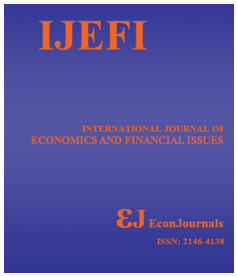

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# Economic Impact on Financial Ratios of Food Industry at Istanbul Stock Exchange Listed Firms

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**ABSTRACT**

In this study, 22 food and beverage sector companies traded on the Istanbul stock exchange were selected as scope for the period 2008-2015. This research aims to investigate the relation between firm's financial ratios and selected macroeconomic indicators which are income, poverty, and Gini coefficient value. Time series of financial ratios are obtained from firm's financial statements. We show that as an economic indicator poverty levels and minimum wage has a significant relation on firm's financial ratios which are cash ratio, sales profitability ratio, and net working capital ratio. This research found that only poverty level and minimum wage has a positive impact on cash and working capital financial ratios and negative impact on sales profitability ratios of listed firms.

**Keywords:** Financial Ratio, Panel Data Models, Food Industry, Economic Impact
**JEL Classifications:** C23, L61, G30

## 1. INTRODUCTION

The ratio is a concept coming from Latin origin and can be defined as a reasonable relationship between two amounts in the structure of an enterprise. For example, current ratio is expressed as the relationship between current assets and short-term liabilities of an enterprise (Durmuş and Arat, 1997). Ratio analysis is the analysis of financial statements by using financial ratios. This concept makes it possible to reveal the financial structure, efficiency, profitability, and liquidity position of an enterprise. This analysis allows us to interpret the current status of enterprises and make predictions about their futures (Şamiloğlu and Akgün, 2010).

In this study, financial ratios are calculated by using financial data reported in the financial statements of food and beverage enterprises publicly traded in Istanbul stock exchange (ISE). In this study, the fact of whether or not there is a relationship between the financial ratios of a company and economic indicators such as net income, Gini coefficient value, poverty level, poverty numbers, and minimum wage is analyzed.

## 2. LITERATURE REVIEW

Morrison and Siegel (1998) examine the relationship between knowledge capital factors - investments in R and D, high-tech and human capital-and cost structure in the U.S food and fiber processing industries from the 1960s through the 1980s. The analysis is made on the basis of the existence and extent of scale economies emanating from these factors. The results of the study imply that the mentioned factors decrease costs depending on the reduction of input use for all privately demanded factors and the effects on private capital are more than the others.

Ferdaus et al. (2005) examine the effects of financial structure change on the U.S. food manufacturing industry. The effects are evaluated on the basis of production, profitability and productivity growth. The empirical results of the study indicate that whereas the increased debt use of this industry has a negative effect on its output growth, input demand profitability, and total productivity growth, dividend payments have positive effect on production and performance. In addition, the results also imply that negative effect outweighs positive effect. Guzmán and Arcas (2008) examine the usefulness of accounting information in the measurement of

technical efficiency in agricultural cooperatives. In this context, they employed the data envelope analysis technique in this study. The results of the empirical study use the data of 247 observations for three accounting years from 2001 to 2003, indicate that the efficiency measures obtained by this technique are complementary to the traditional economic and financial ratio analysis.

Aydeniz (2009) examines the effects of macroeconomic indicators on the financial performance of the beverage and food firms, publicly traded in ISE, by using linear regression analysis. The results of the study show that while profitability rates are affected mostly by consumer price index (CPI) and producer price index, EBIT and EBITDA are affected mostly by the rate of capacity utilization. Moreover, interest rate is found to have a great influence on NOPAT.

Szczecińska (2011) demonstrates the results of the analysis of the liquidity strategies of two food companies for the period from 2005 to 2009. Ratio analysis and residual profit calculation methods are used in this context. The positive value of the calculated residual profit of both companies confirms the strength of their liquidity strategies in the enhancement of the value of both companies. Norvašiene and Stankevičienė (2012) investigate the relationship between capital structure and the performance of companies. The results of the study verify the results of many previous studies that a significant negative relationship exists between capital structure and the efficiency of corporate performance.

Atmaca and Kurt (2011) aimed to find out the effects of the Global Crisis of 2008 on the food companies publicly quoted in the ISE. Panel data analysis and ratio techniques are used in the analysis. The results of the study reveal that the liquidity structures and quality of the mentioned companies worsen during crisis times. Furthermore, the problems related to the liquidity, financial structure and profitability influence profitability and performance levels. Demirel et al. (2011) seek out the effects of financial and economic factors on the financial structure of tourism firms. The results of the study reveal that the debt ratio of firms is sensitive to macroeconomic and financial indicators. In this context, while debt coefficient, GNP and interest rate have positive effect on debt structure, account receivables and cash ratios have negative effects on debt structure.

