A New Way to Assess Brand Equity of Automotive Brands

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Abstract

The concept of brand equity is so appealing nevertheless measuring of it is not as easy as its appeals. Aaker (1996) proposes some ways including price premium for assessing the brand equity. Used car markets may be one of the most appropriate markets to observe price premiums mainly due to the actual conditions of cars may not be examined but brands become the primary determinants of prices of used cars. The main assumption is that if the brand has own an equity, depreciating value of to be used would be less than that of the brand which has a relatively lesser equity. This study aims to assess brand equity in used car market in Turkey by analyzing depreciation differences among specific brands. Findings of the study supports the idea that observing depreciation differences among brands is a useful approach to assess brand equities.

Keywords: Brand Equity, Used Car Market, Automotive Brands

Introduction

Brand is a key factor affecting price of a product in the market by providing clue about product's quality level and creating an attractive image. Thus, it influences the demand for and price of the product. However, it is difficult to assess brand's influence, because other factors, like product attributes, also have effect on demand and price (Sullivan, 1998).

To observe brands' effect on demand and price, one of the suitable markets is the used car market because of two reasons. First, consumers cannot easily determine aspects of quality of cars by observation (Nichols and Fournier, 1999). Also, in used car market there is a problem called "lemon problem" (Akerlof, 1970) which stands for that buyers have less information about quality level of cars which they intended to buy than sellers, and this situation makes it highly possible to them to buy cars in bad

condition (lemons) at higher prices. To avoid this problem, brand is a powerful reference point for the buyer. Secondly, while car manufacturers are oligopolies (Mertens and Ginsburgh, 1985) who adjust market of new cars through supply regulation, and set prices, used car market can be classified as nearly a pure competition market in which neither individual sellers nor buyers are able to considerably affect the price (Betts and Taran, 2004).

With regard to these reasons, in used car market, it can be assumed that buyers are intended to buy cars which have higher brand equity than others, and as a result, prices of those cars are also higher than prices of others. In other words, cars with higher brand equity depreciate less than cars with lesser brand equity (Aaker, 1991: 22). In this study, depreciation differences among specific brands are analyzed to assess brand equity in used car market in Turkey.

Conceptual Framework

Brand equity is a very complex concept that have been studied by many researchers, and do not have an agreed definition, because different researchers have focused on different aspects of brand equity (Christodoulides and De Chernatony, 2010). Despite this differention in perspectives, there is a common idea which defines the brand equity in terms of marketing effects uniquely attributable to the brand (Keller, 1993). On the other hand, there is no consensus in methodologies to measure brand equity. Different researchers focusing on different aspects have developed different methodologies.

To measure brand equity, five general approaches have been proposed: observing price premium that the brand name can support, the impact of the brand name on customer choices, looking at the replacement value of the brand, observing stock price, and earning power of a brand (Aaker, 1991: 22). Observing price premium which is the main focus of our study is an indirect approach of customer based perspective of brand equity (Christodoulides and De Chernatony, 2010).

Price premium is the amount that a customer will pay for the brand in comparison with competing brand or brands offering similar benefits (Aaker, 1996). The suggestions about price premium are that it is more comprehensive than other measures (Baltas and Saridakis, 2010) and is the strongest and most reliable indicator of brand loyalty and may be the best single measure of brand equity (Aaker, 1996). The reason of these suggestions is that price premium originates in consensused definition of brand equity because of quantifying the marketing effects uniquely attributable to the brand (Farquhar, 1989).

Determining price premium can be achieved by asking consumers how much more they would be willing to pay for the brand, using conjoint analysis (Aaker, 1996) or observing price levels in the market (Aaker, 1991: 22). In both new and used car market, price premium can be obtained by using the third approach, observing price levels. Hence, researches analyzing price levels in car market have been made (eg. Arguea, Hsiao and Taylor, 1994; Baltas and Saridakis, 2010; Betts and Taran, 2004; Sullivan, 1998; Ecer, 2013).

In new car market, prices are used as dependent variable (Arguea, Hsiao and Taylor, 1994; Baltas and Saridakis, 2010), however, in used car market, observing price level might be taken a step further to assess brand equity. As Aaker (1991:22) stated, analyzing how much the different brands are depreciating each year may be used instead of prices. Until now, this idea has not been empirically tested.

Methodology

The aim of this study is to analyze depreciation differences among brands to assess brand equity in used car market in Turkey. For this purpose, firstly, sub-brands of 11 parent brands in car market (see Table 1) were sellected judgementally from among B-segment car brands sold in Turkey. One sub-brand for each parent brand were included, except Peugeot. Peugeot had two B-segment sub-brands in 2011, the model year we determined. Sample includes only 2011 model used cars of selected brands.

