Journal of Agricultural Science; Vol. 6, No. 8; 2014
ISSN 1916-9752 E-ISSN 1916-9760
Published by Canadian Center of Science and Education

Factors That Contribute to Vegetable Sales by Hawkers in the Limpopo Province of South Africa

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Received: March 3, 2014 Accepted: May 14, 2014 Online Published: July 15, 2014

doi:10.5539/jas.v6n8p197 URL: http://dx.doi.org/10.5539/jas.v6n8p197

Abstract

This study determines the factors that contribute to vegetable sales by hawkers in the Limpopo province of South Africa. A stratified sampling technique was used to collect data. Three major towns or shopping centres from each district were randomly selected for 366 questionnaire administration. Giyani, Tzaneen and Phalaborwa were selected from Mopani district. Alldays, Polokwane and Lebowakgomo were selected from Capricorn district. Makhado, Thoyandou and Musina were selected from Vhembe district. Mokopane, Naboomspruit and Belabela were selected from Waterberg district. Groblersdal, Marble Hall and Jane Furse were selected from Greater Sekhukhune district. Multiple regression analysis (linear, semi-log and double-log) was used determine the significant variables contributing to vegetable sales. Nine independent variables had a significant impact on the vegetable sales of hawkers when the linear regression model was applied. On application of the semi-log regression, 11 independent variables had a significant impact on the vegetable sales. Ten independent variables had a significant impact on vegetable sales when considering the double-log regression. The study showed the degree of significance of different variables that have an impact on hawkers' vegetable sales.

Keywords: vegetable hawkers, multiple regression, semi-log, double-log, Limpopo Province and South Africa

1. Introduction

Hawking plays a very dynamic role in the urban economy, providing necessary items, which are largely durable and cost-effective to average income earning households at an affordable rate (Saha, 2011). According to Ngiba et al. (2009) the informal sector in South Africa plays an important role in the overall economy, but it is not well understood. Again, Amenya (2007) stated that the hawking of vegetables is one of the leading issues in economic development. Mitullah (2003) stated that even economists lack adequate understanding of street hawking and coverage in economic measurement in the country. Interests in hawking of agricultural products such as vegetables and fruits commonly appear in the Limpopo province. Fresh and locally produced agricultural products are mostly sold by hawkers mainly found in front of municipal markets, around schools, commuter or mass transit terminals, hospitals and gardens, at traffic junctions and commercially congested areas such as CBD (central business district) street. A study done in South Africa by Skinner (2008) showed that hawking is the only source of income to 88 percent of hawkers. Again, Mitullah (2004) stated that 75 percent of street hawkers were sole breadwinners in South Africa and 33 percent had others that supplement their income. A study conducted in Guwahati, Eastern India by Bhattacharyya (2001) showed that hawker's income is utilized primarily for feeding the family and on education of the children. However, a study conducted by Agnello et al. (2004) in Cambodia revealed that hawkers live at substantial level. In their study specific questions regarding how much hawkers earned and spent on daily activities connected to their business was asked, and the answers resulted in negative profits. This meant that, the hawkers were not sincere regarding their earnings or they did not know them since they do not keep written records, or, they simple spend more than they earn and find themselves continuously in need of taking loans. Street hawking is growing at a tremendous rate and that it reflects some structural change or defect in the economy as a whole. The rapid increase in street hawking is attributed to causes as the economic crisis, mass unemployment and the growth of the informal sector (Bromley, 2000). However, very little is known about the informal trading of South African hawkers, particularly those owned or run by black entrepreneurs in the traditionally black environment (economic, legal, political, social and cultural) in which they operate

(Chandle, 2002). There are many factors which contribute to vegetable sales by hawkers, and this study aims to determine those factors contributing to vegetable sales by hawkers using a multiple regression analysis.

