

Financial Performance Determinants of Paper and Paper Products Firms Listed in Borsa Istanbul

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Received: March 12, 2015

Accepted: March 22, 2015

Online Published: March 25, 2015

doi:10.5539/ijef.v7n4p233

URL: <http://dx.doi.org/10.5539/ijef.v7n4p233>

Abstract

The aim of this study is to reveal the major determinants which have impact on financial performance of paper and paper products firms listed in Borsa Istanbul. We examined the impact of the firm specific, industry specific and macroeconomic factors on Return on Assets (ROA) and Return on Equity (ROE) in paper and paper products firms listed in Borsa Istanbul during the period from 2011/01 to 2014/09 by using panel regression. The results show that except for Sales to Asset Ratio, firm specific and industry specific factors have statistically significant and material impact on both financial performance indicators. As macroeconomic factor, the impact of foreign trade deficit on the performance indicators is relatively weak. Through macroeconomic variables, commercial loan interest rate has no statistical significance for both ROA and ROE. The empirical result suggests that the impact of the variables on ROE is stronger compared to ROA.

Keywords: paper, paper products industry, ratio analysis, panel data

1. Introduction

Paper-making was first invented in China in 105 BC and after a while the know-how was carried to Africa and Europe respectively. Today, per-capita paper/cardboard consumption is one of the developmental indicators of a country. The world's average per-capita consumption for paper and cardboard is 48.5kg. While this average is over 200kg in Finland, Belgium, Denmark, the Netherlands and Germany; for Greece it is 62kg and for Turkey it is 32kg (Özarlan et al., 2011). According to these figures, the paper and cardboard consumption per capita in Turkey is lower than the world's average. However, the population growth rate of Turkey is higher than that of other European countries, and thus increasing per capita consumption of Turkey creates a high potential for the paper industry and makes it attractive for foreign capital and high-technology transfer (Zaimoğlu, 2012).

Firms' performance must be measured by using comparable, objective and reliable information for their survival and sustainability. The accuracy of managerial decisions in firms is assessed by performance analysis and according to results of analysis, necessary corrective actions are taken and thus sustainability is ensured. Business decision-making and policy formulation mostly depend on productive, financial and economic indicators (Ray, 2011). Disclosure of financial statements on a periodic and systematic basis and accessibility of financial data makes financial information crucial in performance measurement. Meanwhile financial ratios are useful in predicting firm failure and that failed firms are less profitable, more liquidity constrained and higher in debt leverage (Ho et al., 2013). In this context, amongst financial analysis techniques, the financial ratio analysis is frequently used to determine the financial situation of firms. As uniform financial statements are disclosed by firms, the financial data extracted from these statements will also be uniform and this will provide comparability between firms.

This study is one of very few studies which investigate the relationship between the financial ratios generated from financial statements of the publicly traded paper and paper product companies. Although there are various studies on measurement of financial performance by using financial information, there are a limited number of studies examining the financial aspect of the paper industry in particular. The empirical findings verify a statistically significant relationship between independent variables (firm specific, industry specific and macroeconomic factors) and profitability ratios.

In the next section a macroeconomic view of the global and domestic paper industry is interpreted. The literature examining the impact of financial ratios on profitability is summarized in Section 3. In section 4, detailed information about the data and methods is given. The empirical results are presented in Section 5, followed by a concluding section.

2. Major Financial Indicators of the Domestic and Global Paper Industry

Despite the fact that the history of the paper industry in Turkey is quite old, the development of the industry began in 1934 with the establishment of the Turkish Pulp and Paper Company (SEKA) as a public sector investment. The industry was closed to foreign competition till Turkey’s entry into the Customs Union in 1996 (Şengül, 2010). In 2006, Turkey with more than 50 factories produced 2.4 million tons of paper against 3.9 million tons of paper consumption. As of 2010 year end, among 219 countries exporting paper and cardboard, Turkey was ranked 27th. As being the 15th largest importer out of 229 countries, Turkey’s share of global paper and cardboard imports was 1.6% (Zaimoğlu, 2012). When geographical concentration of the paper and cardboard production industry in Turkey is analyzed, it is observed that about 50% of paper and board production capacity is in the Marmara Region.

