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Hedonic Price Function Estimation for Mobile Phone in Iran

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ABSTRACT: The aim of this paper is the survey of mobile price determinants by hedonic model. We have applied the hedonic price model for mobile phone market in Iran in the year of 2008. The brands conclude NOKIA, QTEK, HTC, MOTOROLA, SONY ERICSSON and SAMSUNG that comprise 193 types of handset mobile phone. The results show that in the hedonic function, the maximum amount of parameters of hedonic price function related to the following variables respectively: touch screen, hands free and connectivity tools, and the minimum amount of them are belonged to clarification of monitor images, phone volume and phone memory. Moreover, except Motorola brand the type of brand has not a significant parameter in the hedonic price function.

Keywords: Hedonic Price Model; Mobile Phone Brands; Iran
JEL Classifications: C43; C51; O18

1. Introduction

Nowadays, communication has an important situation throughout the world. The communication instruments are widely various so that the designers and producers of these facilities continually try to product new and update them. One of the prevalent options in the communication instruments is the handset mobile phone, which everyday, the million calls and messages is carried out in Iran and so phenomena is very crucial in Iranian economy. There are many factors that affect the demand for handset mobile phone and these determinants are very important in mobile phone pricing. The Iranian handset mobile phone importers haven't a vast information on these determinants therefore, they aren't enough successful in marketing and consumer satisfactory. The problem of the sellers of mobile is consumer preferences. They should know the consumer preferences and interests for selling the handset mobile phones. The consumer preferences and interests are formed on the basis of brand, price and facility of mobiles. They should choose the proper brands in order to profit maximization. We can study the characteristics of the different brand of handset mobile phone and it's pricing for advising to importers due to their marketing strategies. The aim of this paper is the survey of handset mobile phone price determinants via the hedonic price model.

Hedonic technique has been applied in different domains concluding urban economics, environment economics and welfare economics. Karjaluoto et al. (2005) in a study on 196 people have shown that most of consumers haven't enough information about the new technologies in market and the seller suggestions haven't a significant effect on the consumer choices. But, they have indicated that brand, price and mobile size effect on mobile phone demand. Anandan et al. (2004) have studied the fidelity of costumers to the brands. The factors of fidelity are price, guarantee, good differentiation and nicety. The fidelity to Nokia is more than other brands. Fujiwara and Takasaki (2007) by a hedonic model have shown that MNP system increases mobile efficiency and decreases its price.

Nazari et al., (2011) show that HTC brand, Wireless network connectivity, Touch Screen, GPS and Mega Pixel quality factor in camera affect price of mobile handset in positive direction.

2. Theoretical Basis

The handset mobile phone as a multi service good has a wider concept in comparison to communication tool. The hedonic price theory considers this wider concept and in the different service of handset mobile phone. The hedonic theory shows that the utility of each person is a function of the different quantities of goods and services consumed (X) and it is the function of the vector of different mobile characteristics (Z). Every individual consumes a set of the goods and services and the service of mobile phone. We examine the utility function as the following form:

$$U = U(X, Z)$$

The budget line for consumer is:

$$Y = X + P(Z)$$

where p(Z) is the value of handset mobile phone which is a function of used characteristics in demanded mobile phone. The hedonic price function is as the formula:

$$P_i = F(P_{Z_i})$$

$$P_i = P(Z_i)$$

i stands for given mobile phone and Z_i shows considered particularities in the hedonic price function. Since, the consumers maximize their utility subject to the budget line restriction, we have:

$$Max : U = U(X, Z_i)$$

$$s.t : Y = X + P(Z_i)$$

The Lagrangian function is as the following:

$$\ell = U(Z_i) + \lambda(Y \quad P_i \quad X)$$

$$\frac{\partial \lambda}{\partial Z_i} = \frac{\partial U}{\partial Z_i} \quad \lambda \frac{\partial P_i}{\partial Z_i} = 0$$

$$\frac{\partial \ell}{\partial x} = \frac{\partial U}{\partial X} \quad \lambda = 0$$

$$\frac{\frac{\partial U}{\partial Z_i}}{\frac{\partial U}{\partial X}} = \frac{\partial P_i}{\partial z_i}$$

where $\frac{\partial U}{\partial X}$ is equal to excess utilities obtained from one excess unit for handset mobile phone consumption. $\frac{\partial U}{\partial Z_i}$ stands for excess utility for goods (Day, 2001).

