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Determinants of Gross Margin of Watermelon Traders in Kampala, Uganda

[1] Wilson Friday, [2] Fredrick Bagamba, [3] William Ekere

[1, 2, 3] Department of Agribusiness and Natural Resource Economics, College of Agricultural and Environmental Sciences, Makerere University, Kampala, Uganda

[1] Department of Economics and Agricultural Development, Faculty of Agronomy and Forestry Engineering, Eduardo Mondlane University, Maputo, Mozambique

Corresponding Author: **Wilson Friday**

Abstract

Watermelon is one of the most important tropical fruits, very nutritious and traded globally. Despite of its importance worldwide, watermelon trade faces challenges accrued from its transportation, poor storage facilities and lack of organized marketing system. This study on market performance of watermelon was conducted in the six selected markets of Kampala district. The study objectives were to; establish socioeconomic characteristics of watermelon traders, compute gross margin and marketing margin of watermelon trade along selected value chain and determine factors influencing watermelon gross margin. Simple random sampling was used to select 90 retailers stratified by the selected markets and retail trade levels and 30 wholesalers. Data was collected using a structured survey questionnaire, analyzed using descriptive statistics marketing margin, multiple linear regression and gross margin analysis. The finding reveals that they were more men than females and zebra F1 was the most traded variety. Generally, the determinants of retailers' Gross margin were gender of the traders, age in years, education, membership of trade association, watermelon variety, financial source, record keeping and storage facilities access significantly influenced the retailer's gross margin at $p>0.01$, $p>0.05$ and $p>0.10$, levels of probability in the selected Kampala markets, Uganda. The study established that average prices charged at the farm gate, wholesale, retail stall, retail wheelbarrow and retail small truck level were UGX 1,054, UGX 1,952, UGX 3136, UGX 5,899 and UGX 3,164 respectively. Overall, the retail prices are higher than the farm gate prices. The marketing margins of the stall traders, wheelbarrow traders, small truck traders and wholesalers of watermelon was UGX1183, UGX3947 and UGX1212 and UGX898 with percentage share of 39%,68%,39% and 15% respectively. The study concluded that socioeconomic characteristics of watermelon traders do affect gross margins of traders, watermelon trade is profitable with gross margins above 55% for the selected value chain actors thus great market performance and watermelon retail price is greater than farm gate price. The study suggested that watermelon traders should pursue membership to associations and seek financial assistance to expand operational scale. The government should adopt watermelon export promotion strategies that aim at improving storage facilities, promote mostly production, trading Zebra F1 variety in Kampala district and traders should embark on accurate record keeping since it is a parameter in finance access. There is a need to conduct further research on the effects of government policies on gross margin and export volumes of watermelon.

Keywords: Watermelon, Marketing Margin, Gross Margin, Traders, Kampala

1. Introduction

Fruits and vegetables are of great nutritional value (Achike & Anzaku, 2010; Kassali *et al*., 2015) [1, 15] with watermelon being one of the most important fruits cultivated in the tropics (Kassali *et al*., 2015) [15]. They are mainly cultivated in the tropical countries and consumed globally whole or blended and consumed as juice (Onyebinama, 2018; Onyemauwa, 2010) [20, 21]. They are highly marketable horticultural fruits which contain major nutritional components. It contains about 87-92% of water and able to meet the mineral requirements of the body for calcium and zinc found in their seeds plus lycopene which is an antioxidant that prevents cancer (Kassali *et al*., 2015; Onyemauwa, 2010) [15, 21]. The annual world production of watermelon was about 90 million tons (Mukrimaa *et al*., 2016) [19]. Algeria is the leading watermelon produce in Africa. This was followed

