THE EFFECTS OF BRAND VALUE AND SALE VOLUME ON STOCK PRICE PERFORMANCE: AN ECONOMETRIC INVESTIGATION ON AUTOMOTIVE, AIRLINES AND TELECOMMUNICATION SECTOR

Mustafa ÖZYEŞİL*

Abstract

In this study, the effects of brand value and total sale volume on the stock price performance of 8 publicly traded companies (listed companies) operating in Telecommunications, Airlines and Automotive sectors during 2012 - 2018 period were examined. In the study, the existence of cross-sectional dependence among the firms was analyzed through the CDLMadj test developed by Pesaran et al. (2008). According to the results of the analysis, it is determined that there is a cross-sectional dependence among these firms included in the sample. The stationarity of the series used in the analyzes was tested with the CADF method developed by Pesaran (2007) and it was determined that the series are not stationary in other words they were I (1). The homogeneity of slope coefficients used in the econometric model was examined by Delta test developed by Pesaran and Yamagata (2008) and it was decided that slope coefficients were homogeneous. Existence of the cointegration relationship between the series was tested by DH method developed by Westerlund (2008) and based on findings of this test it was observed that the series are cointegrated. The coefficients in the econometric model were obtained by Breitung (2005) two-stage estimator. According to the results of the analysis, it was found that the brand value of the 8 firms included in the sample did not have a statistically significant effect on stock returns for the 2012-2018 period. However, it was found that annual sales revenues of these firms had a positive and statistically significant effect on stock returns.

Keywords: Brand Value, Stok Price Performance, Panel Data Analysis

Jel Codes: E44, G14.
1. Introduction

The brand creates a unique identity for the company and for its product and enables the company to differ from other companies in the industry. The brand is one of the most important factors affecting the demand for firm’s products. For sustainable growth, the company’s products need to have a solid brand power.

Brand value refers to the value of all financial and non-financial assets of a firm in the eyes of investors. Brand value goes beyond simple firm valuation and includes valuation of even non-quantitative elements.

It may be misleading to accept the brand value and market value as the same concepts. Market value is the financial value calculated by multiplying the firm’s number of circulating stocks by the current stock price. Depending on the volatility in stock prices, market value of firms may change significantly in the short term. However, brand value is both quantitative and qualitative value showing what a firm’s complete business model means primarily to investors and all stakeholders. When we want to sell a firm, we do not determine the sales price based on only simple firm valuation techniques. In general, when determining the final sales price of a firm, we ascertain a price (excluding the bargain price) above the price level calculated through the firm valuation process. This additional price is a result of the firm’s added value, in other words, the brand value.

In this study, the relationship between the brand value and the stock price performance of 8 companies whose shares are traded on Borsa Istanbul in the Automotive, Airlines and Telecommunication sectors is examined. Panel data analysis method was used in the study. Firstly, the cross-sectional dependency test was performed among the firms in the sample and then the panel unit root test which took into account the cross-sectional dependence. As a result of the unit root test, the series was found to be stationary in the first differences and therefore panel co-integration test was performed and it was determined that the series were co-integrated. In the last stage of the study, panel regression analysis was performed.

According to the results of the study, a statistically significant relationship was not found between the brand value and stock price performances of the firms, while a positive and statistically significant relationship was observed between the sales volume and stock prices.

2. Literature Review

Arıkuşu (2017), examined the relationship between brand value and financial value and sale volume of 7 firms that are operating in Turkish automotive industry during 2014 - 2016 through the Granger causality test. According to the results of the analysis, the causality relationship between brand value and stock prices couldn’t be determined. However, it is determined that there is a mutual causality relationship between the brand value and the market value of the firms.

