

**Hedonic price analysis of tomatoes sold by hawkers in the Vhembe District of
Limpopo Province, South Africa**

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DECLARATION

I, Sigidi Khumbudzo Zelda (11618193), hereby declare that this dissertation for Master of Science in Agriculture (Agricultural Economics) at the University of Venda hereby submitted by me, has not been submitted previously for a degree at this or any other university, that it is my own work in design and in execution, and that all reference material contained therein has been duly acknowledged.

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DEDICATION

I would like to dedicate this work to my family; my mother Mrs Sigidi T.J, my brothers; Ronald, Rendani, Remember and Ndamulelo and lastly to my only sister; Ntanganedzeni.

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ABSTRACT

The study aimed to determine factors that influenced the price of tomatoes sold by hawkers on the roadside market. The study also aimed at determining whether any socio-economic characteristics of hawkers who sold tomatoes had significant impact on the price paid by consumers. The study was conducted in the Thulamela local municipality under Vhembe District of Limpopo, South Africa. A stratified random sampling technique was used to select participants for this study. A sample size of 198 hawkers were drawn randomly. Structured questionnaires were administered through face-to-face interview. Descriptive statistics, correlation matrix, multiple linear hedonic regression and stepwise linear regression were used to analyse collected data. With regards socio-economic characteristics, only age was found to have significant impact on the market price received by hawkers. Smooth appearance, rough appearance, round shape, oval shape, and red and yellow colour tomatoes had a significant impact on the average market price. It is therefore recommended that attributes such as appearances, colour, shapes and sizes of tomatoes should be considered when selling tomatoes at both retail and farm level. This will result in more purchase of tomatoes that will eventually contribute to increase in household income and reduction in poverty.

Keywords: Hawkers, Hedonic, Municipality, Roadside, Tomatoes

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LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
DAFF	Department of Agriculture, Forestry and Fisheries
VECM	Vector Error Correlation Model
GDP	Gross Domestic Product

CHAPTER 1

INTRODUCTION

1.1 Background

Apart from price, consumer purchase decision is more influenced by external quality attributes (Wirth et al., 2011). The demand for the product attributes varies with the consumer preferences. For example, some consumers prefer tomatoes that are of round shape, light red in colour, blemish free while others prefer tomatoes that are of oval shape and full red in colour. Consumers do not mind to pay higher prices as long as the attributes contained in that particular products satisfy their needs. The study conducted by Suthamathy (2012) indicated that the price of any product is determined by quality characteristics or external attributes.

In South Africa like any other country, the consumption of tomatoes seems to be highly influenced by a number of attributes attached to that product. These attributes are important from both the seller and consumer perspectives. From the sellers' side, attributes are used to differentiate products with one of their competitors and are used in developing strategies for displaying products for sale. On the consumers' side, attributes are there to satisfy the needs of consumers (Akpyomare et al., 2012).

Vermeulen & Bienabe (2010) indicated that some of the attributes that are of great importance to South African consumer purchase decisions include the visual appearance, colour, freshness, size and purchase location. According to the Department of Agriculture, Forestry and Fisheries (DAFF) (2013) the consumption of tomatoes was 12 kg per capita in 2013 compared with the 32 kg in Europe. Households consume about 5 to 10 tomatoes per week. Swami (2012) also found similar results in

a study about the importance of food safety and quality standards at various levels in tomato supply chain of South Africa.

The present study applied the hedonic price approach to identify attributes that determine retail prices in the roadside vegetable market. The hedonic price approach has been applied to study various agricultural products and foods. Kassiea et al. (2011) studied the heteroscedastic hedonic price model for cattle in the rural markets of central Ethiopia. Roheim et al. (2011) used hedonic approach to investigate elusive price premium for ecolabelled products. Emerole et al. (2013) applied the hedonic approach on trade enhancement characteristics of dessert banana fruit and estimates of transaction cost in Okwigwe Metropolis, Imo State Nigeria. Suthamathy (2012) studied the quality factors influencing the market price of shrimp in Nha Trang, Vietnam using hedonic price analysis.

1.2. Problem statement

Factors such as quality attributes of tomatoes seem not to be taken into account when hawkers sell tomatoes. For example, tomatoes are not categorized according to the level of ripeness, uniform size, presence of blemish and shape in the study area. Tomatoes are consumed by most households in South Africa and in the Limpopo province in particular but most consumers who do not have time to go to the supermarkets purchase their tomatoes from hawkers either by the road sides or stalls erected by the road sides. Research by Mthombeni et al. (2014) on vegetable sales by hawkers in the Limpopo province indicates that consumers who purchase vegetables

look for external characteristics, apart from price, before deciding to purchase vegetables and tomatoes.

This study concentrated on tomatoes as one of the vegetables displayed on sale by hawkers on roadsides and stalls in the Vhembe District of Limpopo Province. The selection of tomatoes for the study was firstly due to its popular household consumption, and secondly to the fact that there are few studies on the external factors that consumers consider when purchasing tomatoes from hawkers. The outcome of the study is expected to assist hawkers to consider external characteristics that have bearing on consumers' decisions to purchase tomatoes. This study is also expected to determine specific outward attributes that influence the price of tomatoes displayed by hawkers on the roadsides and market stalls.

1.3. Rationale of the study

This study was intended to determine attributes that affect the price of tomatoes sold by hawkers on the roadsides and market stalls in the Vhembe District of the Limpopo Province. The study was necessary in order to identify socio-economic characteristics of tomato sales by hawkers to achieve maximum profit and increase their sale volumes. Increase in household income and reduction in poverty were likely to be achieved in the long run. It was therefore important to conduct this study as it serve as a guide that hawkers would consider when displaying their tomatoes to attract more customers.

1.4. Research Objectives

1.4.1 Main objectives

The main objective of the study was to identify the external characteristics that influence the price of tomatoes and to make recommendations

1.4.2 Specific objectives

- i. To identify socio-economic characteristics of hawkers who sell tomatoes by the roadside.
- ii. To identify the external attributes of tomatoes that affect price.

1.5. Research Hypotheses

- i. The attributes of tomatoes such as colour, shape, appearance, firmness and other socio-economic variables affect the price of tomatoes displayed for sale.

1.6. Limitation of the study

Since the population of vegetable hawkers was very large, time was the major constraint to this study and only a sample size of 198 was considered for the study. This study was limited to the Thulamela local municipality of the Vhembe district. Only a representative sample of hawkers in the selected areas was considered.

1.7. Structure of the study

The study is divided into five chapters. Chapter one introduces the topic of the study. It covers the background, problem statement, rationale of the study, research objectives, research questions and hypotheses. Chapter two covers the literature review. It focuses on global, regional and local evidence related to the study. Chapter three covers methodology, study area, data collection, data analysis and ethical consideration.

Chapter four presents results and discussion. Chapter five covers conclusion and recommendations.

1.8. Chapter summary

This chapter introduces the study and presents the problem statement, rationale of the study, objectives (main and specific objective), hypothesis, limitations and outline of the study.

CHAPTER 2

LITERATURE REVIEW

2.1. Introduction

This chapter presents a literature review related to hedonic price analysis. The main issues are reviewed with reference to price-quality attributes and socio-economics of hawkers in South Africa and other countries.