by Nigeria that produced more watermelons in 2011 (139,223 tons) than Kenya which is the leading fresh produce African exporter, with 66,196 tons and South Africa produced 77,993, tons (Balogun *et al*., 2019) [6]. In Uganda, watermelon market analysis showed that there is a growing demand and therefore market for fruits such as watermelons. The different varieties of watermelon include; Zuri F1, Sukari F1, Charleston Grey variety and Early Scarlet F1. Traders sell different sizes of watermelon at wholesale, retail level as well as the sliced forms making the fruit more available and affordable to final consumers (UIA, 2016) [26]. The degree of market performance depicted by gross margins and marketing margins are fundamental measures of market performance (Ikenna *et al*., 2019; Kassali *et al*., 2015) [11, 15]. A study on the marketing of agricultural produce among rural farm households in Nigeria: the case of sorghum marketing in Benue state, marketing adds economic value that give form, time and place utility to products and services (Asogwa & Okwoche, 2012) [5]. Selling is a marketing central micro concept, mutually enhance enterprise success depend on the management ability to give satisfaction in the targeted market with profit motive (Ikenna *et al*., 2019) [11]. According to another study on how does marketing margin determine local leafy vegetables marketing; results showed that marketing of local leafy vegetables in the study area was inefficient; the benefit-cost ratio showed that it is profitable (Boateng *et al*., 2016) [7]. The authors recommend that, farmers and traders should form co-operatives to enable them bargain for prices, obtain loans and purchase storage facilities (Boateng *et al*., 2016) [7]. According to the authors who obtained data from 90 watermelon marketers and used descriptive statistics and gross margin analysis. Results showed that 53.3% of the watermelon marketers were females; 50.0% were aged between 31-40 years; and 53.3% had secondary education. Findings also revealed that losses derived fruit spoilage, lack of preservation, credit facilities and high transportation costs were the most severe constraints to watermelon marketing (Ekerete & Asa, 2014) [10]. Analysis of Watermelon Marketing study, researchers found out that watermelon marketing was dominated by men (80%) at the wholesale level and women (90%) at the retail level. About 46% level of inefficiency existed in marketing system operationally, wholesalers, were more efficient (0.69%) than the retailers (0.75%) in watermelon marketing (Isibor, A.C and Ugwumba, 2018) [12]. Fruits and vegetables are affected with a lot of risks which call for customers' needs satisfaction take investments and increasing profit levels among traders (Ahimbisibwe *et al*., 2013) [4]. A simple random sampling and a linear regression model was used it was observed that innovation was a significant predictor of export performance. It recommended that fruit exporting firms in Uganda should focus more on innovation if they are to enhance their export performance (Ahimbisibwe *et al*., 2013) [4]. The markets share a key to profitability while evaluating market performance (Ahimbisibwe *et al*., 2013; Buzzell *et al*., 1975) [4, 8]. This article widely recognized that one of the main determinants of profitability is market share (Buzzell *et al*., 1975) [8]. An evaluation of watermelon marketing showed that watermelon potentials is significant for increase in farmers' income (Mobasser *et al*., 2014) [18]. Market Chain Analysis study on agroforestry Products, the structure, conduct and performance (SCP) approach was used to analyze fruits and vegetables markets, actors in the markets where producers, wholesalers, retailers and final ultimate consumers (Mateows, 2015) [16]. The process of making a product available from producer for Consumption by ultimate consumer involves channels (Kassali *et al*., 2015) [15]. The study on the Economic analysis of the marketing margin of watermelon that was determined by using marketing margin models, analysis of variance and multiple range test, primary data used for analysis were generated through random sampling of 90 farmers and 270 regular middlemen, the results showed that the mean marketing margin was 18.2%, marketing costs 12.8% and net profit 83% (Achike & Anzaku, 2010) [1]. Another study on marketing channels and margins of tropical leafy vegetable in Southeastern Nigeria, concluded that the issues and concerns in marketing relate mainly to the performance of the marketing system which depends on the structure and conduct of the market. An efficient marketing system helps in the optimization of resource use, output management and increase in farm income by value addition (Agbugba, 2014; Agbugba & Dorothy, 2015) [2, 3]. The watermelon marketing value chain have been subjected to margins due to price variations from farm gate to final consumer affecting gross margin and market structure characterised by many buyers and sellers with high degree of competition (Balogun *et al*., 2019; Clark, 1999) [6, 9].