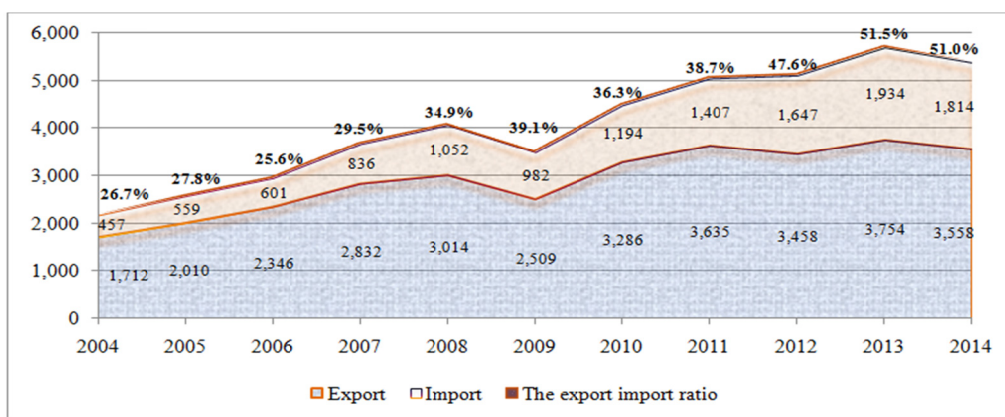


Figure 1. Foreign trade statistics of paper industry in Turkey (www.tuik.gov.tr)

In Turkey consumption of paper and paper products has been growing steadily. Between 1998 and 2008, Turkey’s per capita paper and board consumption grew by an average of 6.9%. In 2009, foreign trade volume declined with the influence of the 2008 Global Financial Crisis but as imports decreased more than exports, the export import ratio remained high compared to 2008. In recent years, the interest of foreign capital in the industry has increased and acquisitions have taken place especially in publicly traded companies such as Mondi Tire Kutsan, and Olmuksan International Paper. Rising foreign capital inflow has helped the producing power of the industry and contributed to the increase of exports positively. Thus the export import ratio of the industry has increased steadily over time and reached 51% as of 2014 year-end.

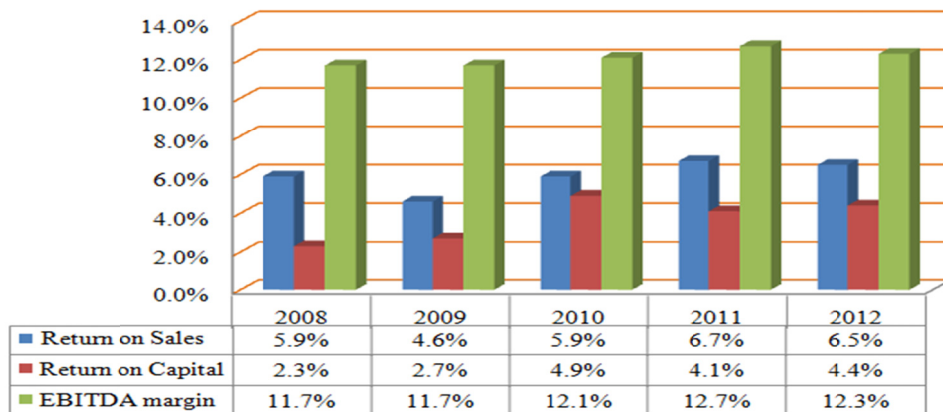


Figure 2. Financial ratios of top 100 forest, paper and packing (FFP) companies

In paper products, the top importing countries are the developed countries such as United States, Germany, France, the UK and Italy. When we examine the Global Paper Industry for the period from 2008 to 2012, considering sales and operating profits, the top 100 Forest, Paper and Packing (FFP) companies were determined whose sales revenue accounted for more than 50% of global sales revenue (Pricewaterhouse Coopers LLP, 2013).

The consolidated return on sales, return on capital ratios and EBITDA margin regarding these companies are displayed in Figure 1. By the impact of the Global Financial Crisis which broke out in late 2008, 2009 Global Sales Revenue of the industry declined sharply. In line with the downswing of sales revenue in 2009, return on sales ratio also decreased. The sales revenue of the top 100 FFP countries was \$358 billion by the end of 2008 and the sales revenue of these companies decreased by 15% and became 311 \$billion by the end of 2009. With the recovery of economies, in 2011 the sales revenue was able to reach \$354billion.