2. Material and Methods

2.1 Data Collection

Data for the study were collected from 366 vegetable hawkers in the Limpopo province of South Africa in 2011. A stratified sampling technique was used to collect data, it is a sampling technique in where the researcher divides the entire target population into different subgroups, and then randomly selects the final subjects proportionally from the different groups. This type of sampling is used when the researcher wants to highlight specific subgroups within the population. The population of hawkers was divided into the five district municipalities of the province. Three major towns or shopping centres from each district were randomly selected for questionnaire administration. Giyani, Tzaneen and Phalaborwa were selected from Mopani district. Alldays, Polokwane and Lebowakgomo were selected from Capricorn district. Makhado, Thoyandou and Musina were selected from Vhembe district. Mokopane, Naboomspruit and Belabela were selected from Waterberg district. Groblersdal, Marble Hall and Jane Furse were selected from Greater Sekhukhune district. From the population of vegetable hawkers in each town and shopping centre, hawkers were chosen randomly and entirely by chance to complete the questionnaires, such that each individual hawker had the same probability of being chosen at any stage during the sampling process.

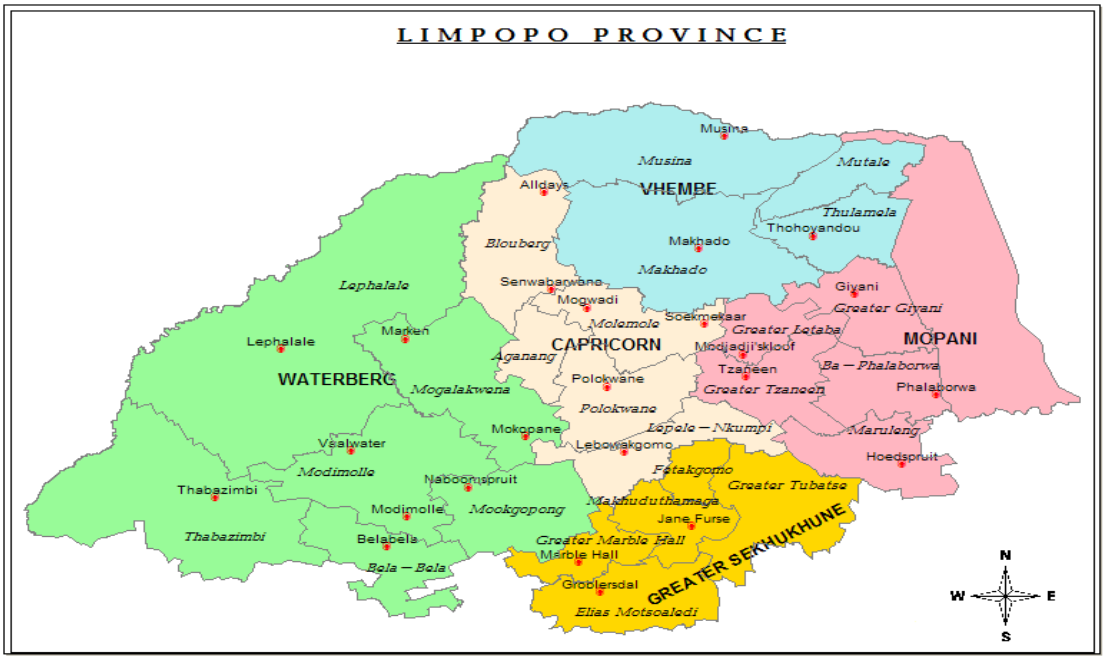

Figure 1. Limpopo Province Map (source: http://www.sa-venues.com; (accessed on 24 August 2013)

2.2 Econometric Model

Multiple regressions (Linear, Semi-log and Double-log) analysis was used to determine the impact of vegetable sales on household income of hawkers**.** Multiple regression analysis is used to analyse the relationship between dependent variable and all the independent variables at the same time (Iversen & Gergen, 1997). A linear function of two or more independent variables can be used in a multiple regression to explain the variation in a dependent variable. Multiple regressions predict the observed values of the dependent variables using linear function of the observed values of the independent variables (Allen, 1997). According to Allison (1999) the kind of variables which can be used in a multiple regression are quantitative variables such as age, income and years of experience. The multiple regressions used in this study involved three different functional forms (Linear, Semi-log and Double-log). This is a mathematical modelling approach that can be used to describe the relationship of several independent variables. The typical regression model used is of the form:

$$Y = f(x_1, x_2, x_3, x_4, x_5, x_6, u) \quad (1)$$

The interpretation of coefficient is different in alternative functional forms. In the following formulations y represents the dependent variable, β_0 is the intercept, β_1-β_6 is the coefficient to be estimated, x_1-x_6 represent all the independent variables, Log represent the natural logarithm of y and χ respectively, and U is an error term.