1.1 Problem Statement

Watermelon marketing is a key employment source and income generation for many people especially women and youth. (Isibor, A.C and Ugwumba, 2018; Isibor & Ugwumba, 2014) [12, 13]. The watermelon potential as an income generating crop is relevant for traders especially those residing near the urban areas. Recent reports indicate that exotic fruits marketing generally generates higher gross profit margin and provides more employment to the farmers than those of indigenous fruits (Isibor & Ugwumba, 2014) [13]. In spite of its importance globally, watermelon has its peculiarities and challenges in its marketing. Watermelon marketing is faced with issues like problem of transportation, the use of numerous agents and mobile traders and lack of an organized marketing system among others (Boateng *et al*., 2016; Tuffour & Dokurugu, 2015) [7, 23]. Large quantities of watermelons is wasted because of poor storage facilities and conditions (Ekerete & Asa, 2014; Ugbogu & Ogodo, 2015) [10, 25]. A study which evaluated microbial quality of polythene packaged sliced fruits especially watermelon sold in major markets reported that fruits were exposed to risk of food borne diseases (Izah *et al*., 2015) [14]. The watermelon prices vary due to seasonal changes in the volume of production throughout the year. In view of the rising demand for watermelon in Kampala district, there was a need to conduct empirical study and accurate estimate the gross margins and establish the variables that determine the gross margin in the study area. It was also necessary to document the socioeconomic characteristics of traders and compute the marketing margin of traders along selected value chain actors right from farm gate, wholesalers retailers up to the final consumers.

1.2 Objectives

The general study objective was: To analyze market performance of watermelon trade in six selected markets in Kampala district.

The specific objectives of the study were:
To describe socioeconomic characteristics of watermelon traders in the study area.

1. To determine the gross margins and marketing margin of watermelon trade along selected value chain in the study area
2. To establish the determinants of the gross margin of watermelon traders in the study area.

1.3 Research Hypothesis

Ho: The socioeconomic characteristics of gender, age, education level, access to financial services do not affect gross margin of watermelon traders in the study area.
Ho: Watermelon trade is not associated with high gross margins among traders in study area.
Ho: Watermelon retail price is less than farm gate price in the study area.

1.4 Significance and Scope

The findings provide current literature to policy makers, Ministry of Agriculture, Animal Industry and Fisheries, other scholars and agro-industry operators with in the market chain. The results empower traders to have preferable knowledge in marketing which signpost them in decision making on inputs-output performance. Watermelon trade has high potential of agribusiness development and employment opportunities which have significant impact particularly for households in Kampala city. The efficient performance of watermelon marketing is useful as it enhances self-sufficiency, country's economic growth leading to increased capital accumulation. The study aimed at assessing market performance in terms of the socioeconomic characteristics, factors affecting gross margin of watermelon traders and marketing margin along the selected value chain. The study is carried out in six selected markets, Kampala district.

2. Materials and Methods

2.1 Population and Sample

The study target sample was 120 watermelon traders comprising of 90 stratified retailers by level and 30 wholesalers. The socioeconomic characteristics description and gross margin analysis of traders while marketing margin analysis was depicted from farm gate to final consumers including wholesalers and retailers. Simple random sampling technique was used to select a sample of 90 watermelon traders for retailers, 15 from each market stratified by 3 retail levels those who use wheelbarrows (5), stall (5) and trucks (5) as well as 30 wholesalers, totaling to 120 respondents.