2.2. Importance of hawking and their Socio-economics characteristics

Hawking is known as a significant part of the economy. It represent part of population not participating in the formal economy. Even thogh its contribution Gross Domestic Product (GDP) of the notional economy is not included and it remains source of income to urban poor. The number of people participating in hawking business continues to increase as a result of lack of formal employment. The study conducted by Ray & Mishra (2011) indicated that most people are engage in hawking because it requires low skills and capital. Hawking plays a vital role in providing source of empleloyemet resulting in poverty alleviation. Most of urban poor and rural people depend on it as it provides goods and services at low prices (Skinner, 2008; Ray & Mishra, 2011; Adhikari, 2011).Hawkers usually look for a place that attract customers. They operate in a open-air space in pavements, along roadside, bus or taxi rank.

Studies indicated that people engage in hawking business for different reason. A study conducted by Adhikari (2011) revealed that majority of the respondents joined the informal sector because they cannot find employment and had to take self-employment as the last resort, some had a keen interest in self-employment and wanted to be their own bosses whilst few percentage wanted a better income to supplement their monthly income. Husain et al. (2015) stated that most of hawkers lack education level that will enable them to find decent employment in the formal sector and are forced to join to the informal sector while others join hawking as a results economic recession.

Most studies indicated that the income generated by hawkers is relatively low. A study conducted by Willem van Heerden (2011) indicated that about 70.2 percent of hawkers were making more than R300 in a week. According to the study conducted by Husain et al. (2015) income of hawkers depended on the types of products they sell, location and in terms of the volume and terms of trade. Mthombeni et al. (2014) indicated those hawkers with bigger selling markets and who often sell to other hawkers are likely to have high income. Alves da Silva et al. (2014) reported that majority of the hawker's income were three times the minimum wage in Brazil.

Roever (2014) conducted a study in the cities of five countries namely South Africa (Durban), Kenya (Nakuru), Limu (Peru) Ghana (Accra) and India (Ahmedabad) in which the active working age of hawkers was between 31 and 45 years with an average age of 42. Oghogho et al. (2014) also conducted a study in Nigeria and the majority of hawkers were between the age 41 and 50 years followed by those who were between the 31 and 40 years. However, contrast findings were reported in the study conducted by Muyanja et al. (2011) which indicated that the majority of hawkers were between the

age of 21 and 40 years. The findings indicated that hawking represents a source of work for a global economically active population that does not take part in the formal job market and appears to be particularly common in developing countries (Alves da Silva et al., 2014).

In most developing countries, studies indicated that there were more female hawkers than male hawkers. This was confirmed by Roever (2014) who claims that there are more female hawkers than male hawkers in African countries. Mthombeni et al. (2014) also concurs, saying that in South Africa there are more female hawkers engaged in hawking to supplement their partners' incomes. However, according to Bhowmik & Saha (2012) and Ray & Mishra (2011) in India the majority of hawkers are male. This was due to the harsh treatment that female hawkers got from authorities.

Alves da Silva et al. (2014) indicates that education levels among Brazilian hawkers is very low. About 50 percent of the participants reported having elementary school education or less and 2 percent of the interviewees were illiterate. Muyanja et al. (2011) states that in Uganda the majority of hawkers have secondary education and only a few have tertiary education. Ray & Mishra (2011) show that more than 90 percent of all surveyed hawkers were literate and have studied at least up to grade 5. Approximately 32 percent have studied up to grade 8, 22 percent have passed grade 10, 6 percent have studied up to grade 12 and 3 percent have been to college. In South Africa, Mashau et al. (2012) indicate that about 44 percent of the respondents had primary education, 12 percent had secondary education while the rest had no formal education.

In Brazil, according to Alves da Silva et al. (2014), about 50 percent of the hawkers studied were married or had a stable relationship. However, the percentage of single hawkers were based on personal definitions of the respondents. Oghogho et al. (2014) found that in Nigeria, 65.56 percent of hawkers were married while 12.22 percent were single, 14.44 percent divorced and 7.78 percent were widowed. Oladejo & Oladiran (2014) reported similar findings.

The career choice of hawking is considered as permanent. In Brazil, Alves da Silva et al. (2014) stated that the average amount of time spent in hawking was nine years. Only a few of the respondents had more than 10 years' experience. Oghogho et al. (2014) found that in Nigeria, 11.11 percent of the respondents had working experience of less than five years while 23.33 percent had experience of between 6 and 10 years with the majority of the respondents 51.11 percent having more than ten years of marketing experience.

In terms of family size, the average household size was 6 members. The majority of hawkers had between 6 and 10 members in their household indicating high dependency rate in Nigeria (Oghogho et al., 2014 and Oladejo & Oladiran, 2014). Mthombeni et al. (2014) discovered that in South Africa approximately 53.6 percent of the hawkers had between 5 and 6 members in their households and some of the family members assist in the hawking activities.

2.3. Willingness to pay quality attributes

Willingness to pay (WTP) is defined as the maximum amount of money a consumer would be willing to pay for improved of quality attributes of specified goods or services

(Dipeolu et al., 2009; Biswas, 2016). Contingent valuation method are used to measure the willing to pay. Huang & Lin (2006) stated that the demand for various quality attributes can be derived from consumer willingness to pay for a product. Hedonic coefficient can be estimated for each product attribute at observed purchase price.

Hussin et al. (2010) conducted a study on essential quality attributes in the fresh produce purchase by Malaysian consumers and founded out that majority (90 percent) of consumers valued shape, colour, absence of defect, absence of blemishes, freshness, ripeness, flavour, nutritional values, absence of pesticides and cleanliness as important attributes affecting the willingness to pay. Campbell et al. (2013) investigated consumer preferences for peaches and found out that price, origin, and quality indicators were the most important drivers of purchases. Oltman et al. (2014) studied consumer attitudes and preferences for fresh market tomatoes in Raleigh/Durham and found that consumers were driven by attributes that assisted them judge the level of ripeness. Colour and firmness were most desired attributes of fresh tomatoes.

Jefferson-Moore et al. (2014) investigated the preferences for local food products in North Carolina and founded that consumers purchased both local and organic. According to the study conducted by Dipeolu et al. (2009) on consumer awareness and willingness to pay for organic vegetables in Nigeria, 64 percent of the respondents were willing to pay higher prices for organic vegetable. However with regard to tomatoes, consumers were less willing to pay for high prices. Yue & Tong (2009) and Moser et al. (2011) suggest that the reason why most consumers prefer to purchase local grown tomatoes is to support the local economy. Fernqvist & Ekelund (2014) revealed that local or origin attributes play significant role in channeling consumer purchasing

decision. This was consistent with the findings of the study conducted by Denver & Jensen (2014) and Wirth et al. (2011).

The attribute 'freshness' also plays an important role in influencing consumer purchasing behavior. Suthamathy (2012) indicated that consumers prefer products that are fresh as this promotes healthy eating. Yue & Tong (2009) showed that approximately 83 percent of the respondents consider freshness of the product as an important attribute. Wirth et al. (2011) indicated that consumers prefer products that are blemish free.