Alper and Aydoğan (2017) investigated the effects of brand value on firm performance. In this study, data of 17 companies that are traded in Borsa Istanbul and operate in Metal Goods Machinery and Equipment Construction Sector for the 2009-2016 period were used and the analysis was performed by the System GMM method. As a result of the study, it is determined that there is a positive and statistically significant relationship between brand value and financial performance of firms. In this study, it was also determined that the brand values of the firms were lowest in 2009 and the highest in 2016. Based on this finding, the authors suggest that firms reduce their brand value investments in the financial crisis period. Narteh (2018) analyzed the relationship between brand value and financial performance with the AMOS method using the June 2015 data of 28 Ghanaian retail banks. As a result of the study, it is determined that there is a positive relationship between the brand values and financial performance of these banks.
3. Data and Sample Construction

In this study, the effects of brand value (BV, TL) and Total Sales (SR, Million TL) of publicly held firms that traded on Borsa Istanbul on the stock price performance (SP, TL) were analyzed by using data of 2012-2018 period. There are 8 companies from 3 sectors in the sample. Four companies operating in the automotive sector (OTOKAR, TODAŞ Oto, Ford Otomotiv and Türk Traktör), 2 airlines (Turkish Airlines and Pegasus) and 2 telecommunications companies (Turkcell and Türk Telekom) were included in the sample.

Data for the brand value variable were obtained from BrandFinance Corp.’s annually research report called top 100 Turkish brands. Sale volume data are obtained from the audited financial statements of the companies published on the Public Disclosure Platform (www.kap.gov.tr). The closing prices of stocks were taken from Borsa Istanbul. Since brand value data is in USD currency but other variables are in TL, we need to translate brand value numbers from USD to TL. We converted USD to TL by taking into account the average of selling and purchasing prices obtained from Central Bank of the Republic of Turkey Electronic Data Dissemination System (EDDS, 2019). Year-end closing prices of stocks are taken into consideration in the calculation of price performance of stocks. Natural logarithms of all series were taken and thus, the heteroscedasticity problem that may occur as a result of the analysis was tried to be prevented.

3.1 Descriptive Statistics

Descriptive statistics of the data set are given in Table 1.

<table>
<thead>
<tr>
<th></th>
<th>LnSP</th>
<th>LnBV</th>
<th>LnSR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Average</strong></td>
<td>2.939515</td>
<td>7.084031</td>
<td>8.982208</td>
</tr>
<tr>
<td><strong>Median</strong></td>
<td>2.813336</td>
<td>7.418169</td>
<td>9.34193</td>
</tr>
<tr>
<td><strong>Maximum</strong></td>
<td>4.820274</td>
<td>9.193999</td>
<td>11.04855</td>
</tr>
<tr>
<td><strong>Minimum</strong></td>
<td>1.360977</td>
<td>4.848698</td>
<td>6.912237</td>
</tr>
<tr>
<td><strong>Standard Deviation</strong></td>
<td>0.931219</td>
<td>1.453472</td>
<td>1.034283</td>
</tr>
<tr>
<td><strong>Skewness</strong></td>
<td>0.186929</td>
<td>-0.19682</td>
<td>-0.34683</td>
</tr>
<tr>
<td><strong>Kurtosis</strong></td>
<td>1.974514</td>
<td>1.62227</td>
<td>2.047839</td>
</tr>
<tr>
<td><strong>Jarque-Bera</strong></td>
<td>2.779915</td>
<td>4.790562</td>
<td>3.238156</td>
</tr>
<tr>
<td><strong>Probability Value</strong></td>
<td>0.249086</td>
<td>0.091147</td>
<td>0.198081</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>164.6128</td>
<td>396.7057</td>
<td>503.0036</td>
</tr>
<tr>
<td><strong>Sum of Squares of Deviations</strong></td>
<td>47.69427</td>
<td>116.1919</td>
<td>58.83574</td>
</tr>
<tr>
<td><strong>Number of Observations</strong></td>
<td>56</td>
<td>56</td>
<td>56</td>
</tr>
</tbody>
</table>

When the data in Table 1 is examined, it is seen that there are no important differences between the highest and lowest values, in other words, the series fluctuate around their averages and their standard deviations are small. This situation will reduce the possibility of encountering heteroscedasticity problems as a result of the analyzes.

