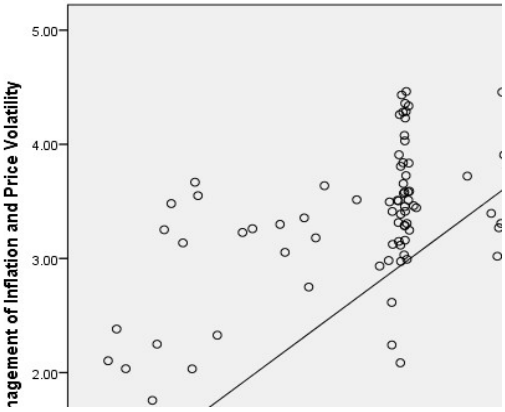


Figure 5. Scatterplot of Regulatory & Government Support and Management of Inflation and Price Volatility



4.2.3. Spearman's Correlation Analysis

Spearman's correlation coefficient (ρ) is a non-parametric measure of the strength and direction of a monotonic relationship between two random variables. It does not assume linearity or normality in a data (Conover 1999). Instead, it ranks the data points and calculates the correlation based on these ranks. The value of Spearman's ρ ranges from -1 to +1 where +1 indicates a perfect positive monotonic relationship -1 indicates a perfect negative monotonic relationship and 0 suggests no relationship (Hauke and Kossowski 2012). Spearman's correlation is ideal for ordinal data or continuous data that violates normality assumptions (Conover 1999). Accordingly, correlation of the study is analyzed using spearman's correlation coefficient (ρ). The spearman's correlation coefficients of study variables are presented below (Table 9)

Table 9. Spearman's rho Correlation Coefficients

Variable	1	2	3	4	5	6
1. Management of Inflation and Price Volatility	—					
2. Cooperative Governance	.509**	—				
3. Supply Chain Management	.504**	.733**	—			
4. Financial Access and Capital Constraint	.433**	.575**	.660**	—		
5. Regulatory and Government Support	.527**	.628**	.783**	.566**	—	
6. Technological Innovation and Digital Tools	.653**	.635**	.675**	.673**	.584**	—

** Correlation is significant at the 0.01 level (2-tailed)

Hypothesis 1 (H_{01}): Urban primary consumer cooperative societies' cooperative governance has no statistically significant relationship to their management of price volatility.

The Spearman's correlation coefficient (ρ=0.509, p=0.01, two-tailed) (table 9) indicated a moderate positive relationship between cooperative governance and the management of inflation and price volatility in urban primary consumer cooperative societies. This suggests that improvements in governance are moderately associated with more effective management of inflation and price volatility. Therefore, at 5% level of significance the null hypothesis *(H_{01})* was rejected since the p value is less than 5% ($p<0.05$). Thus, it is concluded that there is strong statistical evidence to suggest that the relationship between cooperative governance and management of price volatility did not occur due to random variation.

Hypothesis 2 (H_{02}): Urban primary consumer cooperative societies' supply chain management has no statistically significant relationship to their management of price volatility.

The Spearman's correlation coefficient (ρ=0.504, p=0.01, two-tailed) (table 9) showed a moderate positive relationship between supply chain management and the management of inflation and price volatility in urban primary consumer cooperative societies. This suggests that as supply chain management improves there is a moderate tendency for better handling of inflation and price volatility. The correlation coefficient shows a reasonably strong association between the two variables implying that effective supply chain management may contribute to stabilizing prices and controlling inflationary pressures within these cooperatives. Therefore, the null hypothesis *(H_{02})* is rejected at 5% level of significance since the p-value is smaller (0.01) affirming that the relationship between supply chain management and management of price volatility is statistically significant.

Hypothesis 3 (H_{03}): Urban primary consumer cooperative societies' access to finance and capital constraint has no statistically significant relationship to their management of price volatility.