The attribute 'colour' of agricultural produce and other non-agricultural products has a significant impact in both marketing and consumers' perspective. Barrett et al. (2010) stated that a nice colour stimulates the desire to purchase while products with unattractive appearance can reduce consumer willingness to pay. This was consistent with the findings of a study conducted by Emerole et al. (2013) in Nigeria which indicates that colour of the produce also plays a significant role in enhancing consumer willingness to pay. This was also consistent with the findings of studies conducted in South Africa (Aslam et al., 2012; Priilaid & Van Rensburg, 2012).

Emerole et al. (2013) found that in Nigeria, the size of the produce have significant impact in the consumer perception. On the other hand, Campbell et al. (2013) indicated that the attribute 'size' has less impact on consumer decision to purchase. The results of the study conducted by Wirth et al. (2011) under credence products attributes, indicated that a large apple size was preferred than medium size.

2.4. Marketing channels of tomatoes

Research has shown that tomato (*Solanum lycopersicum*) is the most common vegetable crop in the world (Chohan & Ahmad, 2008; Adenegan et al., 2012; Akpan et al., 2014). It is important for commercial and dietary use (Sinesio et al., 2010). Tomatoes are usually consumed in different ways for example some use tomatoes for salads, stews, ingredient for various dishes and sauces. In most developing countries, it is also one of the main vegetables used for hawking in the informal sector (DAFF, 2013; Haruna et al., 2012).

Burnett (2008) defined marketing as a process of planning and executing decision concerning pricing, promotion and distribution of ideas, goods and services to create exchange that satisfied both customers and producer objectives. Marketing plays a dynamic role on both producer and consumer welfare. On the producer's view, it affects the prices they receives for their produce whilst on the consumer's view it affects the price they paid (Chohan & Ahmad, 2008). Several research has indicated that efficient marketing channel is important as it facilitate the exchange between the producers and consumers. According to the study conducted by Sashimatsung et al. (2013) stated that marketing channel starts at the farm gate and end at the final consumer.

Commission agent

Tomatoes can be marketed through commission agent which is of paramount important as all marketing activities revolve around it. Commission agent operate on commission basis and their curtained about the quality of products they receive from farmers or contractors (Khushk et al., 2009).

Wholesale market

Wholesale markets buy and sell large quantities of farm products. It is considered as the most effective marketing channel for tomato through which smallholder, emerging and commercial farmers participate (Sashimatsung et al., 2013 and Kim et al., 2014). Usually they perform their business in wholesale markets. It is found that about 50 percent of farm produce is taken to wholesale markets (Hichaambwa & Tschirley, 2010). A wholesaler usually purchases tomato from the commission agent at open auction and sells smaller quantities to the retailers and consumers. According to the study conducted by Chohan & Ahmad (2008) about 87 percent tomatoes was traded at the wholesale market.

Retailer

In South Africa, tomato retailers exist in both the formal and informal sectors. Formal retailer include large supermarket (Shoprite, Checkers, etc.) while informal retailers comprise hawkers and Spaza shops (DAFF, 2013). They buy and sell small quantities according consumers preference. Retailers usually purchase produce from wholesalers on credit basis (Khushk et al., 2009).

Processor

Processors use tomatoes in food preparations. They include caterers, hospitality and other institutions such as corporate, government institutions. According to the study conducted by Hichaambwa & Tschirley (2010) processors contributed about 8 percent of tomato market share.

2.5. Price analysis of tomatoes

Previous researches focused on the movement of price across seasons. For example, Zakari et al. (2014) used Co-integration and error correction models to analyse the price transmission of grain. Amikuzunoa & von Cramon -Taubadel (2012) used Vector Error Correlation Model method to analyse price transmission between tomato markets in Ghana. The present study will use hedonic model to analyse the price of tomatoes.

Adenegan et al. (2012) indicated that the price of tomatoes varies across season. A study conducted by Mwiinga (2009) revealed that the price of tomatoes is higher during wet season than in dry season but high quality tomatoes are produced during dry season. The prices are expected to be high during rainy season because of the risk involved during production. Mishra & Kumar (2012) indicate that the price of tomatoes start to rise during April (wet season) and decreases during September (dry season). Smith et al. (2008) reported that prices of fresh horticultural produce are higher in the winter as a result of limited production and supply. Zhang et al. (2009) stated that seasonal price variation are mainly caused by product availability and demand. For example, low price are experienced when supply is high and supply is low the price rises. Seasonal price variation can be further explained by law of demand and supply.

Apart from demand and supply, prices of fresh produce varied from location to location. The study conducted by Zhang et al. (2009) indicated regional price variations has significant impact on the purchases of fresh produce. Households satuated in the urban areas were found to be paying higher prices on fresh produce such as onions, peppers and potatoes than those living in the rural areas. Tsakiridou et al. (2011) conducted a study on purchasing fresh produce on the basis of food safety, origin and traceability

labels in Greece and found out that most of consumers prefer to purchase fresh produce from the open market, supermarkets and hardly purchase from the farmers.

2.6. Price and quality relationship

Produce price has significant role on consumers purchase decision. Consumers tend to rely on high price as indicator of good quality (Lamb et al., 2009). Kirchler et al. (2010) investigated the price and its relation to product quality in Austrian Market and found out that the correlation coefficient of prices and quality were positive and statistically significant. The high product price was associated with high quality. Mwiinga (2009) conducted a study on tomato price variability in Lusaka and its effects among smallholder farmers and reported that tomatoes with good quality attracted higher prices compared to low quality. Fernqvist (2014) conducted a study on consumer experiences of tomato quality and the effects of credence and reported that most of consumers were unhappy with the quality of tomatoes.

2.7. Chapter summary

This chapter reviewed the various literature on importance of hawking and their Socio-economics characteristics, willingness to pay quality attributes, marketing channels of tomatoes, and price and quality relationship from global, regional and local perspective. The literature indicates that fresh produce price has significant role on consumers purchase decision. The consumption of tomatoes is highly influenced by a number of attributes attached to that product. High product price is associated with high quality.