Azhagaiah and Deepa (2012) answer the question of which factors are the determinants of profitability of food industry in India in the context of size-wise analysis. The results indicate that the main determinants of the profitability of small size firms are volatility and growth. In addition, whereas growth is the main determinant of the profitability of medium size firms and capital intensity is the main determinant of the profitability of large size firms. Demir and Tuncay (2012) investigate the Turkish food sector in terms of activity and profitability rates. The analysis is made on the basis of 11 firms publicly traded in ISE from 2000 to 2008. The study conveys that the Turkish food sector performs positively in terms of activity ratios. However, the situation is not the same in terms of profitability ratios.

Peeters and Albers (2013) analyse empirically the effects of the world food prices on inflation and government subsidies for such North African countries as Algeria, Egypt, Morocco and Tunisia and such the Middle East countries as Israel, Jordan, Lebanon and the occupied Palestinian territories from 2002 to 2011. The study reveals that there is a positive relationship between the rise in the world food prices and inflation and government subsidies. The rise in the world prices increases both inflations in terms of CPI and government food subsidies. Fuchs et al. (2013) convey the issues related to the intensified financialization in the global agrifood system and the challenges involved in the definancializiation of it. In addition, the study emphasizes the importance of political developments at all political and societal levels and in different shapes and forms in the identification and assessment of the factors driving and facilitating financialization and its diffusion.

Epperson and Escalante (2013) seek out the effect of Eurozone crisis on the U.S. food companies. A system-of-equations approach in which stock prices of well-known U.S. food companies and the S and P index are regressed against such variables as accounting for profitability, the economic wellbeing of both the Eurozone and the U.S. is used. The results of the study imply that the U.S. food companies are influenced mainly by the wellbeing of the U.S. economy in contradistinction to the European Union food companies.

Topuz and Akşit (2013) evaluate the effect of marketing expenses on stock returns within the context of ISE food industry. A panel data regression analysis is used to analyse the effects of marketing, sales and distribution expenses on the stock returns of firms listed in ISE Food Sectoral Index. The results reveal the fact that marketing expenses have usually a positive effect on stock returns and a concave relationship exists between them. Aydın (2013) analyzes the financial performances of food production firms by comparing Turkish and British firms. The analysis covers the period from 2000 to 2012. The results of the study indicate that in spite of some differences in the financial indicators of the food companies in Turkey and in the UK, food firms in both countries are in accord with the crisis.

Avcı et al. (2014) investigate the effects of the Global Financial Crisis of 2008 on financial ratios in the Turkish banking sector. In this context, the study tries to answer the question of how the profitability ratios of the banks, members of the ISE, are affected pre-Global Financial Crisis and post-2008 Financial Crisis of 2008 by using panel data analysis. The results of the study indicate that financial crisis usually affects the profitability ratios of the Turkish banking sector except for a few exceptions.

Momcilovic et al. (2015) try to reveal a sustainable growth rate calculation methodology and find out sustainable growth rate for 60 enterprises in the agricultural and food sectors of Serbia in 2011 and 2012. The results of the study imply that the opportunity for sustainable growth was rare and there was not a real sustainable growth in the mentioned sectors during that time. Geylani (2015) analyses investment and capital adjustment patterns in the U.S. food manufacturing plants. In the beginning, the study both illustrates lumpy nature of investments and implies the necessity of large investments in the food manufacturing industry. The study also uses an investment hazard model to reveal the nature of capital

adjustment costs. The results of the study reveal the existence both of convex and non-convex components of adjustment costs.

Ural et al. (2015) try to predict the financial distress of food and beverage and tobacco companies listed in Borsa Istanbul (BIST) for the period of 2005-2012. The logistic regression model based on the data obtained from their financial reports is used for the empirical analysis. The results confirm that logistic regression model is an appropriate and important tool in the measurement of financial distress. Kara and Erdur (2015) investigate the determinants of capital structure of companies publicly traded in BIST. A panel data analysis is used based on the data related to the financial reports of these companies and the period of analysis goes from 2006 to 2014. The results of the study show that the determinants having an effect on capital structure decisions differ for different industries. Moreover, while the financial hierarch theory is valid for the automotive industry, the financial hierarch theory and trade-off theory are valid for food and drink and textile and leather industries.

Sengottaiyan and Nandhini (2016) investigate the liquidity performances of selected food processing companies in India. The results of the study indicate that the liquidity performances are not promising and high fluctuations are common among the sample companies.