By consideration of the hedonic literature precedent it will be that there is not a just one specific theory for hedonic model and researchers select the appropriate models on the basis of its application and its statistics. Then, we can apply the different functional forms for hedonic price function estimation. In this study, we cannot apply double logarithmic form because, some of observations are zero. But, we can apply the linear and semi-logarithmic function forms for hedonic function estimation. Some diagnostics like R^2 and the stability of coefficients show that the semi-logarithmic form has been preferred to the linear form. The semi-logarithmic function has a low magnitude of heterogeneity therefore; the estimation is more creditable in comparison to the linear form. Moreover, in semi-logarithmic form the sign of variable coefficient are consistent with theory. Hence the analysis of results in this study is based on the semi-logarithmic form.

3. Results

Our sample concludes all the handset mobile phone models in Iranian market in the year of 2008. The source of data is www.GSM.ir. The brands conclude Nokia, QTEK, HTC, MOTOROLA, SONY ERICSSON and SAMSUNG that comprise the 193 types of mobile phone.

Table (1) indicates the number of brands and average price for supplied mobile handset in different companies during the period under consideration in this study, which its data is available. Some of these companies produces more number of brands and supply to the Iranian shops, so that according to the available data the number of handset mobile brands Nokia, Sony Ericson, Samsung, HTC and Motorola are 59, 38, 23, 23, and 20 respectively, whereas the number of : LG, Qtek, Panteck, and Apple are 16, 9,3 and 3 respectively. Among the mobile handset companies in Iran Apple and Panteck devotes the higher and lower prices. For explain the average price for Apple is 7800000 Rails, while correspondent price for Panteck brand is 1550000 as the table (1)shows the average price for used brands during the period of time under consideration of this study is 3509557 Rials.

Table 1. The average of price for various mobile phones

The average of price (Rials)	The number of models	Brand
3،276،102	59	NOKIA
2،234،211	38	SONY ERICSSON
2،421،818	23	SAMSUNG
6،693،636	22	HTC
2،556،500	20	MOTOROLA
2،053،750	16	LG
3،000،000	9	QTEK
1،550،000	3	PANTECH
7،800،000	3	APPLE
3،509،557	193	**Sum**

Ln(Price) = 14/05 + 0/18 HTC + 0/06 LG + 0/25 MOTOROLA + 0/02 QTEK – 0/04 SAMSUNG + 0/7 SONY ERICSSON + 0/18 Operating System + 0/02 Band – 0/003 Time – 4/93 Volume + 1/27 Monitor +0/37 Touch + 0/15 Camera + 0/06 Film + 7/15 Phone Memory + 0/27 Edge + 0/011 Hscsd + 0/2 3G + 0/05 Voice Answer – 0/07 Radio + 0/15 Office Editing – 0/005 PDF + 0/0007 Battery Duration 2 + 0/27 Hands free + 0/15 Hands free Bluetooth

Table 2. Hedonic price function estimation for mobile phone

Semi-logarithmic		Model
t stat	coef	**Independt variables**
0/0000	14/05	const
0/146	0/184	HTC
0/596	0/064	LG
0/033	0/258	MOTOROLA
0/815	0/029	QTEK
0/693	-0/042	SAMSUNG
0/327	0/074	SONY ERICSSON
0/013	0/189	Operating system
0/318	0/026	Frequency Band
0/173	-0/003	Time
0/006	$-4/93*E^{-8}$	Phone size
0/011	$1/27*E^{-8}$	Image clarity
0/0003	0/37	Touch screen
0/0000	0/153	Zoom
0/555	0/066	Camera
0/0003	$7/15*E^{-5}$	Memory
0/0000	0/275	Connectivity tools (Edge)
0/875	0/011	Connectivity tools

		(Hscsd)
0/0006	0/209	Connectivity tools (3G)
0/434	0/056	Voice answer
0/156	-0/077	Radio
0/05	0/151	Office Editing
0/947	-0/005	PDF reader
0/004	0/0007	Battery Duration
0/001	0/279	Hands free
0/091	0/155	Hands free Bluetooth
0/83		R^2
0/80		R^2

4. Conclusion

The purpose of this paper is the survey for mobile handset prices determinants via hedonic price model. We applied the mentioned model in Iranian market in the year of 2008. The number of used brands in this study is 193, which the most famous of them are: Nokia, Samsung, Ericsson, Motorola, HTC and Qtek.

The result of this research shows that the Iranian mobile customers pay attention to the handset memory, battery life, handset dimensions, touch screen monitor, clarity for monitor, Bluetooth facility. All of the mentioned characteristics affect mobile price. The Iranian customers do not care to the included radio facility, especially the young people.

The lack of significance for some brands such as Sony, Samsung, Qtek, LG and HTC in comparison to the Nokia brand show that the customers do not prefer the mentioned brands in the case of equal facilities, while it could be said that the Motorola brand in comparison to Nokia one has the amount of one fourth more in logarithm price.

Overall the most effective factors on the handset mobile are: touch screen facility, hands free and connectivity respectively, while the less effective factors are: monitor clarification and call numbers memory.

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