Table 1: Selected Brands

Parent Brands	Sub-Brands
Citroen	C3
Dacia	Sandero
Fiat	Punto
Ford	Fiesta
Honda	Jazz
Hyundai	i20
Opel	Corsa
Peugeot	206+, 207
Renault	Clio
Toyota	Yaris
Volkswagen	Polo

Data were gathered from sahibinden.com[2] in February 2017, and list prices of brands were obtained via archive.org. Data set includes totally 550 used car classifieds, 50 for each parent brand. The following information

[2] Sahibinden.com is an classifieds website with eight categories: real estate, vehicles, shopping, industrial & heavy equipment, spare parts-accessory-hardware & tuning, services, career, pets & livestock and also one of the largest e-commerce platforms and in Turkey

was obtained from each classifieds; brand, price, mileage, engine capacity, transmission, fuel, and damage history. Table 2 summarizes the car characteristics used.

Table 2: Car characteristics

Variable	Explanation
Brand (B_i)	Dummy, coded as one if car's brand is *i*, zero otherwise
Transmission (T_m)	Dummy, coded as one if transmission is manual, zero otherwise
Transmission (T_a)	Dummy, coded as one if transmission is automatic, zero otherwise
Fuel -petrol (F_p)	Dummy, coded as one if fuel is petrol, zero otherwise
Fuel -LPG (F_{lpg})	Dummy, coded as one if fuel is Liquefied Petroleum Gas, zero otherwise
Fuel -diesel (F_d)	Dummy, coded as one if fuel type is diesel, zero otherwise
Mileage (M)	Measured in kilometer
Engine capacity (E)	Measured in cubic centimeters divided by 1000
Damage history-little damaged (D_l)	Dummy, coded as one if damage history is stated as little or no damaged, zero otherwise
Damage history-moderately damaged (D_m)	Dummy, coded as one if damage history is stated as moderately damaged, zero otherwise
Damage history-heavily damaged (D_h)	Dummy, coded as one if damage history is stated as heavily damaged, zero otherwise
Damage history- no information (D_n)	Dummy, coded as one if damage history is not stated, zero otherwise

Dependent variable of our study is the depreciation rate, ΔV, of which calculation is shown in equation (1) where P is the price of the car, and FV is the present value of car's list price.

$$\Delta V = 100 \times (P - FV)/FV \quad (1)$$

$$FV = P_l(1 + i_m)^{nm} \quad (2)$$

$$i_m = (1 + i_a)^{1/12} - 1 \quad (3)$$

To calculate present value of car's list price, we used equation (2) where P_l is the list price, i_m is the monthly effective interest rate, n is the number of year, and m is the number of months in that year. The calculation was made on monthly base because we were able to get list prices of different months in 2011 for each brand. Therefore, annual interest rate was converted to monthly interest rate by equation (3), and calculation was made year to year. For instance, for a car of which list price of May 2011 was obtained, firstly value at the end of 2011 is calculated, m value is seven. Then, the value at the end of each year is calculated based on the effective interest rates of that year. Lastly, the value at the end of the first two months of 2017 is calculated to reach its present value.

In model, brand, transmission, fuel, and damage history are categorical variables coded as dummy. Base classes in categorical variables are determined by the researcher (Ecer, 2013). Thus, we randomly specified

base classes for each categorical variables; "Dacia" in brands, "automatic" in transmission, "diesel" in fuel, and "little damaged" in damage history. Thus, the model was adjusted as (4);

$$\Delta V = \beta_0 + \beta_1 \sum_{i=1}^{10} B_i + \beta_2 T_m + \beta_3 F_p + \beta_4 F_{lpg} + \beta_5 M + \beta_6 E + \beta_7 D_m + \beta_8 D_h + \beta_9 D_n \quad (4)$$

Results and Discussion

First results are presented in Table 3. As seen, all coefficients, except the coefficient of engine capacity, are significant at 0.05 level. Therefore, we took out the engine capacity variable from our model, and present the results in Table 4.