CHAPTER 3

METHODOLOGY

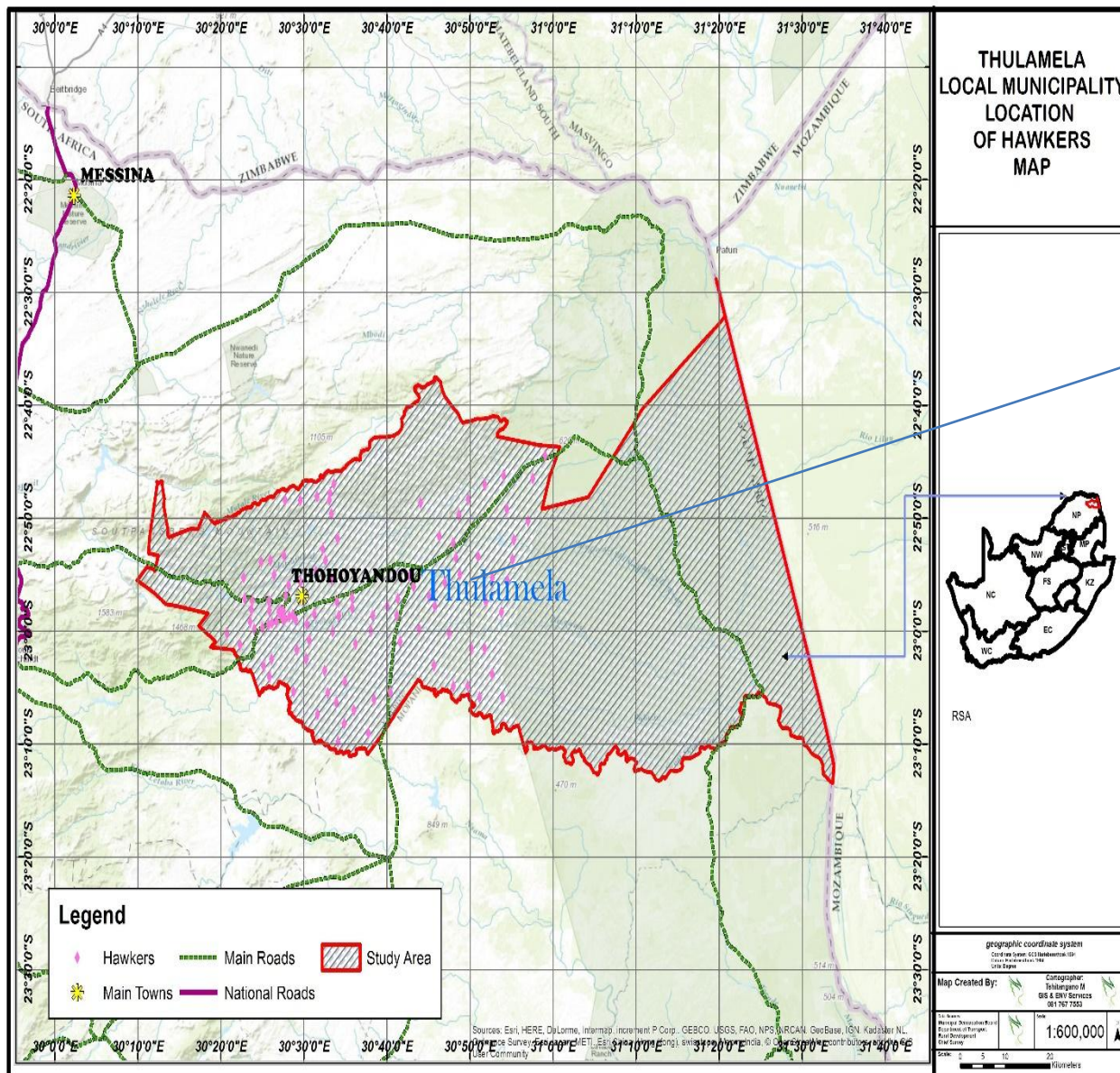
3.1. Introduction

This chapter focuses on the study area, research design, population and sampling, data collection and method of data analyses used. It also present hedonic price model and the results from the analysis.

3.2. Study area

The study was conducted in Thulamela local municipality in the Vhembe District of Limpopo Province, South Africa. It is located in the northern part of Limpopo Province. The Thulamela municipality shares borders with Makhado and Mutale local municipalities. It covers about 5834 km² of land with a total population of approximately

618462. The geographical co-ordinates lies between $30^{\circ}27'38.67''$ E and $22^{\circ}58'15.87''$ S. Agriculture is the primary driver of economic activity. The agricultural activities include livestock, poultry, vegetable and other crops production. Unemployment rate in the area is estimated to be 43.8 percent. Most people in the study area make a living through hawking.



Study area

Figure: 3.1 The study area in Limpopo Province (South Africa)

Source: Created using GIS software on 31 August 2015

3.3. Research design

The study used cross-section data. The study focused on the population of hawkers selling tomatoes on the roadside market. Descriptive statistic and inferential statistical technique were used to identify socio-economic characteristics of hawkers who sell tomatoes by the roadside and to identify the external attributes of tomatoes that affect price.

3.4. Population and sampling

The estimated total population of hawkers under Thulamela local municipality were approximately 478. This information was obtained from the Thulamela Local municipality offices. A stratified random sampling technique was used to select participants of the study. In all, 198 participants were selected randomly. All hawkers who sold tomatoes by the roadside had an equal chance of being selected.

3.5. Data collection

Primary data were collected from hawkers who sold tomatoes by the roadside market. Structured questionnaires were used to collect data. The questionnaires consisted of both open and closed ended questions. These questionnaires were administered through face to face interviews. The questionnaires included socio-economic characteristics (age, gender, income, etc.) and factors that influenced the price of tomatoes.

3.6. Ethical consideration

Data collection started immediately after the ethical clearance certificate has been granted by the university and the local municipality. The nature of the study was

described to all participants. Information sheet and consent form containing the purpose of the study were attached to every questionnaire. All participants were asked to sign a consent forms if they agree to participate in this study. Hawkers were not forced to participate in this study and they were also told that they are free to withdraw from the study anytime without giving reasons why they are doing so. The questionnaires was distributed to participants after signing the consent form. Participants were also given time to ask questions about the study. The identity of the respondents remained confidential. The information arising from the study was treated as confidential. Since the questionnaires comprises of both open and close ended questions, the respondents were not forced to answer since they have a right to keep quite if they are uncomfortable with the question. No physical or emotional harm was caused to participants of the study.

3.7. Data analysis

The collected data was analysed using Statistical Package for Social Sciences (SPSS) version 22 computer programme. All information contained in the questionnaire was coded and entered into SPSS. Descriptive statistic were used to describe socio-economic characteristics of respondents and other factors that influence the price of tomatoes sold by the hawkers on the roadside market. The main descriptive indicator that were used were frequencies. Two-tailed Pearson correlation were used to calculate the strength and the direction of independent variables with market price. The multiple linear hedonic regression and the stepwise linear regression were used to analyse the relationship between price and external attributes of tomatoes.

The correlation coefficients were calculated using the following formula;

$$r = \frac{\sum x_i y_i}{\sqrt{(\sum x_i^2) (\sum y_i^2)}}$$

$$r = \frac{n \sum X_i Y_i - (\sum X_i)(\sum Y_i)}{\sqrt{[n \sum X_i^2 - (\sum X_i)^2][n \sum Y_i^2 - (\sum Y_i)^2]}}$$

Where;

r = correlation coefficient

x_i = deviation form of x (raw data)

y_i = deviation form of y (raw data)

n = number of cases

x = raw data

y = raw data

The hedonic price model

The hedonic price model is defined as the marginal price of the characteristics embodied in a commodity. This model is based on the hypothesis that goods are valued for their utility-bearing attributes or characteristics and the price of goods varies with change in quantity of characteristics associated with it (Suthamathy, 2012). The hedonic price model is developed by using coefficient generated from a regression analysis. Quality characteristics are at the heart of hedonic price analysis. The hedonic

regression model consists of the set quantitative variables, a set of qualitative variables and a set of interaction variables. The hedonic price model can also be estimated using qualitative data in the situation where it is difficult to obtain quantitative data (Aslam et al., 2012). Suthamathy (2012) states that quality attributes can be expressed as dummy variables.