* Assistant Professor Dr. at İstanbul Aydın University, AMBYO, Business Management Dept.
3.2 Correlation Matrix

Correlation is a measure of the tendency of the two series to move together and the correlation coefficient has values ranging from [-1, +1]. When the correlation coefficient approach to +1 or -1 this indicates that the relationship between the variables is strong while it refers to a weak relationship when correlation coefficient approach to 0. The sign of the correlation coefficient shows the direction of the relationship between the variables. When coefficients become positive it represents that the variables tend to move in the same direction but when they get negative it means the variables tend to move in the opposite direction (Büyüköztürk, 2002: 472-473).

The correlation matrix between the series used in this study is presented in Table 2

<table>
<thead>
<tr>
<th></th>
<th>LnSP</th>
<th>LnBV</th>
<th>LnSR</th>
</tr>
</thead>
<tbody>
<tr>
<td>LnSP</td>
<td>1</td>
<td>0.6183</td>
<td>0.66109</td>
</tr>
<tr>
<td>LnBV</td>
<td>0.6183</td>
<td>1</td>
<td>0.817229</td>
</tr>
<tr>
<td>LnSR</td>
<td>0.66109</td>
<td>0.817229</td>
<td>1</td>
</tr>
</tbody>
</table>

According to the results in Table 2, there are positive and relatively strong relationships between stock prices and brand value and sales revenues. The relationship between brand value and sales revenues appears to be stronger (≈0.81), suggesting that consumers prefer more reputable brands in their purchasing preferences.

Based on this finding, it can be stated that allocating more budget to the advertising expenditures of the companies will increase their sales revenue by contributing their awareness and brand values.

4. Econometric Model and Analysis Methods

In this study, the relationship between brand value and stock price performance has been analyzed with the help of Equation (1) by following Alper and Aydoğan (2017) and Arıkuşu (2017) studies. Sales revenue (SR) data is also included in the model as a control variable.

\[
\text{LnSP}_i = \alpha_0 + \alpha_1 \text{LnBV}_i + \alpha_2 \text{LnSR}_i + E_{it} \tag{1}
\]

The meanings of the notations in the equation are shown below:

- \( \text{LnSP}_i \): is the natural logarithm of the stock price of firm \( i \) at time \( t \).
- \( \text{LnBV}_i \): is the natural logarithm of the brand value of firm \( i \) at time \( t \).
- \( \text{LnSR}_i \): refers to the natural logarithm of sales revenue of \( i \) at time \( t \).
- \( E_{it} \): represents a series of error terms that are free from econometric problems.

As a result of the analyzes, it is predicted that increases in brand value and sales revenues will increase the stock prices of firms. Therefore \( \alpha_1 > 0 \) and \( \alpha_2 > 0 \) results are expected.
In this study, the existence of cross-sectional dependence among the firms that make up the panel was evaluated by Pesaran et al. (2008) by the adjusted CDLM (CDLMadj) test. Stability of the series was tested by CADF method developed by Pesaran (2007). Whether the slope coefficients ($\alpha_{1i}$ ve $\alpha_{2i}$) in the established econometric model (Equation (1)) is homogeneous throughout the panel was examined by Delta ($\Delta$) test developed by Pesaran and Yamagata (2008). The existence of cointegration relationship between the series was tested by Durbin-Hausman (DH) method developed by Westerlund (2008). The parameters (coefficients) in the econometric model were obtained by Breitung (2005) two-step estimator (TSE).

4.1 Cross-Sectional Dependency Test

Since the firms are located in Turkey, operate in the same sector and all are listed firms, an internal or external shock that may occur in one of these firms is likely to affect other firms. In econometric literature, this interaction is named as Cross-Sectional Dependency. In the panel data analysis first, the existence of this effect should be investigated. If a cross-sectional dependency can be detected between the companies as a result of the test, 2nd Generation Panel Data Analysis methods that take into consideration this issue should be used.

In this study, the presence of cross-sectional dependence among firms was evaluated through the adjusted (CDLMadj) test developed by Pesaran et al. (2008).