Table 3: Results of first model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Citroen C3	-11.61341	0.894518	-12.98287	0.0000
Fiat Punto	-8.011331	0.950375	-8.429649	0.0000
Ford Fiesta	-7.855783	0.911224	-8.621132	0.0000
Honda Jazz	-5.892732	0.994283	-5.926614	0.0000
Hyundai i20	-11.17165	0.966906	-11.55402	0.0000
Opel Corsa	-5.198220	1.014789	-5.122461	0.0000
Peugeot 206+/207	-9.099817	0.902475	-10.08318	0.0000
Renault Clio	-11.04044	0.896552	-12.31434	0.0000
Toyota Yaris	-11.78504	1.006220	-11.71219	0.0000
Volkswagen Polo	-5.508090	0.902000	-6.106529	0.0000
Mileage	-7.16E-05	4.75E-06	-15.05981	0.0000
Engine Capacity*	-3.584788	2.315110	-1.548431	0.1221
Manual Transmission	-1.164088	0.546387	-2.130519	0.0336
Petrol	4.059573	0.591168	6.867034	0.0000
LPG	5.183541	0.639775	8.102131	0.0000
Moderately Damaged	-7.007853	0.495258	-14.14991	0.0000
Heavily Damaged	-13.33699	0.924982	-14.41865	0.0000
Damage Not Stated	-2.527444	0.903210	-2.798289	0.0053
C	-14.02889	3.861139	-3.633354	0.0003
R-squared	0.744070	Mean dependent var		-34.77109
Adjusted R-squared	0.735395	S.D. dependent var		8.468477
F-statistic	85.76606			
Prob(F-statistic)	0.000000			

*not significant

Table 4: Results of adjusted model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Citroen C3	-11.34039	0.878119	-12.91440	0.0000
Fiat Punto	-7.470862	0.885119	-8.440521	0.0000
Ford Fiesta	-7.506481	0.884018	-8.491317	0.0000
Honda Jazz	-5.589577	0.976097	-5.726459	0.0000
Hyundai i20	-10.63190	0.903071	-11.77305	0.0000
Opel Corsa	-4.516669	0.915564	-4.933211	0.0000
Peugeot 206+/207	-8.815455	0.884753	-9.963752	0.0000
Renault Clio	-10.80091	0.884264	-12.21457	0.0000
Toyota Yaris	-11.17460	0.926989	-12.05472	0.0000
Volkswagen Polo	-5.310543	0.894104	-5.939512	0.0000
Mileage	-7.09E-05	4.74E-06	-14.96122	0.0000
Manual Transmission *	-0.869920	0.512968	-1.695855	0.0905
Petrol	4.381289	0.554181	7.905877	0.0000
LPG	5.393030	0.626127	8.613312	0.0000
Moderately Damaged	-6.978608	0.495547	-14.08263	0.0000
Heavily Damaged	-13.25228	0.924575	-14.33337	0.0000
Damage Not Stated	-2.591013	0.903461	-2.867874	0.0043
C	-19.80404	1.000258	-19.79894	0.0000
R-squared	0.742915	Mean dependent var		-34.77109
Adjusted R-squared	0.734700	S.D. dependent var		8.468477
F-statistic	90.43251			
Prob(F-statistic)	0.000000			

*significant at 0.1 level

Our model has an adjusted R-squared of 0.7347 which states that the model is good enough to fit the data. All coefficients, except the coefficient of manual transmission, are significant at 0.01 level. Coefficient of manual transmission is also significant at 0.1 level, and thus we did not remove it from model.

The price premium measure is defined with respect to a competitor or set of competitors (Aaker, 1996), therefore coefficients of variables must be interpreted by comparing to the base class of their information type. For example, coefficient of Citroen C3 indicates that a Citroen C3 depreciates nearly 11 percent more than Dacia Sandero-the base class of brands. Also, coefficients of other brands can be compared with each other by just a simple subtraction. For instance, it can be said that Ford Fiesta depreciates nearly 2 percent more than Honda Jazz. Coefficients of brands is sorted largest to smallest in Table 5.

Table 5: Coefficient of brands

Brand	Coefficient
Dacia Sandero	-
Opel Corsa	-4.51667
Volkswagen Polo	-5.31054
Honda Jazz	-5.58958
Fiat Punto	-7.47086
Ford Fiesta	-7.50648
Peugeot 206+/207	-8.81546
Hyundai i20	-10.6319
Renault Clio	-10.8009
Toyota Yaris	-11.1746
Citroen C3	-11.3404

As well as brands' coefficients, coefficients of other variables also can be interpreted as their effect on depreciation rate. It can be said that cars with manual transmission depreciates more than cars with automatic transmission. Considering fuel types, coefficients indicate that diesel fuel affects depreciation more than both petrol and LPG. Also we can say that, a car loses value by nearly 7 percent every 100,000 km.