Linear, log linear and double log linear functional forms are commonly used in the hedonic pricing model. Suthamathy (2012); McCannon (2012); Huang & Lin (2006); Huang & Lin (2007) and Zhang et al. (2009) applied linear hedonic functions in their studies. Sogn-Grundvag et al. (2014); Aslam et al. (2012); Roheim et al. (2011) and Ahmad & Anders (2012) all utilized log linear functional forms. The present study will use the linear functional form as it is easy to interpret the parameter coefficients. The general hedonic price function is written as follows:

$$P_{it} = f(Z_{it}) \quad (1)$$

Where;

P_{it} = Price of tomatoes at i^{th} at t time;

Z_{it} = set of independent variables

Simple linear hedonic price form is specified as follows:

$$P_{it} = \beta_0 + \sum_{i=1}^n \beta_1 Z_{it} + e_i \quad (2)$$

The general empirical model for the price of fresh tomatoes as specified in this study is as follows:

$$P_{it} = \beta_0 + \beta_1 Age_{it} + \sum_1^2 \beta_2 App_{it} + \sum_1^2 \beta_3 Shape_{it} + \sum_1^2 \beta_4 Colour_{it} + e_i \quad (3)$$

Where;

P_{it} = price of tomatoes received by hawkers in Rands ;

β = coefficient;

Age_{it} =age of hawkers in years;

App_{it} =appearance of tomatoes (smooth, Rough);

$Shape_{it}$ =shape of tomatoes (Round, Oval);

$Colour_{it}$ =colour of tomatoes (Red, Yellow);

e_i = error term

Table 3.1: Description of variables used in the model

Variable name	Description	Measurement	Expected sign
Dependent variable			
Market price (Y)	market price of tomatoes	(R/Month)	+
Independent variables			
Appearance:			
Smooth (X1)	smooth appearance tomatoes	(1=yes; 0=no)	-
Rough (X2)	rough appearance tomatoes	(1=yes; 0=no)	-
Age (X3)	age of respondents	(years)	+
Shape:			
Round (X4)	round shape tomatoes	(1=yes; 0=no)	-
Oval (X5)	oval shape tomatoes	(1=yes; 0=no)	-
Colour :			
Red (X6)	red colour tomatoes	(1=yes; 0=no)	+
Yellow(X7)	yellow colour tomatoes	(1=yes; 0=no)	+

Source: Survey data (2015); N=198

3.8. Chapter summary

This chapter showed the type of data that was collected and the type of information that the respondents were expected to give. The chapter also showed the sampling technique as well as tools used for collecting data, which was questionnaire. Methods of analysing data were presented in this chapter. The data was analysed using descriptive statistics, correlation matrix and OLS hedonic regression.

CHAPTER 4

RESULTS AND DISCUSSION

4.1. Introduction

This chapter presents the results and discussion of the study. It gives an outline of the descriptive statistics, correlation of variables and estimated coefficients of the ordinary least square hedonic regression (OLS) and stepwise regression. The results are presented in the form of tables.

4.2. Descriptive results

Table 4.1: Descriptive statistics of the average market price

Variable name	N	Min	Max	Mean	Std. Dev	variance
Average market price (Y)	198	700	12 000	3156.37	2175.44	4732520

Source: survey data (2015)

4.2.1. Descriptive result of average market price (Y)

Table 4.1 presents the descriptive results of average market prices. The average market price received by hawkers is R3156.37 with the standard deviation of 2175.44. The minimum market price ranges from 700 to 12 000 per month.

Table 4.2: Age group of respondents

Variable name	Frequency	Percent
Age (X3)		
30 years or less	31	15.7
31 to 40 years	42	21.2
41 to 50 years	55	27.8
51 to 60 years	48	24.2
61 to 70 years	19	9.6
71 years or above	3	1.5
Total	198	100

Source: Survey data (2015)

4.2.2. Age distribution

The results in Table 4.2 indicates that 27.8 percent respondents were between the age of 41 and 50 years, 24.2 percent between 51 and 60 years, 21.2 percent between the age of 31 and 40 years, 15.1percent were 30 years old or less and lastly 9.6 percent between the age of 61 and 70 years. Only 1.5 percent respondents were 71 years and above. This implies that hawking is undertaken by people of all ages. Mashau et al. (2012) stated that majority of the hawkers were within 41 to 60 years of age. However, Husain et al. (2015) stated the ranges within 26 to 35 years and the percentage start declining after the age of 45. The result was in line with other studies (Roever, 2014 and Samapundo et al., 2015).

4.2.3. Descriptive results of appearance, shape and colour

Table 4.3: Descriptive statistics of appearance, shape and colour

Variable name	Measure	Frequency	Percent
Appearance:			
Smooth (X1)	Yes	170	85.9
	No	28	14.1
Total		198	198
Rough (X2)	Yes	27	13.6
	No	171	86.4
Total		198	100
Shape:			
Round (X4)	Yes	96	48.5
	No	102	51.5
Total		198	100
Oval (X5)	Yes	143	72.2
	No	55	27.8
Total		198	100
Colour:			
Red (X6)	Yes	72	36.4
	No	126	63.6
Total		198	100
Yellow(X7)	Yes	65	32.8
	No	133	67.2
Total		198	100

Source: Survey 2015 (N=198)

In all, 198 hawkers were interviewed, 85.9 percent hawkers indicated that their customers purchase tomatoes with smooth (X1) appearance whilst 14.1 percent of hawkers indicated that they do not purchase tomatoes with smooth (X1) appearance. With regard to rough (X2) appearance tomatoes, only 3.6 percent hawkers indicated that their customers purchase tomatoes with rough appearance whilst 86.4 percent indicated that their customer do not purchase tomatoes with rough (X2) appearance (Table 4.3).

The results in (Table 4.3) further indicates that 48.5 percent respondents agreed that their customer purchase round (X4) shape tomatoes whilst 51.2 percent indicated that their customers do not purchase tomatoes with round (X4) shape. With respect to oval (X5) shape tomatoes, 72.2 percent respondents indicated that their customers purchase oval (X5) shape whilst 27.8 percent indicated that their customers do not purchase tomatoes with oval (X5) shape.

Hawker were asked whether their customers purchase tomatoes with red or yellow colour. The further indicates that 36.4 percent respondents indicated that their customers purchase tomatoes with red (X6) colour whilst 63.6 percent do not purchase tomatoes with red colour. With regard to Yellow (X7) colour tomatoes, 32.8 percent indicated their customers prefer to purchase tomatoes with yellow (X7) colour whilst 67.2 percent do not purchase tomatoes with yellow (X7) colour (Table 4.3).

4.3. Independent variable correlations with average market price

Table 4.4: Presents the results of the correlation of average market price with independent variables

Variable	Correlation coefficient (r)	P-value
Independent variables		
Appearance:		
Smooth (X1)	-0.146**	0.041
Rough (X2)	0.108	0.129
Age (X3)	0.105	0.140
Shape:		
Round (X4)	-0.154*	0.030
Oval (X5)	-0.115	0.107
Colour :		
Red (X6)	0.203**	0.004
Yellow(X7)	0.198**	0.005
Source: Survey data (2015) (2-tailed)		N=198;** P<0.01; * P<0.05

The results of two-tailed Pearson correlation independent variables with market price are presented in Table 4.4. The results show a weak negative relationship between smooth (X1) and average market price (Y) and was statistically significant at 5 percent level. This implies that increase in average market price decreases the purchase of smooth tomatoes. However, the correlation coefficients of rough (X2) appearance, age (X3) and oval (X5) shape with market price (Y) were weak and not statistically significant. A weak negative correlation coefficient of round (X4) with average market price was statistically significant at 5 percent level. The results suggest that increase in the purchase of round tomatoes decreases the average market price. The results show a weak positive relationship of red (X6) with Market price and was statistically significant at 1 percent level. This implies that the increase in the purchase of red tomatoes increases average market price. The results further show a weak correlation coefficient of yellow (X7) with market price (Y) and was statistically significant at 1 percent level.