The test statistic used in this test:

$$LM_{BC} = \left( \frac{2}{N(N-1)} \right) \sum_{t=1}^{T} \sum_{j=1}^{N} \frac{(T-K-1)\mu_{ij} - \mu_{ij}^2}{\nu_{ij}} - N(0,1)$$

Here,

$\mu_{ij}$ represents the average.

$\nu_{ij}$ indicates the variance.

The test statistic to be obtained here shows the standard normal distribution feature (Pesaran et al. 2008).

The hypotheses of this test are:

$H_0$: Cov ($\varepsilon_{it}, \varepsilon_{it}$) = 0 There is no cross-sectional dependence in the panel.

$H_1$: Cov ($\varepsilon_{it}, \varepsilon_{it}$) ≠ 0 There is cross-sectional dependence in the panel.

In this study, CDLMadj cross-sectional dependence test was performed by using Gauss 10 econometric analysis program and its related codes written by Pesaran et al. (2008). Results obtained are presented in Table 3.

<table>
<thead>
<tr>
<th>Table 3: Cross-Sectional Dependency Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDLMadj Test Statistic</td>
</tr>
<tr>
<td>-------------------------</td>
</tr>
<tr>
<td>LnSP</td>
</tr>
<tr>
<td>LnBV</td>
</tr>
<tr>
<td>LnSR</td>
</tr>
<tr>
<td>Model</td>
</tr>
</tbody>
</table>

Note: ***, ** and * indicate the presence of cross-sectional dependence among firms at a significance level of 1%, 5% and 10% respectively.

The model refers to the model in Equation (1).
According to the findings in Table 3, there is a cross-sectional dependence among the firms included in this analysis. In other words, an important economic shock in one of these firms affects the others. For this reason, it is necessary to use 2nd Generation Panel Data Analysis methods which take into account the horizontal cross-section dependency in the next stages of the study.

**Panel Unit Root Test**

### 4.2 Stationarity degrees of the series are very important in panel data analysis.

In this study, since the cross-sectional dependence was determined among the companies forming the panel, the stationarity of the series was tested with CADF method developed by Pesaran (2007), which is one of the 2nd Generation panel unit root tests. This test can take into account the horizontal interdependence and common factors between countries. Pesaran (2007: 268) used the following model to test the stability of a $y_{it}$ series with the CADF test:

$$\Delta y_{it} = \alpha_i + \beta_i y_{i,t-1} + \gamma_i f_t + \varepsilon_{it} \quad (3)$$

In this test, the cross-sectional dependence is included in the analysis based on the common factors $f_t$ forming the series.

**Hypothesis of the test:**

$H_0$: $\beta_i=0$   The Series is not stationary.

$H_1$: $\beta_i<0$   The Series is stationary.

Pesaran (2007) used the arithmetic mean of individual test statistics in order to obtain the test statistics (CIPS) of the panel.

The formula used for this purpose is:

$$CIPS = N^{-1} \sum_{i=1}^{N} CADF_i$$

In this study, the CADF panel unit root test was performed by Gauss 10 econometric analysis program V

<table>
<thead>
<tr>
<th></th>
<th>Original Level Values</th>
<th>First Differences</th>
<th>Critical Values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%1</td>
<td>%5</td>
<td>%10</td>
</tr>
<tr>
<td>LnSP</td>
<td>15.60</td>
<td>-8.85***</td>
<td>-3.88 -3.27 -298</td>
</tr>
<tr>
<td>LnBV</td>
<td>-1.74</td>
<td>-5.41***</td>
<td></td>
</tr>
<tr>
<td>LnSR</td>
<td>-2.43</td>
<td>-3.71**</td>
<td></td>
</tr>
</tbody>
</table>

Note: *** indicates that the series is stationary at 1% significance level. Critical Values are obtained from Pesaran (2006: 281).