Table 1. Sales revenue and net Income of top 100 FFP companies

Region/Country	Sales (Billion \$)			Net Income (Billion \$)		
	2011	2012	Change	2011	2012	Change
United States	98.5	106	7.6%	4.2	5.8	1.60
Europe	114.7	105.8	-7.8%	4.3	1.1	(3.20)
Japan	57.4	60	4.5%	0.8	0.5	(0.30)
Emerging Asia	33	33.1	0.3%	1	1.1	0.10
Canada	26.3	26.1	-0.8%	-0.3	0.9	1.20
Latin America	24	23.3	-2.9%	0.8	0.9	0.10
TOTAL	353.9	354.3	1.0%	10.8	10.3	(0.50)

Source: Pricewaterhouse Coopers LLP, 2013.

Top 100 FFP total sales of \$354 billion remained almost the same in 2012 compared to 2011. Sales of European countries were reduced by 8% due to volatility in the FX market; however US sales rose by 8% as the US real estate market began to recover. Sales of Japanese companies increased by 4.5% in 2012 after the booming period in the Far East starting from the tsunami in March 2011. Emerging Asia consists of South Africa and Australia. In South Africa, the devaluation of the rand by 12% against the US dollar reduced sales. The slowdown in the Chinese economy affected the other Asian companies negatively so the growth rate of these in 2012 is consistent with that of 2011. The emerging market share within the top 100 FFP companies is about 10% for 2011 and 2012. Sales of Canadian companies dropped slightly (-0.8%) in 2012. Latin America posted a decrease in sales of 3.0% in 2012. Consequently, the performance of the industry reflected in a large measure the difficulties of doing business in the relatively volatile economic environment.

3. Literature Review

When the recent literature on determination of factors affecting profitability in corporate companies is examined, it is observed that the factors influencing profitability are mainly classified into three groups: firm specific, industry specific and macroeconomic.

Liargovas and Skandalis (2008) examined the impact of key determinants of firms' performance during the period of 1997-2008 by using panel least squares regression method. In the research study, return on sales or profit margin, return on assets and return on equity were used as dependent variables in order to evaluate firm performance of Greek industrial firms. The empirical results showed that leverage, export activity, location, size and effective management significantly affected firm performance in Greece.

By employing panel data of 238 listed companies in the Jakarta Stock Exchange (JSX) in the period 1994-2004 as the sample, Prasetyantoko and Parmono (2008) investigated firm-specific and macroeconomic factors which have impact on corporate performance considering the pre-crisis and post-crisis periods. In the study, return on assets (ROA) and market capitalization growth were selected as dependent variables. Leverage, liquidity and solvability ratios as firm specific factors were found statistically significant on ROA and market capitalization growth. However, according to empirical results, it was verified that macroeconomic factors such as inflation and interest rates were more important variables inducing firm performance, rather than firm-specific factors.

Korkmaz et al. (2008) analyzed the financial performance and ROA of fifteen cement firms quoted on Borsa Istanbul (formerly ISE) during the period 2003-2007. By implementing panel data analysis, the study revealed

that economic development had a positive impact on the financial performance of cement firms. At the same time, financial ratios selected as independent variables were found statistically significant on ROA except for working capital turnover ratio and interest bearing ratio.

In his study, Sarbapriya Ray (2011) analyzed the financial performance of Indian paper and paper product companies considering seven key financial dimensions, namely, financial profitability, capital structure, operational efficiency, fixed asset age, current asset efficiency and liquidity position during the period 2000/01 to 2008/09. According to the findings, resources like current assets of the firms of the industry were being utilized efficiently, but lower rate of dividend payment must be increased by the companies in order to satisfy the investors without affecting the future expansion and modernization programmes of the sector.

Muritala (2012) examined the optimum level of capital structure through which a firm can increase its financial performance in Nigeria using annual data of ten firms between 2006 and 2010. By performing the Panel Least Squares Method, he found that asset turnover, size, firm's age and firm's asset tangibility were positively related to firm's performance (ROA). The study also provided evidence of a negative and significant relationship between asset tangibility and ROA as a measure of performance in the model.

By using financial ratio analysis, Chun-Yu Ho et al. (2013) examined North American pulp and paper company bankruptcies that occurred between 1990 and 2009. They showed that failed firms were less profitable, more liquidity constrained and higher in debt leverage. According to empirical evidence, it was found that during the month a bankruptcy occurred, shareholders suffered substantial losses (37%).