The Spearman's correlation coefficient (ρ=0.433, p=0.01, two-tailed) (table 9) suggested a moderate positive relationship between financial access and capital constraints and the management of inflation and price volatility in urban primary consumer cooperative societies. This correlation indicates that better financial access and fewer capital constraints are moderately associated with improved management of inflation and price volatility. Although the strength of the relationship is not very high, it is still meaningful. Therefore, the null hypothesis *(H_{03})* is rejected at 5% level of significance since the p-value is smaller. The statistical evidence supported the

existence of a relationship between financial access and capital constraints and the ability of urban primary consumer cooperatives to manage price volatility of essential goods.

Hypothesis 4 (H_{04}): Urban primary consumer cooperative societies' regulatory and government support has no statistically significant relationship to their management of price volatility.

The Spearman's correlation coefficient (ρ=0.527, p=0.01, two-tailed) (table 9) indicated a moderate positive relationship between regulatory and government support and the management of inflation and price volatility in urban primary consumer cooperative societies. It suggests that when cooperatives receive stronger regulatory backing and government support, they tend to manage inflation and price volatility more effectively. It is also substantial enough to imply external regulatory and government support plays a critical role in stabilizing prices and managing inflation within these societies. The null hypothesis *(H_{04})* is rejected at 5% level of significance since the p-value (0.01) is smaller confirming that regulatory and government support is significantly related to how urban primary consumer cooperatives manage price volatility.

Hypothesis 5 (H_{05}): Urban primary consumer cooperative societies' use of technological innovations and digital tools has no statistically significant relationship to their management of price volatility.

Finally, the Spearman's correlation coefficient of (ρ=0.653, p=0.01, two-tailed) (table 9) suggested a strong positive relationship between the adoption of technological innovations and digital tools and the management of inflation and price volatility in urban primary consumer cooperative societies. This indicates that cooperatives that utilize technological innovations and digital tools tend to manage inflation and price volatility more effectively. The exhibited correlation reflects implying that use of technological innovations and digital tools play a key role in enhancing the ability of cooperatives to stabilize prices and navigate inflationary pressures. Therefore, the null hypothesis (H_{05}) is rejected at 5% level of significance since the p-value (0.01) is smaller than confirming that the use of technological innovations and digital tools have a statistically significant impact on management of price volatility of essential goods.

To sum up, based on the Pearson's correlation analysis demonstrated all established hypotheses were rejected with a moderate to strong positive correlations indicating that cooperative governance, supply chain management, financial access, regulatory and government support, and technological innovations and digital tools are all significantly related to the management of inflation and price volatility in urban primary consumer cooperative societies. These findings underscore the importance of improving on these areas to enhance the ability of urban primary consumer cooperatives to stabilize price fluctuations and navigate inflationary challenges.

5. Discussion

Urban primary consumer cooperatives play a crucial role in stabilizing prices and managing inflation particularly within economically vulnerable communities. Findings of the study indicated significant positive relationships between inflation and price volatility management and factors like cooperative governance, supply chain management, financial access and capital constraint, regulatory and government support, and use of technological innovation and digital tools. The moderate to strong positive correlations between factors indicate improvements in these areas are associated with enhanced inflation and price volatility management. These findings align with (Birchall 2013) that showed the importance of effective governance and strong member support for cooperative resilience during economic instability. The study stated that the cooperative governance structure ensures member patronage cohesiveness and avoidance of excessive risk-taking. Further, Smith and Rothbaum (2013) stated that members of consumer cooperatives can suggest and develop new ideas that benefit themselves which ultimately goes to improving their consumer cooperatives.

Additionally, Majee and Hoyt (2011) suggested that financial services should be accessible to cooperatives since they possess the potential to bootstrap far more people in low-income communities into socio-economic mainstream than other business organizations. Furthermore, Christopher and Holweg (2011) concluded that during periods of economic instability robust and flexible supply chain strategies are crucial to manage price stability and reduce the impact of inflation on business. Therefore, urban primary consumer cooperatives need to do more on this area to better manage the pressures of price fluctuations.

