Pertanika J. Soc. Sci. & Hum. 25 (S): 69 - 80 (2017)

PERTANIKA JOURNALS

SOCIAL SCIENCES & HUMANITIES

Journal homepage: http://www.pertanika.upm.edu.my/

Attributes of Local and Imported Fresh Apples in Indonesia: A Hedonic Price Approach Based on Consumer Perspective

Rahayu Relawati[1,2]*, Masyhuri[3], Lestari R. Waluyati[3] and Jangkung H. Mulyo[3,4]

[1]Department of Agribusiness, Universitas Muhammadiyah Malang, East Java 65144, Indonesia
[2]PhD Student on Agribusiness Management, Faculty of Agriculture, Universitas Gadjah Mada, Yogyakarta 55281, Indonesia
[3]Department of Agricultural Socioeconomics, Faculty of Agriculture, Universitas Gadjah Mada, Yogyakarta 55281, Indonesia
[4]Center for Population and Policy Studies (CPPS) Universitas Gadjah Mada, Yogyakarta 55281, Indonesia

ABSTRACT

The aim of this paper is to find out how Indonesian consumers assess attributes of cultivars, flavour, aroma, juiciness, freshness, texture, size, and appearance of local and imported fresh apples. A hedonic price approach was used to compare the prices of local and imported fresh apples. A survey among selected consumers was conducted in four cities, namely Malang, Surabaya, Yogyakarta and Bandung in Java Island, Indonesia. These cities were selected as they are the main marketing channels for local apples in Indonesia. Accidental sampling technique was used to select the participants who shopped at supermarkets, fruit stalls and traditional markets. Multiple linear regressions were used to analyse significant attributes of the hedonic pricing method. The results indicate attributes of local and imported apples positively affect their price, namely flavour, texture, size, appearance and place to buy (supermarket). Findings show attributes of cultivar and freshness affect positively hedonic price of local apples, while juiciness affects positively that of the imported apples.

Keywords: Attributes of cultivar and freshness, Indonesian consumer, local and imported apples, hedonic price

ARTICLE INFO

Article history:
Received: 03 January 2017
Accepted: 30 July 2017

E-mail addresses:
rahayurelawati@umm.ac.id (Rahayu Relawati)
masyhuri@ugm.ac.id (Masyhuri)
lestarirahayu_wlyt@ugm.ac.id (Lestari R. Waluyati)
JHandoyoM@ugm.ac.id (Jangkung H. Mulyo)
* Corresponding author

ISSN: 0128-7702

INTRODUCTION

There have been studies on perception of quality of imported apples (Rahayu, Fauziyah, & Ariyani, 2012); motivation, knowledge and attitudes towards local and imported apple (Sadeli & Utami, 2012); and consumer preferences and perceptions

of quality of local and imported apples (Widyadana, Octavia, Palit, & Wibowo, 2013). However, to date there has not been any study on how attributes of local and imported fresh apples in Indonesia influence their pricing.

A comprehensive research on consumer's purchasing behaviour toward local and imported apple which is supported by hedonic price approach is useful in formulating marketing strategies to boost sale of local apples. The objectives of this paper are to:

a) find out how the Indonesian consumer assess the attributes of cultivars, flavour, aroma, juiciness, freshness, texture, size, and appearance of local and imported apples.

b) analyse the influence of those attributes on hedonic pricing and the place to buy these local and imported apples.

LITERATURE REVIEW

A New Approach to Consumer Theory

Lancaster (1966) proposed a new approach to consumer theory. He assumed that consumption is an activity in which goods, singly or in combination, are inputs and in which the output is a collection of characteristics. The essence of the new approach can be summarised as follows with each assumption representing a break with tradition: (1) The good, per se, does not give utility to the consumer; it possesses characteristics, and these give rise to utility; (2) In general, a good will possess more than one characteristic, and many characteristics will be shared by more than one good; and (3) Goods in combination may possess characteristics different from those pertaining to the goods separately (Lancaster, 1966). Lancaster's theory therefore is important to analyse hedonic demand or hedonic price method.

