Firms' financial performances and economic recession: evidence from Macedonian listed companies

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Abstract: *The purpose of this paper is to analyze financial performance of 23 firms listed on the Macedonian Stock Exchange. Selected firms are non-financial entities. Analyzed period covers 2011-2015 and is divided into two sub-periods. The first sub-period presents the period in which positive growth rates have been evidenced in the country's GDP, whereas the second one represents the respectively negative growth rate. Results denoted that, on the overall term, selected financial ratios are, statistically, not significantly different from the sub-periods perspective. But, whereas liquidity has a positive trend, profitability has a negative one. During the economic recession period, there is an emphasized decline of profitability. On the other hand, one year after the recession liquidity significantly increased. This implies that effects of economic recession were reflected in the respective ratios.*

Key-words: *financial performance, economic recession, ratios, panel data*

1. Introduction and literature review

Financial statements present database for accounting information users. Accounting information users are divided into two categories: internal and external, or moreover with direct and indirect interest users. Both of them use information in a decision making process. For example, creditors evaluate whether a firm is able to pay on time principal and interest; or managers judge their decisions in the past and what can there be improved in the future. Of course, there are a lot of business issues that managers have to solve, but the common ones are the following:
- How to finance assets, via debt or equity?
- Where to invest money?
- What is the time period of financing and investment?
- To sell on cash or on credit?

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- To sell more and to have lower profit, or the opposite?
- If price is decreased, will sales increase at the same rate? etc.

Moreover, it is obvious that firms don't operate isolated from the outside environment. Their activities should response- adjust to changes from the economic, financial, etc. environment. Hence, firms are open systems and, as a result, impulses from economic environment are unavoidable. Thus, information users should be aware of the importance of this issue while analyzing financial performance. For example, if the country experiences an economic expansion it is usual to expect that a firms' sales will increase and vice versa. On the other hand, firms adjust strategies toward these macroeconomic changes. It is relational to expect that, in economic expansion, sales will increase even to not necessary cash, too. This means that profitability will increase but not necessarily the liquidity. Situation is expected to be opposite in an economic recession. Due to uncertainty, firms are not able to sell similarly on credit as during a normal economic stage. Probably firms will try to sell less on credit but collect money faster.

It is interesting to analyze furthermore whether firms in economic recession use more debt than equity; whether their ability to convert sales on cash in increased or decreased; whether assets efficiency is increased or decreased in this period; and so on. Hence, this paper is trying to investigate the above issues for the selected sample and providing evidence which cannot be generalized. Of course, for emphasized issues, different authors used different methodologies, samples, periods, etc. But, in general, literature related with the impact of economic recession on financial performance is not so rich.

Cowling and Liu (2011) examined growth performance, access to finance and performance outcomes in the recession. Notta and Vlachvei (2014) have studied 128 Greek large dairy firms and came to the conclusion that during the crisis, market share, liquidity and leverage have significant effects on profits. Tan (2012) has studied 277 firms from eight East Asian economies and found a negative relationship between firm performance and financial leverage. Dolenc, Grum and Laporsek (2012) found that firms' financial performances were negatively affected by the financial/economic crisis.

2. Data, methods and empirical results

Data used in this study are primary data and are extracted from firms' annual reports published on Macedonian Stock Exchange (http://www.mse.mk/mk/). Data are organized in form of panel data for the period 2011-2015. Data presents book values and are in annual terms.

Data are processed using Stata and Excel. Totally 115 observations are examined from 23 non-financial firms. Analyzes are performed using summary

statistics, trend analysis, histograms, correlation analysis, variance ratio test, and two-sample *t* test.

In 2012 the Republic of Macedonia experienced an economic recession (GDP real growth rate was -0.5, for more see NBRM) and in the other selected years it experienced respectively positive rates. Hence, the overall selected period 2011-2015 is divided into two sub-periods, i.e. 2012 presents economic recession and the other years present non-recession.

Table 1 presents variables used in this study, definitions and calculations. The study examines some selected ratios from the category of liquidity, profitability, financing, and cash flow. This is so, because financial performance is not isolated from financial position and, as such, it cannot be treated as independent.

Abbreviation	Description	Calculation
X1	Current ratio	Current assets/Current liabilities
X2	Liquidity ratio	(Current assets - Inventory)/Current liabilities
X3	Cash ratio	Cash and cash equivalents/Current assets
X4	Net profit margin	Net income/Sales
X5	Return on assets (ROA)	Net income/Total assets
X6	Long-term debt ratio	Long-term debt/Total assets
X7	Total debt ratio	Total liabilities/Total assets
X8	Operating cash flow to sales	Operating cash flow/Sales
X9	Operating cash flow to income	Operating cash flow/Net income
X10	Cash flow ratio	Operating cash flow/Current liabilities
X11	Total assets turnover	Sales/Total assets

Source: Bernstein and Wild (1998), Xhafa (2005), and authors' calculations

Table 1. Variables definition

Table 2 presents summary statistics such as number of observations, mean, standard deviation, minimum and maximum. As table 2 presents, on average firms are liquid (4.41 den current assets vs. 1 den current liabilities; or liquid ratio = 3.64 times). Current ratio is above the rule of the thumb (2:1) and presents satisfied level of liquidity. Liquid ratio is smaller than current ratio due to subtracting inventory from current assets, but again presents satisfied level. Current and liquid ratios have higher standard deviation (after operating cash flow to income ratio) compared with the other ratios.