2.2 Study Area and Research Design

The study was carried out in six selected markets of Kampala, Uganda's capital city. Kampala city has a total population of 1,516,210 people made up of 722,638 males and 793,572 females (UBOS, 2014) [24]. The six selected markets in Kampala city included Owino, Nakasero, Nakawa, Nakulabye, Kalerwe and Kawempe. Owino market is the largest wholesale market in Uganda and one of the largest markets in East Africa. The market was built in the 1970s for a few hundred vendors, today houses a population ranging between 5000-50,000 employees. These include actors like buyers, traders, wholesalers, retailers and transporters who compete among themselves for space to ensure the survival of their businesses. It was the first fresh fruits and vegetable wholesale market followed by Nakasero market (UBOS, 2014) [24] A cross sectional research design was adopted, the study focused on gross margin analysis, variables affecting gross margin of retail traders, socioeconomic characteristics of traders and marketing margin of watermelon trade from farm gate to final consumers. However, in study area, there was no standard unit of measure of size or weight used in watermelon trade. This necessitated us to develop three scales of measurement of size and weight., These scales were Small= watermelon weighing of about <3kgs, Medium = watermelon weighing about 3kg-5kgs while Large = watermelon weighing of about 5kgs and above. These scales were adopted while interviewing the respondents as well as in our computation of gross margins and marketing margins.

2.3 Data Collection Methods, Analysis and Techniques

Quantitative data was collected from primary sources using a structured questionnaire and interviews. The primary data collection method was used to collect data in the field. The above approach was applied to assemble primary data which easy to do cross-data validation. The researchers asked questions in order to get substantial data without doubt those who could not write were also interviewed. The questionnaire developed was divided into three sections A, B and C that covered socioeconomic characteristics, costs and revenues. and marketing margin along the selected value chain respectively. Part A and B were filled by 90 stratified retailers while Part C was filled by 30 wholesalers. Where necessary, the questionnaire was interpreted and translated in local languages for easy understanding by traders. Gender and ethical consideration were achieved by seeking respondents' consent before administering questionnaire. Prior to the interviews, study objectives were explained and clarified to the respondents and their voluntary participation was sought. In this study, men and women were treated as equal in value creation and profit hunt in the watermelon value chain and marketing systems. Data was analyzed by utilizing quantitative techniques which treatise appropriate tools and techniques for data analysis, descriptive statistics, marketing margin and gross margin analysis were employed. The descriptive statistics were used to characterize the respondents and analysis was to with do frequencies, means, percentages and standard deviation. Computer application like (SPSS) and MS-Excel packages were used for quantitative analysis techniques like gross margin model and marketing margin analysis. A linear multiple regression model was developed and used to analyze the factors affecting gross margin of retail watermelon trade. Data collected was assessed, analyzed, interpreted and presented using quantitative methods.

2.3.1 The Gross Margin Analysis

It was the point of view of estimation of total expenses (costs) as well as total revenue (TR) within a marketing period (monthly). Variable cost (VC) include; Cost of acquiring watermelon at retail level, cost of transport, storage, labor and packing, market parking dues and tax. The gross margins for the various watermelon traders were computed using the following formulae:

$$Total\ Revenue\ (TR) = Px.Q$$ and
$$Gross\ Margin\ (GM) = TR - VC$$

Where;

P*x* = Price of watermelon at which it is sold,
Q=quantity of watermelon sold,
GM= gross margin, and
VC=variable costs.

2.3.2 Linear Regression Analysis

Linear regression analysis was used to study to establish the factors influencing gross margins realized from retail watermelon trade. The variation in the dependent variable was explained by more than one independent variable. A multiple regression model was found appropriate since few economic models can be explained by only one variable (Gujarati and Porter, 2009). The regression results were based on the model that represents best prediction of dependent variable from several continuous independent variables. Ln= Natural Logarithm was used to minimize the larger values of gross margin during analysis. The multiple regression approach for watermelon trade gross margin.

$$\text{lnyi} = \beta_0 + \sum_{j=1}^{n} (\beta_1 X_{ij}) + \varepsilon j$$

Where:

j=Number of independent variables,
i indicate usage of cross-sectional data,
ε_j=error term,
β_0=intercept of y and
β_1 = Coefficients.