The consumer behaviour to local and imported food is very important as it determines its pricing, more so if the government is encouraging consumption of local food. In United Kingdom, Chambers, Lobb, Butler, Harvey and Traill (2007) reported that consumers are enthusiastic in buying local products because they perceive the latter of being higher quality than the imported ones and also to support the local farmer and boost the national economy. However, higher price and inconvenience prevent them from purchasing local products (Chambers et al., 2007). In US, consumers express concern over protecting their farmland and supporting the local economy; however, direct markets are facing stiff competition with imported products as the latter ensure continuous supplies and convenience (Onozaka, Nurse, & McFadden, 2010). In England and France, vegetable box schemes are used to encourage consumers to purchase local organic foods for logistics, quality and ecological reasons (Brown, Dury, & Holdsworth, 2009). A research to compare hedonic price of fresh apples is important in Indonesia, since imported apples are dominant in the local market and the local agribusiness sector is facing tough competition from the former.

Hedonic Price

Hedonic price refers to implicit prices of attributes and are revealed to economic agents from observed prices of differentiated products and the specific characteristics associated with them (Rosen, 1974).

Econometric problem of estimating hedonic demand parameters is not a standard identification problem caused by demand-supply interaction, as has been often assumed (Bartik, 1987). Estimation procedures based on this assumption leads to biased results. The hedonic estimation problem is instead caused by the endogeneity of both prices and quantities when households face a nonlinear budget constraint. An instrumental solution to this problem is suggested using instruments that exogenously shift the budget constraint.

A hedonic price function describes the equilibrium relationship between characteristics of a product and its price. It predicts prices of new goods, to adjust for quality change in price indexes, and to measure consumer and producer valuations of differentiated products. They emerge as market outcomes from both competitive and non-competitive markets (Nesheim, 2006). This paper uses hedonic price function to analyse the influence of those attributes and place of purchase on hedonic price of apple.

Previous Studies

The attributes of consumers' preference on apple have been studied by many researchers. Attribute of cultivar was studied by Carew and Smith (2004), Peneau, Hoehn, Roth, Escher and Nuessli (2006), Harker, Kupferman, Marin, Gunson, and Triggs (2008), Racskó et al. (2009), Skreli and Imami (2012), and Bonany et al. (2014).

The place of origin of apples (local and imported) has been studied by Skreli and Imami (2012), Sadeli and Utami (2012), Widyadana et al. (2013), Moor, Moor, Põldma and Heinmaa (2014), and Rahayu et al. (2012). Flavour has been studied by Peneau et al. (2006), Harker et al. (2008), Moor et al. (2014), and Bonany et al. (2014). Attribute of size has been studied by Carew and Smith, (2004), Peneau et al. (2006), Racskó et al. (2009), Skreli and Imami, (2012), and Rahayu et al. (2012). Attribute of juiciness has been studied by Bonany et al. (2014). Freshness and aroma have been studied by Peneau et al. (2006). Texture has been studied by Harker et al. (2008). Crispness has been studied by Bonany et al. (2014). Appearance has been studied by Moor et al. (2014) and Peneau et al. (2006).

In this research, the attributes of apple quality were used to regress hedonic price of apple (the implicit price of the attributes of the apple). Earlier studies have used hedonic price approach on apple products (Carew & Smith, 2004; Tronstad, Huthoefer, & Monke, 1992; Wang & Ge, 2008), and also on the other agricultural products, such as coffee, fresh tomatoes and rice.

A hedonic price model for the US apple industry was proposed to determine its implicit value of spatial, seasonal, and quality characteristics (Tronstad et al., 1992). The hedonic price function used is: $Pi = f(C_{i1}; ...; C_{ij}; u_i)$; where P is the observed price of commodity i' C, 7 = 1, . . .