4. Data and Methodology

4.1 Sample and Sample Selection

In this paper it is aimed to reveal the firm-specific, industry-specific and macroeconomic factors which have impact on financial performance of paper and paper product companies listed in Borsa Istanbul. In the study, financial ratios generated from financial statements of the companies are recognized as firm-specific factors.

The financial statements of the companies subject to our research are extracted from the website of Borsa Istanbul. Actually, there are seven paper and paper products industry companies listed in Borsa Istanbul but one of them is excluded in the analysis due to lack of data as it is a newly established company. The list of the companies and their corresponding stock codes are displayed in Table 2. The study covers the period from 2011/01 to 2014/09.

Table 2. List of paper and paper product industry companies listed in Borsa Istanbul

Stock Code	Company Name	Availability
ALKA	Alkim Kağıt Sanayi Ve Tic. A.Ş.	Yes
KAPLM	Kaplamin Ambalaj San. Ve Tic. A.Ş.	Yes
KARTN	Kartonsan Karton San. Ve Tic. A.Ş.	Yes
TIRE	Mondi Tire Kutsan Kağıt Ve Ambalaj San. A.Ş.	Yes
OLMIP	Olmüksan Int. Paper Ambalaj San. Ve Tic. A.Ş.	Yes
PRZMA	Prizma Pres Matbaacılık Yayıncılık San. Ve Tic. A.Ş.*	No
VKING	Viking Kağıt Ve Selüloz A.Ş.	Yes

Note. *Excluded due to lack of data.

4.2 Explanatory and Dependent Variables

In evaluating the financial performance, the ROE would not provide a good comparison because the small and the negative equity levels of some companies would generate distorted indicators of profitability (Vieira, 2010). ROA is a more appropriate indicator of company's profitability reflecting how effectively and efficiently its assets are used. Obviously the higher the net income for a given amount of assets, the better the return. ROA is the product of two factors:

$$\text{Net Income Margin} = \text{Net Income} / \text{Sales}$$

$$\text{Assets Turnover} = \text{Sales} / \text{Total Assets}$$

$$\text{ROA} = \text{Net Income Margin} \times \text{Assets Turnover}$$

Net Income Margin as a factor of ROA may be low, but the company may be able to generate more sales per

dollar of assets than comparable companies. Conversely poor turnover may be partially offset by high net profitability (Jones, 2010). So the relation between ROA and these two factors is not always positive.

ROE looks at the return to equity investors using the accounting net income as measure of this return (Damodaran, 2011). ROE is the product of two factors:

$$\begin{aligned} \text{Net Income Margin} &= \text{Net Income/Sales} \\ \text{Equity Turnover} &= \text{Sales/Equity} \\ \text{ROE} &= \text{Net Income Margin} \times \text{Equity Turnover} \end{aligned}$$

Liquidity ratios help us to measure the firms' capacity to repay short-term debts, with the liquidation of short term assets. In financial statements, liquid items are usually less profitable than fixed items; in other words the fund invested in current assets generates less returns than fixed assets. However a low liquidity level in a company may lead to increasing financial costs and result in the incapacity to pay its obligations (Maness & Zietlow, 2004). So it is a crucial matter for finance professionals to maintain the balance between adequate liquidity and profitability. The literature on liquidity and profitability trade off is fairly expansive and the vast majority of studies suggest a negative relationship between liquidity and profitability (Smith & Begemann, 1997; Teruel & Solano, 2007), while in some of the studies, findings show a positive association (Chhapra & Naqvi, 2010).

The capital structure is defined as the mix of debt and equity that the firm uses in its operation (Shubita & Alsawalhah, 2012). The allocation of debt and equity is a fundamental task of financial managers as the debt burden may cause excessive interest expenses for companies. In this context, capital to asset ratio is a substantial measure of capital structure. There are various studies examining the relation between capital to asset ratio and ROA. Capital structure was initially examined by Modigliani and Miller (1958) and according to their assumption, capital structure has an impact on the firms' total value since the economic activities are exempt from tax, agency costs and asymmetric information. Recently, Ferati and Ejupi (2012) examined the relation between capital structure and profitability in Macedonia. According to empirical evidence, ratios concerning profitability have a positive correlation with short-term debt and equity, and a negative correlation with long-term debt. Singh (2013) examined how far the capital structure affects the profitability of the manufacturing firms in India. By classifying firms into three categories, low, medium and high, based on business revenue, he found that high debt financing would minimize the net profit of these firms and thus lower the ROA and ROCE (Return on Capital Employed).