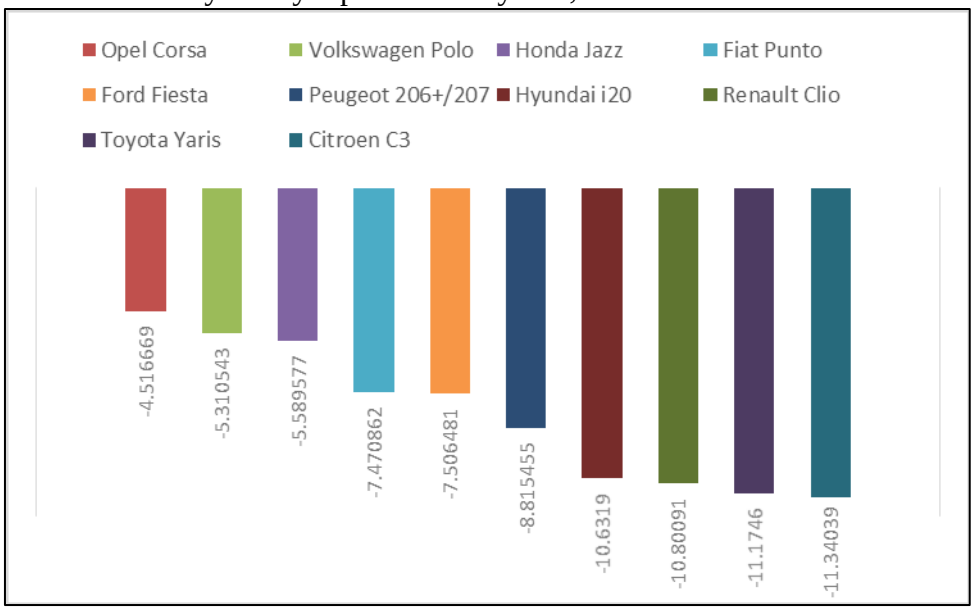

Figure 1: Brands' effect on depreciation rate

Conclusion

This paper aims to analyze the effect of brand on depreciation of cars. We intended to assess brand equity in used car market by observing depreciation differences of brands. This idea is proposed by Aaker (1991:22)

as a kind of price premium approach, but it has not been emprically tested before.

In our model, the base class is Dacia Sandero and its brand effect on depreciation is accepted zero for comparing with other brands. Among all brands in our sample, Sandero has most powerful brand that affect the depreciation. The results shows that 2011 model Sandero depreciates nearly 4.5 percent less than Corsa, the second most powerful brand. Also, comparison between any two of these brands can be made by comparing their coefficient values. According to the results, visualized in Figure 1, it can be stated that the brand has an effect on depreciation of cars. In other words, change in value of different car brands are not the same.

This study is the initial step to analyze the proposition of Aaker (1991:22). Therefore, this approach needs to be tested more. We suggest analyzing brands in different segments, such as C or luxury, in different markets, and in different model years for further research.

References:

Aaker, D. A. (1996). Measuring Brand Equity Across Products and Markets. *California management review*, 38(3), 102-120.

Aaker, David A. (1991). *Managing Brand Equity*. New York: The Free Press.

Akerlof, G. A. (1970). The Market for "Lemons": Quality Uncertainty and the Market Mechanism. *The Quarterly Journal Of Economics*, 84(3), s. 488-500.

Arguea, N. M., Hsiao, C., & Taylor, G. A. (1994). Estimating Consumer Preferences Using Market Data—An Application to US Automobile Demand. *Journal of Applied Econometrics*, 9(1), 1-18.

Baltas, G., & Saridakis, C. (2010). Measuring Brand Equity in the Car Market: A Hedonic Price Analysis. *Journal of the Operational Research Society*, 61(2), 284-293.

Betts, S. C., & Taran, Z. (2004) The 'Brand Halo' Effect on Durable Goods Prices: Brand Reliability and the Used Car Market", *Academy of Marketing Studies Journal*, 8(1), s. 1-7.

Christodoulides, G., & De Chernatony, L. (2010). Consumer-Based Brand Equity Conceptualization and Measurement: A literature review. *International Journal of Research in Marketing*, 52(1), 43-66.

Ecer F. (2013). Türkiye'de 2. El Otomobil Fiyatlarının Tahmini ve Fiyat Belirleyicilerinin Tespiti, *Anadolu Üniversitesi Sosyal Bilimler Dergisi*, 13 (4), s. 101-112.

Farquhar, P. H. (1989). Managing brand equity. *Marketing Research*, 1(3), 24-33.

Keller, K. L. (1993). Conceptualizing, Measuring, and Managing

Customerbased Brand Equity. *Journal of Marketing*, 57(1), s. 1-22.
Mertens, Y. & Ginsburgh V. (1985). Product Differentiation and Price Discrimination in the European Community: The Case of Automobiles, *Journal of Industrial Economics*, 34(2), s. 151-166.
Nichols, M. W. & Fournier G. M. (1999). Recovering From A Bad Reputation: Changing Beliefs About Quality of US Autos, *International Journal of Industrial Organization*, 17, s. 299-318.
Sullivan M. W. (1998). How Brand Names Affect the Demand for Twin Automobiles, *Journal of Marketing Research*, 35 (2), s. 154-165.