As can be seen from Table 4, no series is stationary at their original level value. However, all series become stable when the first differences are taken. Therefore, it was decided that all series are I (1).
4.3 Homogeneity Test

Whether the slope coefficients $\alpha_{1i}$ and $\alpha_{2i}$ in the econometric model (Equation (1)) is homogeneous throughout the panel can be examined by Delta ($\Delta$) test developed by Pesaran and Yamagata (2008). Pesaran and Yamagata (2008) developed two different test statistics here:

\[
\Delta = \sqrt{N} \left( \frac{N^{-1}S - k}{2k} \right)
\]

(5)

\[
\Delta_{adj} = \sqrt{N} \left( \frac{N^{-1}S - k}{v(T, k)} \right)
\]

(6)

$\Delta$, test in large samples and $\Delta_{adj}$ test in relatively small ones can produce more efficient results (Pesaran and Yamagata, 2008: 72-73).

Hypotheses of this test:

$H_0$: $\beta = \beta$ The slope coefficients are homogeneous.

$H_1$: $\beta \neq \beta$ The slope coefficients are not homogeneous.

Delta ($\Delta$) tests developed by Pesaran and Yamagata (2008) are conducted and the results are shown in Table 5.

<table>
<thead>
<tr>
<th></th>
<th>Test Statistic</th>
<th>Probability Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\Delta$</td>
<td>1.214</td>
<td>0.112</td>
</tr>
<tr>
<td>$\Delta_{adj}$</td>
<td>1.717**</td>
<td>0.043</td>
</tr>
</tbody>
</table>

Note: * and ** indicate that the slope coefficients are homogeneous at 10% and 5% significance levels, respectively.

According to the results in Table 5, the slope coefficients according to $\Delta$ test are not homogeneous, but homogeneous according to $\Delta_{adj}$ test. Since $\Delta_{adj}$ test is more effective in small samples, the result of this test is used. Accordingly, the slope coefficients to be estimated in this study are homogeneous. In this case, comments for the overall panel will be valid.

* Assistant Professor Dr. at İstanbul Aydın University, AMBYO, Business Management Dept.
4.4 Panel Cointegration Test

In this study, since the series do not appear to be stationary in the original level values, a spurious regression situation may be encountered in the regression analyzes to be performed with the level values of the series. To avoid this situation, according to Engle and Granger (1987); firstly, the existence of the cointegration relationship between the series should be tested. When the series are cointegrated, a spurious regression problem will not be encountered.

In this study, the existence of cointegration relationship between the series was tested with Durbin-Hausman (DH) method developed by Westerlund (2008). This method can take into account the horizontal cross-sectional dependence among the companies forming the panel over common factors. In the DH method, the existence of the cointegration relationship between Y and X series the following equations are used:

\[ Y_{it} = \alpha_t + \beta_t X_{it} + z_{it} \quad (7) \]
\[ X_{it} = \delta_i X_{it-1} + w_{it} \quad (8) \]
\[ z_{it} = \lambda_i F_t + e_{it} \quad (9) \]

Here \( F_t \) represents the common factors.

\[ F_{jt} = \rho_j F_{jt-1} + u_{jt} \quad (10) \]
\[ e_{it} = \phi_t e_{it-1} + v_{it} \quad (11) \]

Westerlund (2008) developed two different test statistics in the form of group (DHg) and panel (DHp). Hypothesis of DH test:

\( H_0: \phi_i=1 \) Series is not cointegrated
\( H_1: \phi_i<1 \) Series is cointegrated

The critical values required to test these hypotheses are obtained by Bootstrap cycles. In this study, DH panel cointegration test was performed by Gauss 10 econometric analysis program and codes written by Westerlund (2008) in this programming language and the results were presented in Table 6.

<table>
<thead>
<tr>
<th>Test Statistic</th>
<th>Probability Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHg</td>
<td>12.935***</td>
</tr>
<tr>
<td></td>
<td>0.000</td>
</tr>
<tr>
<td>DHp</td>
<td>8.145***</td>
</tr>
<tr>
<td></td>
<td>0.000</td>
</tr>
</tbody>
</table>

Note: *** indicates that there is a cointegration relationship between the series at 1% significance level.