The market share and profitability correlation has long been investigated by various studies. The previous studies on average revealed a significant positive correlation between these variables (Szymanski et al., 1993). But recent empirical results suggest that the relation between these two depends on competitive and strategic context and the fabricated or erroneous impacts that form a great part of the criteria used for measuring this relation (Ritz, 2008).

Foreign trade deficit or surplus is related to agents such as foreign currency fluctuations, foreign capital inflow, competitive structure of the industry, etc. Depending on reduction in manufacturing costs of companies, profitability of companies will be boosted.

In theory, a downswing in interest rates encourages consumers and firms to take out loans to finance greater spending and investment. So the relation between interest rates and profitability is considered to be negative.

Table 3. Definition of variables

Category	Variable	Definition	Type of Variable	Period
Performance Indicator	ROA	Return on Assets	Dependent	2011/01-2014/09
Performance Indicator	ROE	Return on Equity	Dependent	2011/01-2014/09
Turnover	SA	Sales/Assets	Firm-specific	2011/01-2014/09
Profitability	NPM	Net Income/Sales	Firm-specific	2011/01-2014/09
Capital Structure	CAR	Capital to Asset Ratio	Firm-Specific	2011/01-2014/09
Liquidity	ATR	Acid Test Ratio	Firm-Specific	2011/01-2014/09
Market Share	MS	Firm Sales/Total Sales	Industry-Specific	2011/01-2014/09
Foreign Trade Deficit	FTD	Export-Import Diff.	Macroeconomic	2011/01-2014/09
Interest Rates	IR	Commercial Loan Interest Rates	Macroeconomic	2011/01-2014/09

Table 3 shows the firm-specific, industry specific and macroeconomic variables which may have impact on ROA and ROE determined as performance indicators.

4.3 Methodology

In obtaining empirical evidence, panel data analysis is implemented by using E-views version 7 package. In panel data, individuals (persons, firms, cities, ...) are observed at several points in time (days, years, before and after treatment, ...). This handout focuses on panels with relatively few time periods (t) and many individuals (N). This handout introduces the two basic models for the analysis of panel data, the fixed effects model and the random effects model, and presents consistent estimators for these two models (Schmidheiny, 2014).

According to the variables given in Table 3, the following equations are estimated:

Model 1:

$$ROA_{it} = \alpha_{it} + \beta_1 SA_{it} + \beta_2 NPM_{it} + \beta_3 CAR_{it} + \beta_4 ATR_{it} + \beta_5 MS_{it} + \beta_6 FTD_{it} + \beta_7 IR_{it} + \varepsilon_{it} \quad (1)$$

Model 2:

$$ROE_{it} = \alpha_{it} + \beta_1 SA_{it} + \beta_2 NPM_{it} + \beta_3 CAR_{it} + \beta_4 ATR_{it} + \beta_5 MS_{it} + \beta_6 FTD_{it} + \beta_7 IR_{it} + \varepsilon_{it} \quad (2)$$

where i is a subscript for each firm and t for each year. ROA_{it} and ROE_{it} represent firm performance indicators.

The estimated panel least squares models displayed in (1) and (2) equations have an insufficient number of cross sections (number of firms) to run the random effects model; in other words as the number of cross-sections in both of the equations is 6 which is less than the number of regressors, the fixed effect model is appropriate for the estimation. In the fixed effect model estimation, all regression coefficients are restricted to be the same across all cross sections.

Inference on estimation of equations primarily needs verification of the stationarity of the individual time series otherwise spurious regression equations can be generated if regressed for non-stationary series (Engle & Granger, 1987). In order to ensure stationarity of the variables in the sample, we perform a set of common and individual panel unit root tests. The main difference to time series testing of unit roots is that we must take asymptotic behavior of the cross-sectional dimension and the time-series dimension into consideration. In the study, the following panel tests based on common and individual unit root tests are performed, because there is no significant difference between the tests.

-Levin, Lin, and Chu (2002).

-Im, Pesaran and Shin (2003).

-Fisher, Augmented Dickey Fuller (Maddala & Wu, 1999).