## 3. HYPOTHESES

This study aims to investigate the relation between food sector financial ratios and economic indicators related to income, poverty, and Gini coefficient value. Financial indicators are obtained from firm's financial statements. Turkish Lira is used for economic and financial data as local currency. As an economic dependent indicator, we choose net income, Gini coefficient value, poverty level, poverty numbers, and minimum wage. For financial ratios, we choose cash ratio, sales profitability ratio, and net working capital ratio. The research aim is that which economic indicator has a positive impact on financial ratios of the food sector. In order to analyse this impact, we test following five hypotheses:

$H_1$: Net income purchasing power has a positive impact on financial ratios of food sector

$H_2$: Gini coefficients has a positive impact on financial ratios of food sector

$H_3$: Poverty level has a positive impact on financial ratios of food sector

$H_4$: Poverty numbers has a positive impact on financial ratios of food sector

$H_5$: Minimum wage has a positive impact on financial ratios of food sector.

## 4. RESEARCH METHODOLOGY

Table 1 represents the summary statistics of variables and Table 2 shows the correlation matrix between variables. ISE corporate data and public disclosure data are the main sources of financial variables (www.borsaistanbul.com/en/data) (www.kap.gov.tr). We calculate each firm cash ratio, sales profitability ratio, and net working capital ratio. Sample period covers the years from 2008-2015. This sample period also covers 22 firms listed on ISE. Panel data is used to test this series. In order to test stationary, we analyse the unit root test.

Highest correlation is seen on between cash ratio and poverty level. And another correlation was seen on cash ratio and the minimum wage which both <20%.

Descriptions of variables on functions can be seen in Table 3. Economic indicators are year-end Turkish lira.

This research empirical analysis is based on the following general formula: $y_{it}=x_{it}\beta+a_i+u_{it}$, $i=1,2,\ldots,N$ $t=1,2,\ldots,T$, where $i=1,\ldots N$ is the firm, $t$ is the time period (year-end values), $y$ is the dependent variable, $x$ are independent variables and control variables. Tested equations were estimated by using the standard panel data. The null hypothesis indicates selected economic indicators hasn't a positive impact on firm's financial ratios. Alternative hypothesis indicates there is a positive impact on financial ratio from economic indicators. In order to test our hypothesis, we develop five equations. For each equation $\alpha, \beta, \phi, \gamma, \eta$, are the time constant factors. All equations and notations are as follows:

$$ni_t = \theta_{it}+\alpha_1 csr_{it}+\alpha_2 sp_{it}+\alpha_3 nwc_{it}+\mu_i+\varepsilon_{it} \quad (1)$$

$$gini_t = \theta_{it}+\beta_1 csr_{it}+\beta_2 sp_{it}+\beta_3 nwc_{it}+\mu_i+\varepsilon_{it} \quad (2)$$

**Table 1: Summary statistics**

| Variables | Minimum | Standard deviation | Median | Mean | Maximum |
|---|---|---|---|---|---|
| $ni_t$ | 3.920 | 3.985 | 4.050 | 4.055 | 4.180 |
| $gini_t$ | 0.391 | 0.402 | 0.402 | 0.403 | 0.415 |
| $logpl_t$ | 1.000 | 3.000 | 5.000 | 5.455 | 9.000 |
| $logpn_t$ | 3.820 | 3.830 | 3.855 | 3.850 | 3.870 |
| $logmw_t$ | 2.810 | 2.870 | 2.945 | 2.947 | 3.100 |
| $csr_{it}$ | 0.000 | 0.010 | 0.050 | 0.160 | 2.020 |
| $sp_{it}$ | −11.540 | −0.080 | 0.010 | −0.080 | 1.090 |
| $nwc_{it}$ | 9.370 | 13.340 | 14.620 | 14.410 | 18.490 |

**Table 2: Correlation matrix**

| Variables | ni | gini | logpl | logpn | logmw | csr | sp | nwc |
|---|---|---|---|---|---|---|---|---|
| $ni_t$ | 1.00 | | | | | | | |
| $gini_t$ | −0.66 | 1.00 | | | | | | |
| $logpl_t$ | 0.96 | −0.65 | 1.00 | | | | | |
| $logpn_t$ | −0.73 | 0.68 | −0.68 | 1.00 | | | | |
| $logmw_t$ | 0.99 | −0.66 | 0.96 | −0.72 | 1.00 | | | |
| $csr_{it}$ | 0.18 | −0.14 | 0.19 | −0.14 | 0.18 | 1.00 | | |
| $sp_{it}$ | −0.10 | 0.03 | −0.11 | 0.10 | −0.11 | 0.07 | 1.00 | |
| $nwc_{it}$ | 0.13 | −0.08 | 0.12 | −0.10 | 0.13 | 0.04 | 0.13 | 1.00 |