, / measures intrinsic "quality characteristic" for each unit of commodity /; and u. is a disturbance term. In this paper, this formula is used to explain that hedonic price of fresh apple is a function of some quality attributes, namely cultivar, flavour, aroma, etc. (Formula 1).

Sensory methods were used to evaluate subjective apple characteristics such as juiciness, flavour, and texture. In this study, a hedonic price function for apples was estimated to evaluate the relationship between apple prices from British Columbia (BC) and the wholesalers' perception of product quality characteristics. In this study, sales data and cultivar characteristics were obtained for three large wholesalers in western Canada that purchase BC apples (Carew & Smith, 2004).

An empirical analysis based on Washington organic apples and pears will provide some general understanding of organic fruit marketing for the industry. Hedonic price functions are incorporated in this study case to measure a wide variety of commodity characteristics such as size and grade based on Lancaster's theory that consumers view commodity characteristics as the sources of utility (Wang & Ge, 2008).

A previous study also used hedonic price approach not only to analyse product attributes but also the other factors assumed to influence price. Besides product attributes such as organic and random weight, Smith et al. included market factors (discount store) and households characteristics as independent variables that influence price products (Smith, Lin, & Huang, 2008).

This paper adopts attributes from the previous studies and also adds other relevant variables. Specifically, it will assess attributes of cultivar, flavour, aroma, juiciness, freshness, texture, size and appearance and analyse their influence on the price of local and imported apples. Hypothetically, all attributes have positive influence on the price of apples. This study also posited place to buy (supermarket, fruit stall, and traditional market) as dummy variables.

METHODS

This study uses a quantitative consumer survey method to measure and analyse how attributes of imported and local apple affect its hedonic pricing in Malang Raya (Malang Regency and Batu City in Java), Surabaya, Yogyakarta and Bandung. , Malang Raya is the supplier area of local apple while the other cities represent three areas of Java Island: east, centre and west areas of Java. Selection of the cities was made based on demand for the fruit. The fruits were purchased from supermarkets, fruit stalls and traditional markets.

A total of 240 respondents were recruited for this survey using questionnaire method are 240 costumers. In each city, 60 consumers (customers and consumers are used interchangeably in this paper) were interviewed (20 customers each from the supermarket, fruit stall and traditional market). The sampling technique is known non-probability sampling (Bhattacherjee, 2012).

The purchasing behaviour of customers were measured using Likert scale, ranging from 1 being the worse attribute to 5 being the best

Consumer assessment on the attributes of the apples were analysed descriptively using cross tables while hedonic price approach was analysed using multiple linear regression. Formula for hedonic price method used the basic function of P = f(Z). Following Rosen (1974), and Carew and Smith (2004), the formula for hedonic price of local apple is as follow:

$$P_{Lc} = \alpha_0 + \beta_1 Culti_{Mana} + \beta_2 Culti_{Rome} + \beta_3 Flavour_{Lc} + \beta_4 Aroma_{Lc} + \beta_5 Juiciness_{Lc} + \beta_6 Freshness_{Lc} + \beta_7 Texture_{Lc} + \beta_8 Size_{Lc} + \beta_9 Appearance_{Lc} + \beta_{10} Supermarket_{Lc} + \beta_{11} Fruitstall_{Lc} + \varepsilon_{it} \quad (1)$$

where:

P_{Lc} = Price of local apple (Rupiah); USD1 = IDR13,086

$Culti_{Mana}$ = Cultivar of Manalagi = 1, 0 if RB and Anna

$Culti_{Rome}$ = Cultivar of Rome Beauty = 1, 0 if Manalagi and Anna

$Flavor_{Lc}$ = Consumer assessment on flavour of local apple (score 1 – 5)

$Aroma_{Lc}$ = Consumer assessment on aroma of local apple (score 1 – 5)

$Juiciness_{Lc}$ = Consumer assessment on juiciness of local apple (score 1 – 5)

$Freshness_{Lc}$ = Consumer assessment on freshness of local apple (score 1 – 5)