Table 1: Description of gross margin and its independent variables

	Variable name	Description or Measurement
lny	Ln gross margin	TR-VC UGX per trader, monthly
X1	Gender	1=Male, 0=Female
X2	Age	Years per trader
X3²	Age²	Years per trader
X4	Education level	1=Formal, 0=Non-Formal
X5	Watermelon variety	1=Zebra F1, 0=Otherwise
X6	Experience	Years per retail trader
X7	Trader Association	1=Have association, 0=Otherwise
X8	Financial Source	1=Bank loan, 0= Otherwise
X9	Record Keeping	1= Keep Records, 0=Don't keep records
X10	Storage facilities Access	1=Have Access, 0=No Access

Ln gross Margin in UGX (Monthly)

In this study, multiple regression analysis was used to establish the factors influencing the magnitude of the gross margin of the traders. The independent variables included: gender, age, education level, watermelon variety, trade association membership, storage facilities access and financial source were analyzed with gross margin per month of watermelon enterprises.

2.3.3 Marketing Margin Analysis

The data was analyzed by means of descriptive statistics such as percentages, means and standard deviation. Marketing margin has remained an important tool in analyzing the performance of marketing systems. The analysis included the wholesale and stratified retail margin as well as the total marketing margin where n=120 comprising of wholesalers (30) and stratified retailers (90). The marketing margin were stratified along the selected value chain from farm gate to final consumer with the only interest being the price difference including wholesalers and retailers. The wholesale margin was measured as the difference between wholesale (P_{xw}) and farm gate (P_{xf}) prices, retail margin stall measured as the difference between retail stall price (P_{xs}) and wholesale prices, marketing margin wheelbarrow measured as the difference between retail wheelbarrow (P_{xwb}) and wholesale prices and retail margin truck users was measured as difference between retail truck users (P*x*t) and wholesale prices. The Percentage Share was computed using the following formula:

$$\text{Percentage share} = \frac{Margin}{Final\ Price} * 100$$

3. Results and Discussions

In this section, we present the results and discussion of the study and based on the research objectives, sought to analyze market performance of watermelon trade in the six selected markets, Kampala. Statistical Package for Social Scientists (SPSS) was used to generate descriptive statistics and also to establish relationship between dependent and independent variables of retailers' gross margin.

3.1 Socioeconomic Characteristics of Watermelon Traders

Table 2: Socioeconomic characteristics by trader type

Socioeconomic characteristics (n=120)	Retailers		Truck traders	Wholesalers
	Stall	Wheelbarrow		
Sex-Male (%)	53	93	83	67
Age in years	27*	20*	33*	28*
Education -Formal (%)	80	53	57	77
Experience in years	5*	3*	4*	5*
Watermelon variety-Zebra F1 (%)	73	70	73	60
Trade Association-Associate (%)	83	27	73	83
Record Keeping-Keep records (%)	97	47	77	76
Storage facilities access (%)	97	37	90	87
Financial source- Bank loan (%)	43	10	57	67

Source: Author's computation * sign indicates variables in years

The results of the study (Table 2) revealed that men dominated watermelon trade with 53% of the men being retail stall traders, 83% being small truck traders, 93% engaged in watermelon wheelbarrow trade and 67% being wholesale watermelon traders. This is contrary to the findings in the studies by (Agbugba, 2014; Isibor & Ugwumba, 2014; Onyemauwa, 2010) [2, 13, 21]. In terms of age, most stall traders had a mean age of 27 years, wheelbarrow traders' had a mean age of 20 years, truck user traders' had a mean age of 33years and wholesale traders a mean age of 28 years. This, implies that typical traders of watermelon in the area were youth and hence of economically active age. This is plausible since the majority of the country's population belong to younger age group. Generally, the traders were young and energetic and if they were motivated with needed marketing facilities, they could make meaningful contribution in watermelon marketing.