Moreover, the impact of regulatory support may vary by region where regulatory frameworks alone may not guarantee improved inflation and price stability management without efficient implementation but government

can better help cooperatives through enacting cooperative specific eligibility and regulation laws, provision of financial support, grants, loans and loan guarantees, special preferences in contracting and procurement (Theodos, Edmonds, and Scally 2020). In addition, Core et al (2024) emphasized the transformative role of technology in cooperative operations concluding that the use of technological innovations and digital tools is a formidable catalyst for the attainment of objectives within cooperative enterprises. It is known that one of the main objectives of consumer cooperatives is delivery of essential goods to members at affordable or reduced price (Birchall 2013) Therefore, it is recommended that urban primary consumer cooperatives should improve their effort to using technological innovations and digital tools as this study concluded the existence of strong correlation between technological innovations and effective price volatility management.

In conclusion, observed positive relationships align with prior research that supported the reliability of these findings. For urban primary consumer cooperatives of Ethiopia focusing on cooperative governance, access to finance and capital, Supply chain management, regulatory and government support, and technological innovations and digital tools are proved essential for effective price volatility management of essential goods. These insights can help these cooperatives to prioritize improvements to strengthen their resilience in volatile economic periods.

6. Implications of the study

Findings of this research indicated a moderate to strong relationship between urban primary consumer cooperatives' ability to manage inflation and price volatility and factors like cooperative governance, supply chain management, financial access, regulatory and government support, and use of technological innovations and digital tools that can immensely help in their business endeavors. Effective cooperative governance is essential for building a strong cooperative identity and engaging members in the affairs of their cooperatives. Such environment is essentially needed to enable cooperatives to adapt to challenges, introduce new business strategies and offer enhanced value to their communities.

Use of technological innovations and digital tools further strengthen capacity of cooperatives to effective management during periods of economic volatility. By adopting digital platforms and other technologies, cooperatives can improve operational efficiency, streamline supply chain processes and increase their ability to respond swiftly to market changes. Findings also suggest government support through subsidies, financial assistance and favorable regulatory policies help cooperatives to adopt appropriate technological tools that can make them more resilient to price fluctuations.

Further, strong governance, better access to finance and technology can create a robust framework that enable urban primary consumer cooperatives to meet member needs while creating job opportunities in local communities. Particularly, in urban areas where high unemployment remains a challenge employment within cooperatives contributes to economic stability. As cooperatives expand their technological capabilities and strengthen governance with government backing, they are able to play an increasingly vital role in providing affordable essential goods, stabilizing prices and fostering local economic resilience.

Therefore, urban primary consumer cooperatives can continue to grow and develop, stabilize prices of essential goods and help poverty reduction efforts of the nation through good governance culture, improved supply chain management, better access to finance, adoption of appropriate technology and digital tools, and sustained regulatory and government support. Ultimately, this will contribute to economic resilience and improved living standards for members and communities, at least, across urban Ethiopia.

7. Limitations of the study

While offering valuable insights into the factors impacting urban primary consumer cooperative societies' management of price volatility, the study is subject to certain limitations. Data collection was primarily confined to the perspectives of chairpersons or vice-chairpersons. Additionally, the survey correlation study cannot definitively establish causal linkages while effective in identifying relationships between variables.

Future research should consider a broader stakeholder perspective including members, cooperative employees, experts on cooperative societies and other relevant stakeholders including government officials in order to gain a more comprehensive understanding on the issue. Employing mixed-methods research like qualitative interviews and case studies alongside quantitative surveys can provide deeper insights into causal relationships. While correlation analysis can identify relationships and areas for improvement, longitudinal studies can track changes and impacts over time.

By addressing these limitations and exploring these future research directions, researchers can further contribute to the development of effective strategies for managing inflation and price volatility of essential good in urban primary consumer cooperative societies.

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