**Table 3: Variables, descriptions and measures**

| Variable | Description and measure |
|---|---|
| $ni_t$ | Net income purchasing power year end values |
| $gini_t$ | Gini coefficients values |
| $logpl_t$ | Poverty level (log values) |
| $logpn_t$ | Poverty numbers (log values) |
| $logmw_t$ | Minimum wage (log values) |
| $csr_{it}$ | Cash ratio for *i* firm, *t* year |
| $sp_{it}$ | Sales profitability ratio for *i* firm, *t* year |
| $nwc_{it}$ | Net working capital ratio for *i* firm, *t* year |

$$logpl_t = \theta_{it}+\phi_1 csr_{it}+\phi_2 sp_{it}+\phi_3 nwc_{it}+\mu_i+\varepsilon_i \quad (3)$$

$$logpn_t = \theta_{it}+\gamma_1 csr_{it}+\gamma_2 sp_{it}+\gamma_3 nwc_{it}+\mu_i+\varepsilon_{it} \quad (4)$$

$$logmw_t = \theta_{it}+\eta_1 csr_{it}+\eta_2 sp_{it}+\eta_3 nwc_{it}+\eta_i+\varepsilon_{it} \quad (5)$$

## 5. RESEARCH RESULTS

We first test the stationary and unit root test. Panel regression tests models are pooled ordinary last squares, fixed effects, and random effects. Equations are analyzed according to pooled OLS cross-section fixed effect and random effect model. Fist equation results which net income as an economic indicator can be seen in Table 4.

Equation 1 probability values are significant for P < 0.10 and cash ratio and net working capital ratio has positive coefficient value. Sales profitability have negative coefficient value for net income data. For the second equation coefficient values are seen on Table 5.

As a dependent value, Gini coefficient data equation are not significant for financial ratio. Individual effect within model results of equation 3 can be seen on Table 6.

Poverty level equation probability values are significant for P < 0.10. Sales probability have negative coefficient value for poverty level. Cash ratio and net working capital ratio has positive coefficient results. Equation 4 model results and coefficient values are indicated on Table 7.

Cash ratio and sales profitability have negative coefficient results for poverty levels as dependent value. For the equation 5 coefficient and estimated results indicated in Table 8.

**Table 4: Equation 1 one-way (individual) effect pooling model results**

| Variable | Estimate | Standard error | t-value | P (>\|t\|) |
|---|---|---|---|---|
| (Intercept) | 3.9377693 | 0.0539234 | 73.0252 | < 2e-16*** |
| csr | 0.0588800 | 0.0228087 | 2.5815 | 0.01067* |
| sp | –0.0131956 | 0.0073065 | –1.8060 | 0.07267 |
| nwc | 0.0074060 | 0.0036979 | 2.0028 | 0.04677* |

Significant codes: ***0.001 *0.05 0.1+1 SE: Standard error

**Table 5: Equation 2 pooling model results**

| Variable | Estimate | Standard error | t-value | P (>\|t\|) |
|---|---|---|---|---|
| (Intercept) | 0.40740554 | 0.00387311 | 105.1882 | < 2e-16*** |
| csr | –0.00311563 | 0.00163826 | –1.9018 | 0.05887 |
| sp | 0.00036516 | 0.00052480 | 0.6958 | 0.48749+ |
| nwc | –0.00029503 | 0.00026561 | –1.1108 | 0.26821+ |

Significant codes: ***0.001, 0.1+1 SE: Standard error

**Table 6: Equation 3 pooling model results**

| Variable | Estimate | Standard error | t-value | P (>\|t\|) |
|---|---|---|---|---|
| csr | 3.62642 | 1.00975 | 3.5914 | 0.0004443*** |
| sp | –0.35991 | 0.21583 | –1.6676 | 0.0974682 |
| nwc | 0.59828 | 0.21851 | 2.7379 | 0.0069258** |

Significant codes: ***0.001 **0.01, 0.1+1 SE: Standard error

Equation 5 probability values are significant for P < 0.10 and just sales profitability have a negative coefficient value other financial ratios have positive coefficient value for minimum wage as the dependent variable. All equations, total sum of squares, the residual sum of squares, r-squared, adjusted r-squared, f statistics and probability values summarized in Table 9.

Highest R-Squared and adjusted R-Squared results can be seen on Equation 3 and Equation 5. Equation 2 and 3 has probability values higher than 0.05 level. All equations lagrange multiplier test, f tests and Housman test results summarised in Table 10.