The advantage of the linear form is that it is easier to apply and interpret, in the linear function the coefficients are easily expressed as a unit change in an attribute that causes the dependent variable to change (Huili, 2008)

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x + \beta_5 x_5 + \beta_6 x_6 + U \quad (2)$$

β represents the change in y that will occur as χ changes one unit.

In the semi-log form the linear dependent variable or the explanatory variable is transferred in to logarithms. According to Huili (2008) the log-linear form (semi-log form) takes the natural logarithm of the depended variable before conducting a regression analysis. The semi-log form is more complicated to utilise and the results are more difficult to interpret if compared to the linear function. The two major advantages of the semi-log form suggested by Woodridge (1999) were; that when the dependent variable has a large range, transformation into logarithmic form can reduce the range significantly, which makes the estimates less sensitive to the extreme values or outliers on the dependent variable. The other advantage is that the variance of the error term on the independent variable is not homogeneous, this is called heteroskedasticity and it is often present in the process of analysis.

$$LogY = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + U \quad (3)$$

In this functional form β is interpreted as follows: a one unit change in χ will cause a β (100%) change in y, e.g., if the estimated coefficient is 0.05 that means that one unit increase in χ will generate a 5% increase in y.

When logarithms are used for both the independent and dependent variables, we get a double-log model or function. The advantage of the double-log stated by (Fesenmaier et al., 1996) was that the coefficients can be interpreted as elasticity and have relatively low residual variance.

$$LogY = \beta_0 + \beta_1 logx_1 + \beta_2 logx_2 + \beta_3 logx_3 + \beta_4 logx_4 + \beta_5 logx_5 + \beta_6 logx_6 + U \quad (4)$$

In this functional form β is the elasticity coefficient. A one percent change in χ will cause a β% change in y, e.g., if the estimated coefficient is -2 that mean that a 1% increase in χ will generate a -2% decrease in y.

3. Results and Discussion

The definition and description of variables was presented in Table 1, showing the mean, standard deviation and variance of all the significant variables.

Table 1. Description of variables

Variables	Mean	Std. Dev.	Variance
Dependent variable:			
Vegetable sales (Y)			
Total vegetable sales per month (Rand per kg)	1009.84	468.529	219519.425
Independent variables:			
District (X1)			
1 = Waterberg; 2 = Mopani; 3 = Capricorn	2.96	1.220	1.488
4= Vhembe; 5 = Sekhukhune			
Household size (X2)			
Total number of people in the house	2.92	0.725	0.526
Gender (X3)			
1 = Female; 2 = Male	1.73	0.446	0.199
Income per month (Rand per month) (X4)			
1 = <R200; 2 = R200 – R699	1.09	0.300	0.090
3 = R700 – R1499; 4> R1500			
Stock price (Rand per month) (X5)			
1 < R500; 2 = R500 – R1000	2.26	0.891	0.794
3 = R1100 - R2000; 4 = > R2000			
Transport used (X6)			
1 = Own vehicle; 2 = Hired vehicle	2.33	0.966	0.933
3 = Trolley; 4 = Other			
Transport cost (Rand per month) (X7)			
1 <R500; 2 = R500 – R1000	1.46	0.684	0.468
3 = R1100 –R2000; 4 > R2000			
Experience (X8)			
Total number of years in the business	3.08	0.832	0.691
Selling days per week (X9)			
Total number of selling days per week	3.44	0.679	0.461
Pricing of produce (X10)			
1 = Displayed; 2 = Negation; 3 = Other	1.42	0.567	0.322
Different kinds of vegetable products sold(X11)			
1= 1-5 products; 2= 6-10 products	2.64	0.737	0.543
3= 11-15 products; 4>15 products			

N (List wise) = 366.