4.4. Pearson correlation matrix of independent variables

Table 4.5: Presents the results of pearson correlation matrix of independent variables

Variables	X1	X2	X3	X4	X5	X6	X7
X1	1						
X2	-0.979**	1					
X3	-0.022	0.006	1				
X4	0.104	-0.091	-0.078	1			
X5	0.122	-0.115	0.030	-0.602**	1		
X6	0.005	0.006	-0.175	0.107	-0.117	1	
X7	0.068	-0.058	-0.098	-0.011	-0.025	0.232**	1

Source: Survey 2015 (N=198); ** $P \leq 0.01$

Two-tailed Pearson correlation analysis was conducted to assess the relationship, strength and direction between the independent variables (Table 4.5). The results show a strong negative correlation coefficient between X2 and X1 and was statistically significant at 1 percent level. This implies that when the purchase of rough tomatoes (X2) increases the purchase of smooth tomatoes (X1) decreases. A strong negative relationship was observed between X5 and X4 and was statistically significant at 1 percent level. The results suggest that when the purchase of round tomatoes (X4) increases the purchase of oval tomatoes (X5) decreases. The results further indicate that a weak positive relationship exist between X7 and X6 and was statistically significant at 1 percent level. The results suggest that when the purchase of red colour tomatoes increases the purchase of yellow colour tomatoes increases. The correlation coefficient of most variables was weak which indicates that there was no multicollinearity among the independent variables.

4.5. Results of OLS regression analysis

The description and computation of variables used in the model are presented in Table 3.1. Most of the variables used in the OLS regression were dummy variables except age of respondents.

Table 4.6: Estimated coefficient for OLS regression equation

Variables	β	S.E	t-value	P-value
Dependent variable				
Market price (Y)	-	-	-	-
Independent variables				
Appearance:				
Smooth (X1)	-5206.438**	2013.499	-2.586	0.010
Rough (X2)	-4800.565**	2013.498	-2.363	0.019
Age (X3)	22.237 *	11.671	1.905	0.058
Shape:				
Round (X4)	-1304.169***	364.515	-3.578	0.000
Oval (X5)	-1245.535***	406.816	-3.062	0.003
Colour:				
Red (X6)	891.336***	306.742	2.906	0.004
Yellow (X7)	771.134**	309.940	2.488	0.014

*** $P \leq 0.01$; ** $P \leq 0.05$; * $P \leq 0.10$; $N=198$; $R^2 = 20.2\%$; *** F -value=6.864; Dependent variable=Market price (Y)

The estimated coefficients for the OLS regression equation are summarised in Table 4.6. The specified model gave a good fit to the data with F -value of 6.864, which was statistically significant at 1% level and R^2 of 0.202. The low value of R^2 indicated that some other variables which could also affect the dependent variable, market price (Y), were not included in the model. Low value of coefficient of determination (R^2) was also reported in the study conducted by (Huang & Lin, 2007; Smith et al., 2008; Zhang et al., 2009). On appearance, the coefficient of smooth appearance (X1) tomatoes had a

negative sign and statistically significant at 5 percent level. The result suggested that an additional unit in smooth appearance (X1) tomatoes decreases the average market price other factors held constant. The coefficient of rough (X2) appearance had negative sign and statistically significant at 5 percent level. The result suggested that an additional unit in rough appearance tomatoes (X2) decreases the average market price other factors held constant. Age (X3) of hawker had a positive significant impact on the market price at a 10 percent level of significance. The result indicated that the increase in age of the hawker was associated with the increase in average market price. The coefficient of round (X4) shape and oval (X5) had negative significant on the market price received by hawkers. This implies that when the purchase of round (X4) and (X5) tomatoes increase the average market price decreases other factors held constant. Red colour (X6) and yellow (X5) colour tomatoes had positive significant impact on the market price. The increase in the average market price was associated with the increase in desired colour of tomatoes.

4.6. Results of Stepwise regression analysis

Table 4.7: Estimated coefficient for Stepwise regression equation

Step	Variable	β	S.E	R^2	Sig.	F
1	Red	917.262	315.473	0.041	0.004	0.004
2	Red	1002.944	312.889	0.073	0.002	0.011
	Round	-771.136	301.166		0.011	
3	Red	928.636	304.001	0.133	0.003	0.000
	Round	-1568.329	363.809		0.000	
	Oval	-1492.617	406.411		0.000	
4	Red	774.029	309.674	0.153	0.013	0.033
	Round	-1533.574	360.825		0.000	
	Oval	-1470.755	402.800		0.000	
	Yellow	677.002	314.984		0.033	
5	Red	870.251	310.771	0.171	0.006	0.043
	Round	-1481.578	358.813		0.000	
	Oval	-1442.395	399.784		0.000	
	Yellow	717.576	313.069		0.023	
	Age	24.082	11.806		0.043	

*** $P \leq 0.01$; ** $P \leq 0.05$; * $P \leq 0.10$; N=198; Dependent variable=Market price; Durbin-Watson=1.580

The estimated coefficient for stepwise regression equation are presented in Table 4.7. Stepwise regression was conducted to emphasize the OLS results. It was also conducted to determine the contribution of each independent variable to the total variation in the market price (Y). This was achieved by observing the coefficient of determination (R^2) at each step when each independent variables was included in the model. It starts by adding variables that increase the coefficient of determination (R^2). The model depicted no multicollinearity as indicated by the low intercorrelation among the independent variables and the Durbin Watson statistic (1.580).

At step 1 of the analysis, red (X6) colour was added first in the regression equation and was statistically significant at 1 percent level. The regression coefficient of red (X6) colour tomatoes was positive. The specified model gave a good fit to the data and was statistically significant at 1 percent level as indicated by *F-statistic*. The coefficient of determination (R^2) was 0.041.

At step 2 of the analysis, round (X4) shape tomatoes was added into the regression equation and had a negative significant influence on the market price (Y) of tomatoes at 1 percent level. The coefficient of determination (R^2) increased from 0.041 to 0.073. The increased in R^2 indicates that the added variable had significant influence on market price of tomatoes. The *F-statistic* was statistically significant at 5 percent level.

At step 3 of the analysis, oval (X5) shape tomatoes was added in the regression equation and had a negative significant impact on the market price (Y) at 1 percent level. The coefficient of determination (R^2) continues to increase from 0.073 to 0.133. *F-statistic* was statistically significant at 1 percent level.

At step 4 of the analysis, yellow (X7) was added in the regression equation and had a positive significant impact on the market price (Y) at 5 percent level. The coefficient of determination (R^2) increases from 0.133 to 0.153. The model was statistically significant at 5 percent level as indicated by *F-statistic*.