$Texture_{Lc}$ = Consumer assessment on texture of local apple (score 1 – 5)

$Size_{Lc}$ = Size of local apple (measured in weight, ounce per fruit)

$Appearance_{Lc}$ = Consumer assessment on appearance of local apple (score 1 – 5)

$Supermarket_{Lc}$ = $Supermarket_{Lc}$ =1 if apple is purchased from supermarket, 0 if fruit stall and traditional market

Fruit $stall_{Lc}$ = Fruit $stall_{Lc}$ = 1, if apple is purchased from fruit stall, 0 if supermarket and traditional market.

The similar formula of hedonic price is also used on imported apple, however, the cultivars analysed are: Fuji, Washington and Others. Data was analysed using Eviews software.

RESULTS AND DISCUSSION

Validity and Reliability of Data

Pearson correlation coefficient was used to validate data (Sanusi, 2015). The results indicate that all attributes measured with

Likert scale are valid. Reliability test via Cronbach alpha showed each value for local and imported apple are 0.818 and 0.753 respectively. It is generally agreed the reliability is satisfied if Cronbach alpha > 0.7 (Churchill, 1979).

Description of Apple Cultivars Bought by Consumers

This study separated the fresh apples based on place of origin, namely local and imported apple. Local apples are grown only in Malang Raya while imported apples are sourced from various countries. Table 1 shows distribution of apple cultivar.

Table 1
Distribution of apple cultivar based on cities and consumer preference

	Cultivar of local apple			Cultivar of imported apple		
	Manalagi	RB	Anna	Fuji	Washington	Others*
Malang	17	10	3	10	4	6
Surabaya	19	9	2	18	7	5
Yogyakarta	15	15	0	20	9	1
Bandung	10	20	0	15	11	4
Total	61	54	5	63	31	16
%**	0.508	0.450	0.042	0.525	0.258	0.133

Note: *More than 5 cultivars bought each by 1
** Percentage of each local and imported apple

Based on customer preference, the most popular cultivars are Manalagi and Fuji respectively for local and imported apple. Apple cultivars from the most popular to least are: Red Delicious, Granny Smith, Royal Galla, Pacific Rose Jumbo, Wangshan and Envi Scilate NZ. The last three cultivars were each bought by one customer only. Consumers in Malang and Surabaya prefer cultivar of Manalagi because of its sweet flavour, while those in Bandung prefer Rome Beauty because it is a little sour and good for health. As for imported apples, customers in the four cities prefer Fuji because it is sweet, crispy and juicy.

Based on Table 3, for local apple, the dummy variables are Manalagi, Rome Beauty, and Anna. On imported apples, the dummy variables are Fuji, Washington and Others.

Consumer assessment on apple attributes

Consumer assessment on the attributes of local and imported apples are shown in Table 2.

Almost all attributes of imported apples had better scores, except for aroma and freshness. Although the customers are aware that imported apples are processed and

stored before they are flown to Indonesia, they still rate them better than the local apples. Therefore, local agribusiness should promote the freshness of local apples especially their health benefits.

Table 2
Consumers' assessment on attributes of each apple cultivar, measured using Likert scale

Apple attributes	Cultivar of local apple				Cultivar of imported apple			
	Manalagi	Rome Beauty	Anna	Average score	Fuji	Washington	Others	Average score
Flavour	4.0*	3.54	2.60	3.73	4.16*	3.45	4.15	3.98
Aroma	3.70	3.78*	3.40	3.73	3.62	3.32	4.23*	3.68
Juiciness	3.34	3.61*	2.60	3.43	3.95	3.84	4.19*	3.98
Freshness	3.61	3.94*	2.60	3.72	3.54	3.32	3.65*	3.51
Texture	2.87	3.06*	3.00	2.96	3.56	3.55	3.92*	3.63
Size (ounce)**	1.38	1.56*	1.14	1.45	2.05*	1.68	1.75	1.89
Appearance	3.54	3.74*	2.80	3.60	4.13	3.61	4.19*	4.01

Note: * the highest score and size among cultivars
**Measured in average of apple weight (ounce)

Cultivars of Pacific Rose Jumbo, Wangshan and Envi Scilate NZ are the most expensive imported apples which are priced at more than IDR40,000/kg. Premium priced cultivars are also assessed as having good quality based on consumer perception.