Levin, Lin and Chu (2002) revealed that the panel unit root testing notably increases power in finite samples when compared with the single-equation Augmented Dickey Fuller Test (ADF) test and proposed a panel approach that limits β_i by holding it the same across cross-sections as follows:

$$\Delta X_{it} = \alpha_i + \beta X_{i,t-1} + \gamma_i t + \sum_{j=1}^k \theta_{ij} \Delta X_{i,t-j} + \varepsilon_{it} \quad (3)$$

where $i = 1, 2, \dots, N$ represents cross-sections. Levin-Lin-Chu have tested H_0 hypothesis of $\beta_1 = \beta_2 = \dots = \beta = 0$ against the H_1 of $\beta_1 = \beta_2 = \dots = \beta < 0$, with the test based on the t-statistic $t_\beta = \hat{\beta} / se(\hat{\beta})$ where $\hat{\beta}$ is the OLS estimate of β in Equation (3), and $se(\hat{\beta})$ is its standard error.

Im et al. (2003) have developed a panel-based unit root test that unrestricts β to vary across cross-terms under the alternative hypothesis. The Im, Pesaran and Shin test is based on the mean of individual ADF test statistics.

$$\bar{t} = (1 / N) \sum_{i=1}^N t_{\beta_i} \quad (4)$$

Based on Fisher's (1932) empirical results, Maddala and Wu (1999) derived tests by combining the p -values from individual unit root tests and thus developed a new panel based approach. If we define π_i as the p -value from any individual unit root test for cross-section, then under the null of unit root for all cross-sections, we have the asymptotic result that:

$$-2 \sum_{i=1}^N \log(\pi_i) \rightarrow \chi_{2N}^2 \quad (5)$$

In addition, it demonstrates that:

$$Z = \frac{1}{\sqrt{N}} \sum_{i=1}^N \Phi^{-1}(\pi_i) \rightarrow N(0,1) \quad (6)$$

where Φ^{-1} is the inverse of the standard normal cumulative distribution function. It reports both asymptotic χ^2 and standard normal statistics using ADF and Phillips-Perron individual unit root tests.

In order to determine the autocorrelation Woolridge test is performed. In Woolridge test the residuals from a linear model first differences are used. Let Δ be the first-difference operator, The model that is estimated by the method is:

$$\Delta Y_{it} = \Delta X_{it} \beta_1 + \Delta e_{it} \quad (7)$$

5. Empirical Results and Discussions

In the research sample, the impact of Sales/Assets, Net Income/Sales, (log) Capital/Asset Ratio, Firm Sales/Industry Sales, (log) Export-Import Diff., Commercial Loan Interest Rates on ROA and ROE is examined for six companies operating in the paper and paper products industry. In order to ensure normality the natural logarithm of Capital/Asset Ratio and Export-Import Diff. is taken. The descriptive statistics regarding the variables in the research sample is displayed in Table 4.

Table 4. Descriptive statistics

	ROA	ROE	ATR	SA	FTD	IR	NPM	MS	CAR
Mean	0.00	(0.14)	1.49	0.31	13.09	12.17	0.00	0.17	(0.77)
Median	0.01	0.01	0.97	0.33	13.07	12.14	0.02	0.15	(0.58)
Maximum	0.05	0.06	5.52	0.43	13.48	14.82	0.22	0.31	(0.11)
Minimum	(0.09)	(10.10)	0.20	0.12	12.84	8.54	(0.40)	0.05	(4.78)
Std. Dev.	0.03	1.07	1.22	0.08	0.14	2.02	0.12	0.09	0.73
Skewness	(1.26)	(9.10)	1.71	(0.42)	0.98	(0.26)	(1.41)	0.32	(0.24)
Kurtosis	5.51	85.09	5.43	2.01	4.86	1.84	6.04	1.51	11.68
Jarque-Bera	47.41	26,513.09	65.91	6.29	27.67	6.01	64.67	9.89	372.2
Probability	0.00	0.00	0.00	0.04	0.00	0.05	0.00	0.01	0.00
Sum	0.29	(12.53)	134.29	27.55	1178.141	1095.65	0.04	15.00	(69.20)
Sum Sq. Dev.	0.06	102.01	132.89	0.57	1.76	363.20	1.19	0.75	48.44
Observations	90	90	90	90	90	90	90	90	90

In Table 4, when Jarque-Bera Test Statistics are examined, all series are normally distributed after the proper transformation of the series CAR and FTD. As all p-values are less than 5 percent, the null hypothesis (the distribution is normal) is accepted and alternative hypothesis (the distribution is not normal) is rejected. Correlation among series is displayed in Table 5.