According to the results shown in Table 6, there is a cointegration relationship at the level of 1% significance (99% reliability) between the series in Equation (1). In this case, these series act together in the long run and are interacting with each other. Therefore, the spurious regression problem will not be encountered in the regression analyses to be performed with the level values of these series.
4.5 Panel Regression Analysis

In this study, the parameters (coefficients) in Equation (1) were obtained by Breitung (2005) two-step estimator (TSE). This method takes into account the cross-sectional dependence between the firms forming the panel. In the first step, the coefficients of each firm were obtained by Maximum Likelihood method. In the second stage, the Pooled OLS method is used to calculate the results of the overall panel. In this study, TSE panel regression results were produced by Gauss 10 econometric analysis program and codes written by Breitung (2005) in this programming language and the results were presented in Table 7.

<table>
<thead>
<tr>
<th></th>
<th>Test Statistic</th>
<th>t Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>LnBV</td>
<td>-0.063</td>
<td>-0.550</td>
</tr>
<tr>
<td>LnSR</td>
<td>0.855***</td>
<td>6.198</td>
</tr>
</tbody>
</table>

Note: *** Indicates that the relevant coefficient is statistically reliable at 1% significance level.

According to the results presented in Table 7, the brand values of the 8 Turkish firms included in the analysis have no statistically significant effect on stock returns during the 2012-2018 period. This result is consistent with the results of Arıkuşu (2017) study in the literature. On the other hand, it was found out that annual sales revenues (sale volume) of these firms have a positive and statistically significant effect on stock returns. According to the results of the analysis, it was observed that when the sales revenues of the firms included in the sample increased by 1%, the returns of stocks increased by 0.855% on average.

5. CONCLUSION

In this study, the relationship between firms’ brand value and total sales and stock price performance is analyzed by using 2012-2018 data. A total of 8 companies were included in the study, including 4 companies operating in the automotive sector, 2 companies operating in the airlines and 2 companies operating in the telecommunications sector.

In the study, the existence of cross-sectional dependency among the companies forming the panel was tested through adjusted CDLMadj test developed by Pesaran et al. (2008). According to the test results, cross-sectional dependence was found among the 8 firms included in the sample. Stationarity of the series used in the analyzes was tested with the CADF method developed by Pesaran (2007) and it was determined that all series were not stationary at their original level values but they become stationary after taking the first difference. The homogeneity of slope coefficients in the established econometric model was examined by Delta (Δ) test developed by Pesaran and Yamagata (2008) and it was decided that slope coefficients were homogeneous. The existence of cointegration relationship between the series was tested with Durbin-Hausman (DH) method developed by Westerlund (2008) and it was found that the series were cointegrated. The coefficients in the econometric model were obtained by Breitung (2005) two-stage estimator. According to the test results, it was found that the brand values of 8 Turkish firms included in the analysis did not have a statistically significant effect on stock returns in the 2012-2018 period, but the annual sales revenues of these firms had a positive and statistically significant effect on stock returns. It was observed that when the sale volume of the sampling firms increased by %1, stock returns also increased % 0.855 on average.
Based on the findings obtained from this study, it is considered that it may be beneficial for companies to focus on studies that emphasize brand values (advertisements, etc.) in order to increase the price and return of their stocks. On the other hand, based on the finding that the increase in sales revenues of the firms has a significant effect on stock returns, it can be said that sharing of financial statement information with the public in a transparency approach will affect stock returns positively. However, in order to achieve this goal, firms should be prevented from creating misleading financial statements by some earning management practices in order to convince investors. In this regard, the regulations of the authorized and regulatory institutions such as the Capital Markets Board (CMB) has vital importance on this issue. Failing in auditing of corporate governance practices and transparency practices of firms may cause a depressive financial crisis.
REFERENCES


* Assistant Professor Dr. at İstanbul Aydın University, AMBYO, Business Management Dept.