Table 3
Average price of apples based on cultivar and place to buy in 2015-2016

Place to buy	Cultivar of local apple (IDR*/Kg)			Cultivar of imported apple (IDR*/Kg)		
	Manalagi	Rome Beauty	Anna	Fuji	Washington	Others
Supermarket	31,004	35,506	n.a.**	41,594	32,400	47,907
Fruit stall	24,118	25,333	18,000	30,208	32,844	22,800
Trad. Market	21,548	23,188	15,000	29,863	26,800	25,000

Note: *USD1 = IDR13,086 (Bank Indonesia, 2016)
**Not available

Description of price at each cultivar can also explain the position of market segmentation. Supermarket tends to attract middle-class consumers, based on the high price of both local apples and imported ones. Meanwhile, the fruit stall and traditional market tend to attract lower middle class consumers. Rome Beauty (RB) is the most expensive cultivar

of local apple and in terms of size, it is also bigger than that of Manalagi and Anna.

Supermarket is the most expensive place to buy local apple cultivars. They sell only big sized apple, namely grade A of Manalagi. A Kilogramme of Manalagi only has 6-7 fruits. The supermarkets usually prioritise quality of apple which attract middle and upper class consumers.

Hedonic Price of Local and Imported Apple

Table 4 provides regression coefficient estimates for the local and imported apple price. Goodness of fit of the models is explained by the adjusted R2 over 60% and they are free from disturbance of multicollinearity, heteroscedasticity and autocorrelation. The F-values on both regressions indicate that cultivar, flavour, aroma, juiciness, freshness, texture, size, appearance and dummy of place to buy are the principal factors influencing apple prices.

Table 4
Estimated regression model results for local and imported apple

		Local apple		Imported apple	
Adjusted R^2		.702		.638	
F-value		26.477		20.107	
	Expect. Sign	Reg. Coef.	Sig. level	Reg. Coef.	Sig. level
(Constant)		-4992.655	.111	-17753.438	.008
Culti_Mana	+	3069.109	.121	-	
Culti_Rome	+	3926.446*	.052	-	
Culti_Fuji	+	-	-	-1660.015	.325
Culti_Wash	+	-	-	1030.453	.595
Flavour	+	1055.274*	.053	2873.724**	.022
Aroma	+	723.286	.181	660.083	.527
Juiciness	+	38.242	.948	1894.019*	.060
Freshness	+	938.991*	.092	298.185	.691
Texture	+	876.584**	.047	1938.702*	.061
Size	+	6100.868***	.003	3824.125**	.024
Appearance	+	1209.226**	.021	2824.276***	.010
Supermarket	+	4844.438***	.000	9050.871***	.000
Fruit stall	+	1128.874	.210	2189.296	.130

Note: *p < 0.10; **p < 0.05; ***p < 0.01

In terms of significance level, seven attributes of local apple are positively significant in affecting the price. Imported apples have six significant attributes. For both apple origin categories, the significant attributes are flavour, texture, size, appearance and supermarket as the place to buy. The significant attributes for local apple are cultivar of Rome Beauty and freshness. Meanwhile the most significant attribute for imported apples is their juiciness.

Table 4 shows all significant attributes affect positively hedonic price of fresh apples. There is only one attribute, Fuji cultivar that has a negative impact though it is not significant in affecting hedonic price.

The most significant factors affecting local apples are size and purchasing place, namely supermarket. Their significance level is less than 1%. The price of the local apple corresponds with its size and weight, an increase of one ounce means the price will increase to be IDR6100/kg. At the supermarkets, the price of premium local apples is IDR4844/kg.