Table 5. Correlation matrix

	ROA	ROE	ATR	SA	FTD	IR	NPM	MS	CAR
ROA	1.0000								
ROE	0.4581	1.0000							
ATR	0.6642	0.1347	1.0000						
SA	0.2477	0.1606	(0.1377)	1.0000					
FTD	0.0353	0.0358	(0.1397)	0.0243	1.0000				
IR	(0.0042)	(0.2185)	0.0045	0.0002	(0.1329)	1.0000			
NPM	0.9712	0.4515	0.6698	0.2304	0.0441	(0.0897)	1.0000		
MS	0.3883	0.1549	0.1363	0.3293	(0.0000)	(0.0000)	0.3626	1.0000	
CAR	0.7958	0.6492	0.5858	0.3772	(0.0767)	0.0078	0.7866	0.4223	1.0000

The correlation between performance indicators ROA, ROE and the independent variables is positive except for IR, in other words commercial loan interest rates are negatively correlated with return on equity and return on asset of the companies in the research sample. Decrease in interest rates does have a positive impact on investment through lower borrowing costs and thus the profitability of the companies rises. For the aforementioned series, Common

(Levin- Lin-Chu) and Individual (Im- Pesaran-Shin, ADF - Fisher Chi-square) Unit Root Tests are performed, in order to ensure stationarity. The results of panel unit root tests are illustrated in Table 6.

Table 6. Results of panel unit root test

Variables	Levin, Lin & Chu	Im, Pesaran and Shin	ADF - Fisher Chi-square
ROA	(3.159) <i>0.001</i>	(2.568) <i>0.005</i>	26.253 <i>0.003</i>
ROE	(1.952) <i>0.025</i>	(2.548) <i>0.005</i>	26.040 <i>0.004</i>
CAR	(0.624) <i>0.266</i>	(1.658) <i>0.040</i>	21.622 <i>0.040</i>
FTD	(13.704) <i>0.000</i>	(9.110) <i>0.000</i>	82.126 <i>0.000</i>
MS	(2.479) <i>0.040</i>	(3.786) <i>0.000</i>	36.992 <i>0.000</i>
SA*	(2.508) <i>0.006</i>	(3.783) <i>0.000</i>	36.529 <i>0.000</i>
NPM	(3.384) <i>0.000</i>	(3.365) <i>0.000</i>	35.556 <i>0.000</i>
IR*	(4.425) <i>0.000</i>	(6.223) <i>0.000</i>	37.046 <i>0.000</i>
ATR*	(2.703) <i>0.000</i>	(3.926) <i>0.000</i>	38.349 <i>0.000</i>

In the table, p-values are shown in italic and t-statistics in normal characters. * after taking the first difference series becomes stationary.

After determining normality and stationary, in order to detect multicollinearity, variance impact factors (VIF) of variables are calculated. VIF values are shown in Table 7.

Table 7. Variance impact factors of variables

Variables	R_i^2	VIF
CAR	0.709	3.436
FTD	0.091	1.101
MS	0.227	1.293
SA	0.361	1.565
NPM	0.711	3.460
IR	0.039	1.041
ATR	0.604	2.525

Since all VIF values are less than 5%, it is concluded that there is no multicollinearity between the variables. After providing all assumptions, the cross section fixed effect model is performed. The coefficients estimations and the t-statistics are given in Table 8.

Table 8. Panel data fixed effects regression results

Explanatory Variables	Cross Section Fixed Effects	
	ROE	ROA
SA (Sales/Assets)	0.0149 <i>0.9764</i>	0.0072 <i>0.6021</i>
IR (Commercial Loan Interest Rates)	(0.0006) <i>(0.9760)</i>	(0.0001) <i>(0.7184)</i>
FTD (Foreign Trade Deficit)	(0.1019) <i>(1.9348)</i> **	(0.0051) <i>(1.9804)</i> **