## 6. CONCLUSIONS

This research aims to analyse positive relation on net income purchasing power, Gini coefficient, poverty level and numbers, minimum wages on financial ratios of the food sector. We select 3 financial ratios which are cash ratio, sales profitability ratio, net working capital ratio. We found that there is a significant relation on poverty level (Equation 3) and minimum wage (Equation 5) on financial ratios which are cash ratio, sales profitability ratio, and net working capital ratio. In order to choose fixed and random effects model, we run Hausman test where the null hypothesis is that the preferred model is random or alternatively fixed effect. We run the fixed effect and random effect model and perform Hausman test. According to results equation 3 has a random effect and equation 5 has fixed effect model. Both equations have 0.15 and 0.16 R-squared results.

On the other hand, net income, Gini coefficient and poverty numbers regression results are relatively low. These economic indicators positive impact on financial ratios R-squared ratios are 0.06, 0.02 and 0.09. As for the financial ratios, sales profitability has negative coefficient estimated results for both poverty level and minimum wage over the time. Rather sales profitability has a negative coefficient, cash ratio and the net working capital ratio has positive coefficient estimated results.

Our analysis is focused on 22 food industry firms listed on ISE on given time period years. This study focus on only selected ratio and economic indicator. We conclude that only minimum wage and poverty level has a positive impact on cash and working

**Table 7: Equation 4 pooling model results**

| Variable | Estimate | Standard error | t-value | P (>\|t\|) |
|---|---|---|---|---|
| csr | –0.0220927 | 0.0087884 | –2.5138 | 0.01299* |
| sp | 0.0029150 | 0.0018785 | 1.5518 | 0.12281 |
| nwc | –0.0045582 | 0.0019018 | –2.3967 | 0.01777* |

Significant codes: *0.05 0.1+1 SE: Standard error

**Table 8: Equation 5 pooling model results**

| Variable | Estimate | Standard error | t-value | P (>\|t\|) |
|---|---|---|---|---|
| csr | 0.1467944 | 0.0420295 | 3.4927 | 0.0006276*** |
| sp | –0.0156987 | 0.0089836 | –1.7475 | 0.0825839 |
| nwc | 0.0291925 | 0.0090953 | 3.2096 | 0.0016237** |

Significant codes: ***0.001 **0.01, 0.1+1 SE: Standard error

**Table 9: Equation results summary**

| Statistics | Equation 1 | Equation 2 | Equation 3 | Equation 4 | Equation 5 |
|---|---|---|---|---|---|
| Total sum of quares | 1.3508 | 0.0066852 | 924 | 0.066 | 1.6269 |
| Residual sum of squares | 1.2593 | 0.0064966 | 784.46 | 0.059424 | 1.3591 |
| $R^2$ | 0.067748 | 0.028212 | 0.15102 | 0.099633 | 0.16461 |
| Adjusted $R^2$ | 0.066208 | 0.027571 | 0.12957 | 0.08548 | 0.14123 |
| F statistic | 4.1665 | 1.66443 | 8.95343 | 5.56977 | 9.91796 |
| P value | 0.0070451 | 0.17651 | 1.6984e-05 | 0.001189 | 5.2264e-06 |

**Table 10: Equation test LM, F and Housman results**

| Equation | Lagrange multiplier test-(Honda) | | | F test for individual effects | | | Hausman test | | |
|---|---|---|---|---|---|---|---|---|---|
| | Normal | P value | Alternative hypothesis | F | P value | Alternative hypothesis | $\chi^2$ | P value | Alternative hypothesis |
| 1 | –2.5341 | 0.01127 | Significant effects | 0.81366 | 0.6999 | Significant effects | 29.302 | 1.935e-06 | Random effect |
| 2 | –3.0798 | 0.002072 | Significant effects | 0.34277 | 0.997 | Significant effects | 11.791 | 0.008135 | Fix effect |
| 3 | –2.398 | 0.01649 | Significant effects | 0.75155 | 0.7732 | Significant effects | 23.497 | 3.181e-05 | Fix effect |
| 4 | –2.9548 | 0.003129 | Significant effects | 0.4349 | 0.9855 | Significant effects | 4.0345 | 0.2578 | Random effect |
| 5 | –2.5198 | 0.01174 | Significant effects | 0.8075 | 0.7074 | Significant effects | 1.4828 | 0.6862 | Random effect |

capital ratio. Just sales profitability has negative coefficient results over time. Also, these results may comparable between emerging financial markets on same industry and it would be enlightening food and beverage industry capital structure related to economic indicator effects.

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