The mean age of watermelon traders in Kampala is much lower contrary to the mean age of 42.5 and 42.25 years for wholesalers and retailers respectively as reported by (Osondu *et al*., 2014) [22]. Approximately, 80% stall traders,53% of Wheelbarrow traders, 57% of Truck traders and 77% of wholesaler traders had attained formal education. This is contrary to the study by Boateng et. al where only 34% of watermelon traders had attained formal education. The results showed that both retail stall and wholesale traders had 5 years of experience while small truck traders and wheelbarrow traders had 4 year and 3 years of experience in trade. This study compares with wholesalers (8.63) and retailers (7.62) years (Balogun *et al*., 2019; Kassali *et al*., 2015; Osondu *et al*., 2014) [6, 15, 22]. The most traded watermelon variety was Zebra F1 with 73% of stall traders and truck users selling this variety. Most traders who were members of trade association were those who own stalls and wholesalers at 83%:83% respectively, this could be due to variation of group awareness in different trading levels. The study indicated that traders who get financial assistance from bank loans source were retail truck users and wholesalers with 57%:67% respectively. This is attributed to variation of bank requirements possession and affordability.

3.2 Gross Marginal Analysis of Watermelon Trade

Table 3: Gross margin of watermelon trade by type of traders per month

Sales revenue and costs	Retailers			Wholesalers
in Ugx monthly	Stall	Truck users	Wheelbarrow	
Small watermelon sales	78328	76328	68328	24328
Medium watermelon sales	138137	136137	128137	126137
Large watermelon sales	242116	240116	232116	230116
Total sales (A)	**458581**	**452581**	**428581**	**380581**
Small cost of purchase	36253	34253	26253	24253
Medium cost of purchase	62907	60907	52907	50907
Large cost of purchase	109304	107304	99304	97304
Cost of sales (B)	**208463**	**202463**	**178463**	**172463**
Transport	13789	11789	3789	1789
Parking	5000	3000	2000	4333
Labor	18728	16728	14728	8728
Storage	7889	5889	5889	7556
Packing	5537	3537	3537	5204
Tax	8022	6022	6022	7689
Operating Expenses (C)	**58965**	**46965**	**35965**	**35298**
Gross margin=A-(B+C)	191153(55)	203153 (55)	214153(58)	172820(55)

Source: Author's computation. The values in parentheses () are the Gross margin percentage

It breaks down various mean costs of the enterprise and also the mean revenues accruing from it, inclusive was the mean gross margin of the enterprise. The results indicated gross margins of UGX 191,153, UGX 203,153, UGX 214,153 and UGX 172,820 for retail, wheelbarrow, truck and wholesale traders respectively. This implies that wheelbarrow trade is more profitable with gross margin of UGX 214,153 (58%) as compared to other retail trade businesses and this is because of low marketing costs of UGX 35,965 incurred and use of primary processing on watermelon like slicing. Therefore, we reject null hypothesis and conclude that Watermelon trade is profitable with high gross margin in the study area.

3.3 Marketing Margin for Watermelon Traders

The Marketing margin has remained an important tool in analyzing the performance of marketing systems as it provides insights into the profitability of different players in the supply chain and the efficiency of distribution The wholesalers provided the buying price at the farm gate called farm gate price (P_{xf}) and the price at what they sell watermelon called wholesale price (P_{xw}) while retailers provided the price paid by the consumers to the retailer called retail price.

Table 4: Prices and margins of traders per watermelon per month

Prices and Margins (Ugx)	Small	Medium	Large	Average
Farm gate price (P_{xf})	483	1030	1650	1054
Wholesale price (P_{xw})	1050	1710	3097	1952
Retail-stall price (P_{xs})	1713	3007	4687	3136
Retail-wheelbarrow price (P_{xwb})	3847	5153	8697	5899
Retail-truck users' price (P_{xt})	1667	3113	4713	3164
Marketing margin				
Farm gate -Wholesale	567	680	1447	898
Wholesale - Retail margin Stall	663	1297	1590	1183
Wholesale-Retail margin Wheelbarrow	2797	3443	5600	3947
Wholesale-Retail margin truck users	617	1403	1616	1212