CAR (Capital to Asset Ratio)	0.2924	0.0027
	<i>2.7609</i> **	<i>2.2239</i> **
ATR (Acid Test Ratio)	(0.0081)	(0.0018)
	<i>(2.3475)</i> **	<i>(2.3227)</i> **
MS (Market Share)	(0.2356)	0.0075
	<i>(1.4436)</i> **	<i>(1.4798)</i> **
NPM(Net Profit Margin)	0.2314	0.1962
	<i>19.3452</i> ***	<i>26.663</i> ***
Constant	0.2811	0.0053
	<i>1.6728</i> *	<i>1.893</i> *
Unweighted Stat.		
R-squared	0.9611	0.9700
Durbin-Watson stat	1.5267	1.5506
Number Of Obs.	60	60

Note. In the Table, the italic characters stand for t-statistics and normal characters for coefficients.

* Indicates significance at the 10% level. ** Indicates significance at the 5% level. *** Indicates significance at the 1% level.

In the sample, as we have cross-sections less than the number of coefficients, random effect model is not appropriate for the estimation. In other words, random effect model requires equal number of cross sections and regressors. At the same time, the data is unbalanced which refers to different number of observations for each cross-section unit so to estimate the model by using two-way fixed effects specifications is not possible. For this reason, the panel regression is estimated with a cross sections fixed effects model.

Finally, in order to test heteroscedasticity, Long-Run (LR) Variance test and in order to test autocorrelation Wooldridge test is performed. The results are given in Table 9.

Table 9. Long-run variance test and woolridge test

Test	Test Statistics	p-values
LR (ROA)	22.34	0.03
LR(ROE)	27.59	0.04
Woolridge (ROA)	1.34	0.01
Woolridge (ROE)	2.22	0.02

Both tests have p-value less than 0.05. Therefore, it is concluded that there is no heterodasticity and autocorrelation in the model.

According to regression results using cross-section fixed effects specification, most of the explanatory variables have statistically significant impact on the dependent variables, ROE and ROA. Only SA and IR have no statistical significance in both cases. As firm specific factor, SA which indicates the firm's efficiency in utilizing its assets to generate sales does not have association with ROA and ROE. Similarly there is disconnection between the change in commercial loan interest rates and the profitability ratios during the period.

In the model, through firm specific factors, ATR measured as the ratio of current assets (without inventories) to short term debts has statistically significant and weak negative impact on the profitability ratios in the period for the paper and paper product firms. Capital to asset ratio has statistically significant and material positive impact on ROE (0.2924); however the impact of Capital to Asset Ratio on ROA(0.0027) is quite weak. Net Profit Margin has also significant and material positive impact on ROE (0.2314) and ROA (0.1962). The results show that through firm specific factors, CAR and NPM have significant and the strongest impact on ROA and ROE

As industry specific variable, the market share which is related to volume of sales significantly and negatively influences both ROE(-0.2356) and ROA(-0.0075), however the negative impact of Market Share on ROA is too weak. Negative relation between volume of sales and the profitability ratios indicates that as the volume of sales increases, with respect to competitive structure of the industry, decrease in net profit margin affects profitability of the firms negatively.

In the sample, from macroeconomic factors, the relation between Foreign Trade Deficit and the dependent variables ROE(-0.1019) and ROA(-0.0051) is significant and negative for the paper and paper products industry

firms listed in Borsa Istanbul. However the negative impact of FTR on ROE is stronger compared to ROA. According to these outcomes, as the foreign deficit decreases, correspondingly profitability increases.

6. Conclusions

Analyzing the firm-specific, industry-specific and macroeconomic variables which have impact on the profitability (used as dependent variables) ratios of paper and paper product companies listed in Borsa Istanbul, it is concluded that the empirical outcomes are consistent with the expected results. In the sample, firm specific and industry specific variables turn out to be more efficacious on ROA and ROE compared to macroeconomic variables. Among all the variables, capital to asset ratio and net profit margin have significant and strongest positive impact on the performance indicators. Through firm specific variables, Acid Test Ratio which is a measure of liquidity risk has significant but weak negative impact on ROA and ROE while sales to asset ratio has no statistical significance for both ROA and ROE. The outcome concerning sales to asset ratio shows that in the period, for the paper and paper products firms, efficiency in utilizing their assets to generate sales cannot be considered as significant on the profitability. Likewise, commercial loan interest rate has no statistical significance for the performance indicators.

The results of regression analysis show that for the sample, ROE is a more appropriate performance indicator rather than ROA due to sound association with the independent variables.

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