At step 5 of the analysis, age (X3) was added in the regression model and had a positive significant impact on the market price (Y) at 5 percent level. The model was statistically significant at 5 percent level. The coefficient of determination (R^2) continues to increase from 0.015 to 0.171. Smooth (X1) and rough (X2) appearance tomatoes

variables were removed in the model because they reduced the coefficient of determination (R^2).

The results show that five independent variables (X_6, X_4, X_7, X_3 , and X_1) were the most significant in determining the market price (Y) of tomatoes.

4.7. Discussion of results

4.7.1 Appearance

Koutsimanis et al. (2012) stated that the appearance plays a dynamic role on fresh produce sales. Consumers make judgement on whether the produce is good or not based on visual appearance. The descriptive analysis indicated that most consumers prefer tomatoes with smooth appearance. According to correlation (Table 4.4) and regression (Table 4.7 and Table 4.8) analysis smooth (X) appearance was negatively related to market price. Tomatoes with smooth appearance tend to lose moisture rapidly resulting in skin shrinkage. This was in agreement with the study conducted by Moneruzzaman et al. (2008) indicating that the firmness of tomatoes decrease with change in time. According to the study conducted by Farruggiaa et al. (2016) freshness of the produce affect the purchase frequency. The study conducted by Pradhan & Biswas (2012) revealed that consumer want tomatoes with hard/tight appearance because it can be cut easily and stored for a long period.

The results also revealed that tomatoes with rough (X_2) appearance was statistically significant at 5 percent level. Rough (X_2) appearance tomatoes had negative relationship with market price (Y). The increase in the damages or blemishes in the tomatoes results in decrease in the market price. At the time of data collection, majority

of the tomatoes that were available in the market were having black spots and unattractive visual appearance. This result in decrease in market price of tomatoes. Mwiinga (2009) stated that during the period of scarcity traders care less about the quality of tomatoes they sell hence when supplies are high, traders could be more selective in what they buy driving down the price of low quality produce. Similar findings were reported in several studies (Adenega et al., 2012; Mishra & Kumar, 2012)

4.7.2. Age of respondents

The surveyed data indicated that the age of respondents have positive significant impact at on the market price at 10 percent level. The results suggest that hawker receive high prices as they grow. Similar results were reported in the study conducted by Wongnaa et al. (2014) the amount traders receives for their products increases with an increase in age up until it reaches maximum age where the amount will decrease with an increase with age. This was consistent with the findings of the following studies (Huang and Lin, 2007; Martinez, 2015; Zhang et al., 2009). However, Adewuyi and Adekunle (2015) reported that the age have negative significant ($P < 0.05$) impact indicating that as trader grows older their likely to get low income.

4.7.3. Shape

The shape of tomatoes were included in the regression model. Both round and oval tomatoes had a negative coefficient and a high significant level of 1 percent (Table 4.7 and Table 4.8). A negative relationship was also confirmed by Pearson correlation analysis (Table 4.4). Round shape (standard round) and oval (plum) tomatoes were most common tomato cultivar found in the study area. Descriptive results indicated that about 48.5 percent of respondents prefer standard round tomatoes and about 72.2

percent prefers oval shape tomatoes (Table 4.3). Most consumers because of its long shelf life preferred oval shape tomatoes whilst round shape tomatoes were associated with rapid deterioration. Fernqvist (2014) stated that there is a decrease in the market demand for round tomato type. However, several studies revealed that round shape were most accepted tomatoes than varieties (Rocha et al., 2013). Priilaid & Van Rensburg (2012) reported that both round and oval shape tomatoes were most preferred.

4.7.4. Colour

The results (Table 4.4) shows a positive and significant relationship between red coloured, yellow coloured tomatoes and market price. The regression coefficient of red (X6) coloured tomatoes was positive and highly significant at 1 percent level. With regard to yellow colour (X7) tomatoes, the regression coefficient was positive and statistically significant at 5 percent level. The increase in one variable was associated with an increase in another variable (Table 4.7 and Table 4.8). The descriptive results (Table 4.3) indicated that no colour preferred. The results suggest that the colour of tomatoes purchased would depend on the end usage. For example, when tomatoes are used for salads a light red colour would be preferred. The findings of this study was similar with other studies (Pradhan & Biswas, 2012). Tomatoes are generally consumed when they reach the full red colour stage (Lopez Camelo and Gomez, 2004). Several studies have indicated that red coloured tomatoes are highly accepted compared to yellow coloured tomatoes (Oltman et al., 2014; Rocha et al., 2013)

Clement et al. (2008) stated that colour strongly influence the consumers initial purchase decision. Fruit colour is good indicator of quality (Moneruzzaman et al., 2008).

Consumers are less willing to pay for tomatoes that have unattractive colour resulting in hawkers receiving low prices. According to the study conducted by indicated colour as an important indicator of fruit quality.

4.8. Hypotheses testing

The hypothesis was that attributes of tomatoes such as colour, shape, appearance, firmness and other socio-economic characteristics affect price of tomatoes received by hawkers. With regard to attributes affecting market price, the inferential statistically analysis indicated that appearance and shape of tomatoes had negative significant impact on market price received by hawkers. Red colour and yellow colour tomatoes had a positive significant impact on market price. With regard to socio-economic characteristics, age had a positive significant impact on market price received by hawkers. The hypothesis as stated is therefore accepted.

4.9. chapter summary

This chapter presented the results of the study. The descriptive statistics, correlation of variables and estimated coefficients of the ordinary least square hedonic regression (OLS) and stepwise regression results were presented in the form of tables. The chapter also covers discussion of the results and hypothesis testing.

CHAPTER 5

CONCLUSSIONS AND RECOMMENDATIONS

5.1. Introduction

This chapter comprises of the summary and conclusions. It summaries and discusses the results of the study with respect to objectives presented in the first chapter. This is followed by recommendations. Finally, the Chapter direction of future research.

5.2. Summary

This study revealed the following:

- Most of hawkers selling tomatoes were of middle age (41-50 years). The number of years a hawker has had a positive significant impact on the market price he/she receives.
- Smooth appearance tomatoes had a negative significant impact on market price. Smooth appearance tomatoes had lot of water content that cause tomatoes to be rotten resulting in decrease in market price.
- Rough appearance had a negative significant impact on market price. Tomatoes with unpleasant appearance/blemishes were found to decrease the market price.
- The market demand for round shape (standard round) tomatoes continues to decreases, as it is associated with rapid deterioration.
- Oval shape (plum) tomatoes were most preferred because it can be stored for long period.

- Both red and yellow coloured tomatoes was found to be significant in determining the market price received by hawkers. The increase in the market price of tomatoes was associated with the increase in the desired colour.

5.3. Conclusions

The first objective was to identify socio-economic characteristics of hawkers who sell tomatoes by the roadside. From the results (Table 4.2), it can be concluded that the age of the hawkers had a significant impact on the market price they receives. The study revealed that the number of years a hawker has contribute to the market price they receives. They receives high prices as they grow and when they reach a certain age the prices they receives start decreases.

The second objective was to identify the external attributes that affect the price of tomatoes. It can be concluded that external attributes such as smooth appearance, rough appearance, round shape, oval shape red colour and yellow colour had significant impact on the market price received by hawkers.