Table 5: Percentage market share of traders per watermelon per month

% Marketing share	Small	Medium	Large	Average
Wholesalers	15	13	17	15
Retailers Stall	39	43	34	39
Retailers Wheelbarrow	73	67	64	68
Retailers small truck users	37	45	34	39

Source: Author's Computation where n=120. Note: The % share wasn't subjected to costs

The findings in tables 4 and 5 above shows watermelon prices and market margin of wholesalers and stratified retailers. The study revealed average prices at the farm-gate, wholesale, retail stall, retail wheelbarrow and retail small truck level of UGX 1,054, UGX 1,952, UGX 3,136, UGX 5,899, UGX 3,164 respectively. However, the marketing margins of the retail stall traders, wheelbarrow traders and small truck traders of watermelon was UGX1183, UGX3947 and UGX1212 with percentage share of 39%,68% and 39% respectively. The retail margin by wheelbarrow traders for small, medium and large watermelon fruits was UGX 2,797, UGX 3,443 and UGX 5,600 with a percentage share of 73%, 67% and 64% for small, medium and large watermelon respectively. This means that wheelbarrow traders realize a higher marketing margin and share than other value chain actors. This study relates to the (Agbugba & Dorothy, 2015; Boateng *et al*., 2016; Onyemauwa, 2010; Osondu *et al*., 2014) [3, 7, 21, 22]. The wholesale margin of watermelon traders was UGX 898 with a percentage share of 15%. Therefore, the average retail margin is higher than that of wholesalers' margin. This result is consistent with those of earlier studies by (Ikenna *et*

al., 2019; McLagan, 1981; Mobasser *et al*., 2014) [11, 17, 18]. It is probably because they are always on the road moving the products from one market to another which may limit their time to bargain in Kampala. The average retail margins above compares with 51.09% (Osondu *et al*., 2014) [22]. Generally, the findings indicated that retail prices are higher than the farm gate prices which is consistent with economic theory. We therefore reject the null hypothesis and conclude that watermelon retail price is greater than farm gate price in the study area.

3.4 Factors that Influence the Gross Margin of the Watermelon Retailers

The regression estimates show the factors influencing gross margin for watermelon retailers in Kampala markets, Uganda as presented in table 6 above were gender of trader, age, education level watermelon variety,belonging to traders association, keeping records, having access to storage facilities. The linear functional form gave an adjusted R^2 of 0.629. This is contrary to the adjusted R^2 of 0.804 (Osondu *et al*., 2014) [22]. This showed that about 63% of variation in the dependent variable is explained by the independent variables. The coefficient (-0.251) for gender of the retail traders was negative and statistically significant at 5% with a value of p=0.037. This implies that when the watermelon trader is a male, then gross margin is reduced by 0.251 per unit. Male gender has a negative relationship with the gross margin.

Table 6: Regression analysis for gross margin of watermelon retailers

Dependent variable: *Ln* (gross margin) monthly	**Coefficient (ß)**	**t-value**	**p-value**
(Constant)	0.804	16.746	0.096
Gender (1=Male, 0=Female)	-0.251	-4.171	0.037**
Age (years)	0.170	1.851	0.068*
Age² (years)	0.136	5.183	0.553
Education (1=Formal, 0=Non-Formal)	0.146	2.282	0.025**
Experience (years)	-0.048	-0.62	0.537
Watermelon Variety (1=Zebra F1, 0=Otherwise)	0.104	1.708	0.092*
Trade Association (1=Association, 0=Otherwise)	0.199	3.246	0.002**
Record keeping (1= Keep Records, 0=do not)	0.172	2.576	0.012**
Storage facilities access (1=Access, 0=do not)	0.358	4.889	0.000***
Financial source (1=Bank loan, 0= Otherwise)	0.215	2.865	0.005**
Adjusted R Square **(Adj. R^2) =0.629**	R Square (R^2) =**0.694, (n=90)**		