The next significant attributes of local apples are their texture and appearance, with a significance level of less than 5%. The increase in one score in texture and appearance will increase the price as much as IDR876 and IDR1209 respectively.

The last attributes of local apple which have significance level less than 10% are Rome Beauty cultivars, flavour and freshness. Rome Beauty is considered premium and can cost as much as IDR3926/kg, compared with other local apples. Meanwhile, the increase in one score in terms flavour and freshness attributes will increase its price as much as IDR1055 and IDR938 respectively.

As for imported apples, the most significant factors are appearance and supermarket as purchasing place. They have significance level less than 1%. Consumers prefer apple with smooth skin, without bruises from impact. The increase in one score in terms of appearance will increase the price of imported apples as much as IDR2824/kg. Meanwhile, the purchasing place can contribute to increase in prices of imported apples in the supermarket. It has a premium price of IDR9050/kg, compared with fruits sold at the stalls and traditional markets.

The next attributes of imported apple are flavour and size, with their significance level less than 5%. The increase of one score of attribute in terms appearance will increase price of imported apple as much as IDR2824/kg. Meanwhile, increase in one ounce of size per fruit will increase its price as much as IDR3824/kg.

The last attributes are juiciness and texture of imported apples which have a significance level of 10%. These attributes have a positive influence on their price. The increase in one score of attributes of juiciness and texture will increase the price of imported apples as much as IDR1894 and IDR1938 respectively.

CONCLUSION

Almost all attributes of imported apple were assessed to be better, except for aroma and freshness which were the unique

characteristics of local apples. Consumers tend to provide a better assessment for imported apples which are freely available in the domestic market. The only edge the local apples have is their aroma and freshness. Therefore, it is important to promote freshness of local apples and relate them to their health benefits. This effort is expected to gradually increase their competitiveness in the domestic market.

Some attributes of local and imported apples positively influence their hedonic price: flavour, texture, size, appearance and place to buy. The higher the score related to attributes, the more expensive the imported apples are, approximately double the price of local apples, except the fruit size which is otherwise. Likewise, premium price of imported apples in the supermarket is IDR9050/kg (double that of local apples).

Attributes of cultivar and freshness affect hedonic price of local apples. The increase in freshness score can contribute to a rise of IDR938/kg in the price of local apple while cultivar Rome Beauty has a premium price as much as IDR3926/kg. The increase in juice score of imported apples can lead to a corresponding increase in price by IDR1894/kg.

It is thus recommended that producer and marketer of local apples should pay attention on freshness as their advantage. Most consumers have health motivation in consuming local apple, so that freshness is an important attribute. Therefore, promotion of local apple should focus both on their freshness and health benefits.

REFERENCES

Bank Indonesia. (2016). *KURS BI USD/IDR*. Retrieved from http://pusatdata.kontan.co.id/makroekonomi/kurs_bi

Bartik, T. J. (1987). The estimation of demand parameters in Hedonic Price models. *Journal of Political Economy.*

Bhattacherjee, A. (2012). Social science research: Principles, methods, and practices. *Global Text Project*. doi: 10.1186/1478-4505-9-2

Bonany, J., Brugger, C., Buehler, A., Carbó, J., Codarin, S., Donati, F., … Schoorl, F. (2014). Preference mapping of apple varieties in Europe. *Food Quality and Preference, 32*(PC), 317-329.

Brown, E., Dury, S., & Holdsworth, M. (2009). Motivations of consumers that use local, organic fruit and vegetable box schemes in Central England and Southern France. *Appetite, 53*(2), 183-188. doi: 10.1016/j.appet.2009.06.006

Carew, R., & Smith, E. G. (2004). The value of apple characteristics to wholesalers in western Canada: A hedonic approach. *Canadian Journal of Plant Science, 84*(3), 829-835.