Table 2. Estimated coefficients for regression equations

Variables	Linear	Semi-log	Double-log
Dependent variable:			
Vegetable sales (Y)			
Independent variables:			
District (X_1)	0.197	0.299	0.521
	(-1,293)	(-1.039)	(-0.642)
Household size (X_2)	0.101	0.079	0.056
	(1,645)	(1.761)*	(1.914)*
Gender (X_3)	0.031	0.076	0.275
	(-2,161)**	(-1.782)*	(-1.094)
Income per month (X_4)	0.012	0.018	0.002
	(-2.517)**	(-2.383) **	(-3.136) ***
Stock price (X_5)	0.000	0.000	0.000
	(6.968)***	(7.250) ***	(8.075) ***
Transport used (X_6)	0.000	0.000	0.001
	(-3.817)***	(-3.609) ***	(-3.446) ***
Transport cost (X_7)	0.010	0.002	0.006
	(2.602)**	(3.110) ***	(2.755) **
Experience (X_8)	0.000	0.000	0.002
	(3.835)***	(3.945) ***	(3.067) ***
Selling days per week (X_9)	0.010	0.003	0.000
	(2.606)**	(3.008) ***	(3.711) ***
Pricing of produce (X_{10})	0.014	0.009	0.047
	(2.474) **	(2.620) **	(1.990)*
Different vegetable products (X_{11})	0.117	0.063	0.009
	(-1.573)	(-1.865)*	(-2.610) **

*** P<0.01; **p<0.05; *p<0.10; Number of cases = 366; () = t-values.

Household *size* had a significant impact on vegetable sales when considering the semi-log and double-log regression. At least 53.6 per cent of hawkers had five to six members in their households and some of them can always assist in the hawking activities. The findings in a study by Jensen (2003) showed that there was an average of 4.5 members in a hawker's household. Agnello and Moller (2004) also state that hawkers' household size tend to be large with usually more than one income earner. His findings show that 60 per cent of the hawkers lived with five to ten family members.

Gender also had a significant impact on vegetable sales when the linear and semi-log regression was applied. Female hawkers dominated by 19 per cent compared to male hawkers. This was because more female hawkers engaged in selling vegetables to supplement their partners' incomes. According to Jensen (2003) the dominance of females in the hawking business is one of the important characteristic. The findings in a study by Holness *et al.* (1999) showed that 75 per cent of the responded hawkers were women. Their dominance is one of the socio-economic factors in a hawking business (Cummins & Harvey, 1996; Mitullah, 2003; Agnello & Moller, 2004; Manganga, 2007; Motala, 2008; Skinner, 2008). This study somehow does not agree with similar studies conducted in other parts of the world. Findings in a study by Bhowmik (2005) show that in India, male hawkers were more dominant than female hawkers. Other findings from a study by Saha (2011) conducted in Mumbai, India indicated that 59 per cent of the street hawkers were male, and 41 per cent female. The low number of female hawkers in the market is ascribed to the harsh treatment meted out to hawkers by the authorities (Arjun,

2008).

Home language had a significant impact when all the three regression models were applied. The predominant language in the Limpopo province is Northern Sotho which is spoken by 52.1 per cent of the population, Xitsonga spoken by 22.4 per cent and Tshivenda spoken by 12.1 per cent of the population (Census, 2001). The results show that Xitsonga speaking hawkers dominated by 44 per cent compared to the 1.4 per cent English and 0.5 Afrikaans speaking hawkers and 54.1 per cent for other languages such as Shona, Tshivenda and Northern Sotho.

Total income per month had a positive and significant impact on the vegetable sales when all the three regression models were applied. Hawkers with high income per month are the ones who are likely to have bigger selling markets and who are mostly mobile and they often sell to other hawkers. The findings in a study by Skinner (2008) were that fruit and vegetable hawkers in South Africa earn between R300 and R600 per month, and an average turnover of R1000 per month. Tissington's (2009) findings from his study were that hawkers earned between R800 to R1600 a month depending, according to them, on the weather. The income generated from street hawking activities was critical to the survival of street hawkers' households. According to Bhattacharyya (2001) a hawker's income is utilized primarily for feeding the family and for educating the children. However, a study conducted by Agnello and Moller (2004) in Cambodia revealed that hawkers live on a substantial level. In their study specific questions about how much hawkers earned and spent on daily activities connected to their business were asked, and the answers resulted in negative profits. This meant that the hawkers were not sincere about their earnings or they did not know what they were since they do not keep written records, or, they simply spend more than they earn and find themselves continuously in need of taking loans.