5.3. Recommendations

- Appearances (colour), shapes and sizes of tomatoes should be considered when selling tomatoes at both retail and farm level. This will result in more purchase of tomatoes that will eventually contribute to increase in household income and reduction in poverty.
- Producer and breeders should consider appearance, shape, and colour attributes that match consumers preferences.

- There is a need to improve post-harvest techniques and grading system at farm level to sort tomatoes into different sizes, shapes and colours before selling.

5.4. Direction for future research

- In this study intrinsic attributes taste and the amount of juice in tomatoes were not included. Further studies should include the intrinsic variables to explain market price variation.
- There is a need to include other independent variables in the model for example, weather conditions, previous market prices and other variables that can affect variations in market prices of tomatoes

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APPENDICES

Appendix A: Work plan and research budget (2015/2016)

Table: 3. 2 Gantt chart for the research work plan

Research activity	Mar 2015	Apr 2015	Ma 2015	Jun 2015	Jul 2015	Aug 2015	Sep 2015	Oct 2015	Nov 2015	Dec 2015	Jan 2016	Feb 2016	Mar 2016	Apr 2016
Formulation of proposal	■	■	■	■	■									
Presentation of proposal						■								
Editing of presented proposal						■								
Proof reading of proposal						■								
Submission of proposal							■							
Formulating of questionnaires for pretesting								■						
Formulating final questionnaires								■						
Focus group discussion									■					
Data collection										■				
Data analysis											■	■		
Initial write up of research												■	■	
Corrections of initial write up for final submission													■	
Binding of final dissertation													■	

Appendix B: A detailed research budget of the study

ACTIVITY	ITEM	UNIT DETERMINATION	UNIT TOTAL	UNIT COST	SUB-TOTAL
TRAVELLING COSTS					
Initial visit to local municipality (Thulamela)	Km travelled	5.6 km x 5 trips	28	R3.30	R92.40
Pretesting of questionnaires (Thohoyandou)	Km travelled	5.6 km x 5 trips	28	R3.30	R92.40
Transact tour (Thohoyandou, Phangami, Makonde, Malamulele, Sibasa, Tshikombani, Phiphidi, Dzingahe, Tshisaulu)	Km travelled	336 km x 6 trips	2016	R3.30	R6 652.80
Data collection (Thohoyandou, Phangami, Makonde, Malamulele, Sibasa, Tshikombani, Phiphidi, Dzingahe, Tshisaulu)	Km travelled	336 km x 20 trips	6 720	R3.30	R22 176.00
PREPARING RESEARCH MATERIAL					
Proof reading	Per page	70 pages	70	R25.00	R1 750.00
Formating of questionnaires	Page print out and copies for pretesting	7 pages x 302 copies	2 114	R3.50	R7 399.00
CONDUCTING RESEARCH					
Data collection, field assistance	Field assistant	2 assistants x 20 days	40	R160.00	R6 400.00
Stationery	Pen	6 pens	6	R5.00	R30.00
	Pencil	7 pencil	7	R1.00	R7.00
REPORT WRITING					
Binding of final research	Bound copies	5 bound copies	5	R120.00	R600.00
SUBSISTANCE					
Food allowance	Number of people	3 people x 20 days	60	R75.00	R4 500.00
Food allowance during data analysis	Number of people	1 person x 4 days	5	R75.00	R300.00
TOTAL					R49 999.60

Appendix C: Information sheet

Dear respondent

I am **Khumbudzo Zelda Sigidi** from the school of Agriculture at the University of Venda. I would like to invite you to participate in the research am conducting on hawkers in the Thulamela Local Municipality. The purpose of this research is find out factors that influence the price of tomatoes. The output of this research will be communicated to you in a workshop.

Please do not enter your name or your contact details on the questionnaire. It remain anonymous. The information you provided remains confidential and will be kept in the Agricultural Economics department. You are not forced to participate in this study and you may withdraw at any time during the interview. However, your participation is critical for the success of this study.

You may contact me at the following number:

Cell: 076 044 9875

Appendix D: Consent form to be completed by all the respondents.

Consent Form			
University of Venda			
Topic: Hedonic price analysis of tomatoes sold by hawkers in the Vhembe District of Limpopo, South Africa			
<p>The consent form is designed to check that you understand the purposes of the study, that you are aware of your rights as a participant and to confirm that you are willing to take part</p>			
Please tick as appropriate			
	YES	NO	
1. The nature of the study has been described to me.			
2. I have received sufficient information about the study for me to decide whether to take part.			
3. I understand that I am free to refuse to take part if I wish			
4. I understand that I may withdraw from the study at any time without having to provide a reason			
5. I know that I can ask for further information about the study from the research team.			
6. I understand that all information arising from the study will be treated as confidential.			
7. I know that it will not be possible to identify any individual respondent in the study report, including myself.			
8. I agree to take part in the study			
<p>I confirm that quotations from the interview can be used in the final research report and other publications. I understand that these will be used anonymously and that no individual respondent will be identified in such report.</p>			
Signature:	Date:		
Name in block letters, please:			

Appendix D: Questionnaire

HEDONIC PRICE ANALYSIS OF TOMATOES SOLD BY HAWKERS IN THE VHEMBE DISTRICT OF LIMPOPO, SOUTH AFRICA

QUESTIONNAIRE NUMBER:

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Date of interview:

Instruction:

Kindly mark one box next to answer the question of your choice or write in the space provided.

SECTION A: SOCIO-ECONOMIC CHARACTERISTICS OF HAWKERS

1. Gender of respondents: Female Male

2. Age:

3. Age group: Less than 24

25-34

35-45

46-54

55-64

More than 65

4. Marital Status: Single Married

Divorced Widowed

6. Level of Education: Primary Secondary Tertiary
 No formal education

7. Income group: Less than R1000

R 1001-2000

R 2001-3000

R 3001-4000

R 4001-5000

More than R 5000

8. Number of dependents:

SECTION B: MARKETING INFORMATION

1. Where do you purchase your tomatoes to sell? Retail Stores

Other hawkers Farms Other (specify).....

2. Cost of your Stock per week.....

3. Season you receive high price: Summer

Autumn

Winter

Spring

4. Season you receive low price:

Summer	
Autumn	
Winter	
Spring	

5. How often do you purchase your stock per month?

.....

6. Do your suppliers allow you purchase tomatoes on credit: Yes No

7. Type of transport you use to the market: Own transport Public transport Other
(Specify).....

8. Do you keep records? Yes No

9. What kind of records do you keep? Daily sales

Weekly sales

Monthly sales

Seasonal sales

Seasonal sales

10. How long have you been in hawking tomatoes?

11. Income generated from selling tomatoes:

Less than R1000

R 1000-2000

R 2001-3000

R 3001-4000

R 4001-5000

More than R 5000

12. Working hours per day: 1-2 hours

3-4 hours

5-6 hours

7-8 hours

More than 8 hours

13. Which methods do you use when you set price of tomatoes?
Negotiate

14. Do you look at the level of freshness when you set price?
Display price Both

Yes No

15. Type of tomatoes your customers prefer most: Round type Oval
type

16. Colour of tomatoes your customers prefer: Pale green Light red
Full red

17. Which size of tomatoes do your customers prefer most? Small size
Medium size Large

18. Price of tomatoes per kg.....

Thank you!