Chambers, S., Lobb, A., Butler, L., Harvey, K., & Traill, B. W. (2007). Local, national and imported foods: A qualitative study. *Appetite, 49*(1), 208-213. doi: 10.1016/j.appet.2007.02.003

Churchill, G. A. (1979). A paradigm for developing better measures of marketing construct. *Journal of Marketing Research, 16*(1), 64-73.

Harker, F. R., Kupferman, E. M., Marin, A. B., Gunson, F. A., & Triggs, C. M. (2008). Eating quality standards for apples based on consumer preferences. *Postharvest Biology and Technology, 50*(1), 70-78.

Lancaster, K. J. (1966). A new approach to consumer theory. *The Journal of Political Economy, 74*(2), 132-157.

Moor, U., Moor, A., Põldma, P., & Heinmaa, L. (2014). Consumer preferences of apples in Estonia and changes in attitudes over five years. *Agricultural and Food Science, 23*(March), 135-145.

Nesheim, L. (2006). *Hedonic price functions* (CeMMAP Working Papers). *Working Papers.* Retrieved from http://www.cemmap.ac.uk/publications.php?publication_id=3732

Onozaka, Y., Nurse, G., & McFadden, D. T. (2010). Local food consumers: How motivations and perceptions translate to buying behavior. *Choices, 25*(1), 1-6.

Peneau, S., Hoehn, E., Roth, H., Escher, F., & Nuessli, J. (2006). Importance and consumer perception of freshness of apples. *Food Quality and Preference, 17*, 9-19. doi: 10.1016/j.foodqual.2005.05.002

Racskó, J., Miller, D. D., Duarte, E. E., Szabó, Z., Soltész, M., Nyéki, J., & Szukics, J. D. M. C. (2009). Consumer preference for apple cultivars grown in various countries: A case study with Hungarian consumers. *Acta Horticulturae, 831*, 219-226. Retrieved from http://www.scopus.com/inward/record.url?eid=2-s2.0-75749148819&partnerID=40&md5=96be5eaaaf656bf4f7f8a350c471e701

Rahayu, J. N., Fauziyah, E., & Ariyani, A. H. (2012). Preferensi konsumen terhadap buah apel impor di toko buah hokky dan pasar tradisional Ampel Surabaya. *Agriekonomika, 1*(1), 52-67.

Rosen, S. (1974). Hedonic price and implicit market: Product differentiation in pure competition. *Journal of Political Economy, 82*, 34-55.

Sadeli, A. H., & Utami, H. N. (2012). Motivasi, pengetahuan, dan sikap konsumen terhadap atribut komoditas apel lokal dan apel impor: Studi kasus pada konsumen buah apel lokal dan apel impor di wilayah Kota Bandung. *Sosiohumaniora, 14*(2), 142-154.

Sanusi, S. R. (2015). *Beberapa uji validitas dan reliabilitas pada instrumen penelitian*. Universitas Sumatra Utara.

Skreli, E., & Imami, D. (2012). Analyzing consumers' preferences for apple attributes in Tirana, Albania. *International Food and Agribusiness Management Review, 15*(4), 137-155.

Smith, T. A., Lin, B., & Huang, C. L. (2008). Organic premiums of U. S. fresh produce. *Renewable Agriculture and Food Systems, 23*(3), 208-216. http://doi.org/10.1017/S1742170508002238

Tronstad, R., Huthoefer, L. S., & Monke, E. (1992). Market windows and Hedonic price analyses: An application to the apple industry. *Journal of Agricultural and Resource Economics, 17*(2), 314-322.

Wang, H. H., & Ge, Y. (2008). What marketing measures can organic apple and pear growers take to increase their receipts? *Western Economic Forum, Spring*, 42-48.

Widyadana, I. G. A., Octavia, T., Palit, H. C., & Wibowo, D. F. (2013). Consumer preferences and quality perception of imported and domestic apple in Surabaya. *Proceeding, 6th Internasional Seminar on Industrial Engineering and Managemen*t (pp. 48–53), Batam, Indonesia.