Stock price had a significant impact on the vegetable sales when all the three regression models were applied. Stock price determines the pricing value which the hawker attach to the vegetables sold in the market.

The results showed that when all the three regression models were applied, the *transportation used* to the market place as well as within had a significant impact on vegetable sales. Transportation in the market determines the flexibility of the hawker. Mobile hawkers had more access to customers as they are the ones who move around in search of customers. The stationary hawkers, on the other hand, wait for the customers to approach them. Hawkers use transportation such as hired vehicles, trolleys and taxes to get to the market (Bromley, 2000; Wallace, 2001; Mitullah, 2004; Maheshwari et al., 2007; Tissington, 2009; Arora & Taore, 2010).

Transport costs had a significant impact on the vegetable sales when all the three regression models were applied. From the results, 64.2 per cent of hawkers spent less than R500 for transport per month, because hawkers mainly hire one vehicle to carry their stock to the market and share the transportation costs among them. Mitullah (2004) states that most street hawkers cannot afford the cost of transport, and therefore live within walking distance from their operation sites or near their residential areas. They do not spend a lot on transportation during the selling process because they are stationary and those who are mobile use trolleys or carry their products in baskets or boxes.

Experience had a positive and significant impact on vegetable sales when all the three regression models were applied. Old and experienced hawkers knew their way around customers. Also, customers prefer purchasing their vegetables from a familiar hawker they always see in the market. Ngiba et al. (2009) observe that the average year a hawker operates in the hawkers' market was 6.5 years, which indicated a considerable degree of stability. The results of the study show that the number of selling days per week had a significant impact on vegetable sales when all the three regression models were used. At least 64.4 per cent of hawkers sold their vegetables on six to seven days per week. According to some authors (Renner & Pegler, 1997; Mitullah, 2002; Asiedu & Agyei-mensah, 2008; Muzaffar, et al., 2009) hawkers worked long irregular hours a day. In a study of hawkers, Bhowmik (2005) stated that most street hawkers operate an average of 25 days a month. Holness et al. (1999) also state that hawkers work very long hours, up to 12 hours a day and 7 day a week. The study by Jensen (2003) showed that hawkers worked on average 22 days per month. The findings of Agnello and Moller (2004) reveal that hawkers worked an average of between 8 and 13 hours seven days a week, unless they were sick or unable to buy the stock.

Pricing of the vegetables had a significant impact on vegetable sales when considering all the three regression models, 61.5 per cent of hawkers preferred to display their selling prices on the vegetables than negotiating the price with customers. Different vegetable products sold by hawkers had a significant impact on vegetable sales only when using the semi-log and double-log regression. The results of the study show that 42.3 per cent of hawkers sold three to four different vegetable products and 42.1 per cent sold five to six different vegetable products. Cummins and Harvey (1996) observed female hawkers handling over 30 different commodities,

ranging from vegetable cash crops to indigenous vegetables such as okra.

4. Conclusion

This study revealed that the Household size, Gender, home language, Stock price, Transport cost, the type of transport used to the market, Total income per month, and experience in years of a hawker, pricing method employed by a hawker, selling days per week and the number of different vegetable products sold by a hawker contribute to the vegetable sales in a hawkers market. Access to market information should be improved. This will alleviate the problem of high and fluctuating supplier's prices so that hawkers will know the prices and gains before engaging in to the hawking business. Both the government and NGOs should intervene and help hawkers with credit for capital, funds and provide business skills. In this study the majority of the hawkers were female with primary education. There is a great need for adult education and business skills training to help the hawkers grow their businesses, and to keep records of their sells.

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