Source: Author's computation. Note: The statistical significance levels indicated as follows in asterisk: * =p<0.10, ** =p<0.05 and *** =p<0.01

The coefficient (0.146) for retail traders education was positive and statistically significant at 5% level with *p*=0.025. This means that education has a positively significant relationship with gross margin for retail trade business. A unit increase in the level of education increases enterprise gross margin by 0.146 units. The coefficient (0.199) for membership of a trade association by retail traders was positive and statistically significant at the 5% level with a value of *p*=0.02. A unit increase in the access to trader's association increases gross margin of the enterprise by 0.199 per unit hence trade association has a positive significant relationship with the gross margin of retail trade businesses. The coefficient (0.215) of financial source of retail traders was positively signed and statistically significant at the 5% with a value of *p*=0.05. A unit increase in the source of finance increases gross margin of the retail trade businesses by 0.215 per unit. The coefficient (0.358) of access to storage facilities by retail traders was positive and statistically significant at the 5% with a value of *p*=0.00.Traders with access to storage facilities therefore increases their gross margins of the retail trade businesses also increases by 0.358 per unit. Age of the traders, the coefficient (0.170) of age preferred was positively signed and statistically significant at the 10% with a value of *p*=0.068. A unit increase in age as measured in years of traders, accompanied by experience increases the levels of competence and gross margin of the watermelon trade business by 0.170 per unit hence age has a positive significant relationship with gross margin. The findings generally shows that the determinants of retailers' Gross margin were gender of the traders, age in years, education, membership of a trade association watermelon variety, financial source, record keeping and storage facilities access significantly influenced the retailer's gross margin at 1%,5% and 10% levels of probability, therefore we reject the null hypothesis and conclude that socioeconomic characteristics of Sex, age, education level and access to financial services for watermelon traders do affect gross margins of traders in the selected Kampala markets, Uganda.

4. Conclusion and Recommendations

4.1 Conclusion

The socioeconomic characteristics of watermelon traders sex, age, storage access, watermelon variety Zebra F1, education, access to trade association, bank loan financial source and record keeping do affect market gross margin in the study area. The study showed that marketing of watermelon was profitable with a mean monthly gross margin of UGX 191,153, UGX 203,153, UGX 214,153 and UGX 172,820 each month of gross margin for retail stall, wheelbarrow, truck users and wholesale traders respectively, hence showing higher gross margins of above 55% for the selected value chain actors. The study summarized average farm-gate, wholesale, retail stall, wheelbarrow trade and retail small truck trade prices of UGX 1054, UGX 1952, UGX 3136, UGX5899 and UGX 3164 respectively meaning that the retail prices are higher than the farm gate prices. The marketing margins of the retail stall traders, wheelbarrow traders, small truck traders and wholesalers of watermelon was UGX 1183, UGX 3947 and UGX 1212 and UGX 898 with percentage share of 39%,68%,39% and 15% respectively. Regression results show that linear model gave coefficient of determination of R^2=0.694 and there is significant relationship between dependent and independent variables. The determinants of retailers' gross margin were gender, education, membership of trade association, financial source, record keeping and access to storage facilities. Only the gender variable has negative relationship with gross margin. Therefore, study concluded that watermelon trade has high market gross margin with adjusted R^2 of 62.9% for retailers' gross margin.

4.2 Recommendations

The gross margin was relatively high and able to attract new entrants into business hence watermelon trade serves as

source of income and employment for the traders. Watermelon trade should be intensified and diversified to satisfy the wider regional market demand and to gain abnormal profits thus preventing seasonal fluctuation in the markets enabling stable supply and prices. Government needs to encourage traders to form cooperative associations or working together to increase the efficiency in the market and increase gross margin along the value chain. Traders should join associations and get financial assistance in order to expand scale of operation. Further research should focus effects of government policies on the gross margin of watermelon trade with emphasis on storage facilities establishment and improvements.

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