Cash and its equivalents are, on average, eight percent of the current assets. In other words, on average, in 100 denars current assets, 8 denars are cash and cash equivalents.

Firms are, on average,   profitable. 100 denars sales generate 15 denars net incomes. Moreover, 100 denars total assets generate 3 denars net incomes.

Firms, on average, are financed more with equity rather than liabilities. 100 denar total assets are financed with 37 denars liabilities. In other words, rest 63 denars are equity.

Firms were able, on average, to convert each 100 denars sales into 16 denars operating cash flow; but, on the other hand, on average operating cash flow to income was negative. Moreover, there were available 46 denars operating cash flow for 100 denars current liabilities. Finally, 100 denars total assets on average generate 57 denar sales.

Variable	Obs	Mean	Std. Dev.	Min	Max
X1	115	4.41	8.86	0.24	70.67
X2	115	3.64	8.45	0.12	67.63
X3	115	0.08	0.13	0.00	0.87
X4	115	0.15	0.95	-0.55	9.85
X5	115	0.03	0.08	-0.18	0.58
X6	115	0.11	0.12	0.00	0.43
X7	115	0.37	0.22	0.02	0.83
X8	115	0.16	0.58	-0.24	5.74
X9	115	-6.50	172.48	-1284.38	1115.58
X10	115	0.46	1.20	-0.91	8.20
X11	115	0.57	0.54	0.02	2.74

Source: authors' calculations

Table 2. Summary statistics

Table 3 presents means of selected variables by years. Based on these data, projections (trends) are performed for the respective ratios and results are presented in table 4.

Table 4 presents that current and liquid ratios have positive trends, but this result is not so convincing, due to low R-square. On the other hand, cash ratio, net profit margin and return on assets have negative trends.

Long-term debt and total debt financing view as trends are almost similar.

Operating cash flow to sales and cash flow ratios denote that there will be a slight improvement in operating cash flow, but not in operating cash flow to income.

Finally, total assets efficiency as trend is decreasing. In other words, with similar assets, firms will generate fewer sales or similar sales will be generated using more assets.

Years	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11
2011	3.56	2.90	0.09	0.60	0.08	0.11	0.38	0.08	-5.61	0.47	0.67
2012	3.38	2.77	0.09	0.06	0.02	0.11	0.38	0.07	-12.58	0.25	0.63
2013	6.58	5.47	0.07	0.07	0.02	0.11	0.37	0.30	50.08	0.26	0.54
2014	3.96	3.23	0.07	0.04	0.01	0.11	0.35	0.14	-12.86	0.60	0.54
2015	4.55	3.86	0.08	-0.02	0.00	0.12	0.37	0.22	-51.50	0.72	0.49
Total	4.41	3.64	0.08	0.15	0.03	0.11	0.37	0.16	-6.50	0.46	0.57

Source: authors' calculations

Table 3. Mean by year

Variable	Equation	R^2
X1	y = 0.2539x + 3.644	0.0964
X2	y = 0.2386x + 2.9283	0.1166
X3	y = -0.0042x + 0.0931	0.2921
X4	y = -0.1257x + 0.5259	0.6101
X5	y = -0.017x + 0.0761	0.7674
X6	y = 0.0031x + 0.1026	0.843
X7	y = -0.0038x + 0.38	0.3953
X8	y = 0.0368x + 0.0512	0.3264
X9	y = -9.2051x + 21.12	0.1598
X10	y = 0.0847x + 0.2062	0.4172
X11	y = -0.046x + 0.7103	0.9476

Source: authors' calculations

Table 4. Ratios trends

Table 5 presents mean of selected variables view from both non-recession and recession period. We are trying to test whether economic recession affected liquidity and profitability of selected firms. We believe that firms in non-recession times are more focused on profitability rather than liquidity. So, they give priority to profitability and not to liquidity. But, in economic recession times the future becomes more difficult to predict and hence probability that firms will fail increases. As a result, firms will be more interested in liquidity rather than in profitability. Hence, in order to analyze liquidity and profitability in non-recession, respectively in recession period the variance of these ratios should be first measured. Variance ratio test indicates that current, liquid, net profit margin and return on assets ratios

have significantly different standard deviations between these periods. Thus, two-sample *t* test with unequal variance is performed for liquidity and profitability ratios.

Results of this test indicated that firms' liquidity and profitability is not significantly different between non-recession and recession period ($t_1 = 0.9025$; $t_2 = 0.8034$; $t_4 = 0.9722$; $t_5 = 0.2113$).

Description	X1	X2	X4	X5
Non-recession	4.66	3.86	0.17	0.03
Recession	3.38	2.77	0.06	0.02

Source: authors' calculations

Table 5. Mean according to non-recession and recession

As table 5 presents, on average, firms were more liquid and profitable in non-recession compared with recession time.

Figure 1 presents the trend mean of current and liquid ratios. As it can be noticed there are positive trends for both ratios. On the other hand, as figure 2 presents net profit margin and return on assets have negative trends. One explanation is that ratios of 2013-2015 are influenced by previous year ratios and uncertainty related with business failure has continued in next coming years (after 2012). For example, in 2013 current and liquid ratio achieved their maximum values whereas net profit margin and return on assets experienced emphasized negative trends.
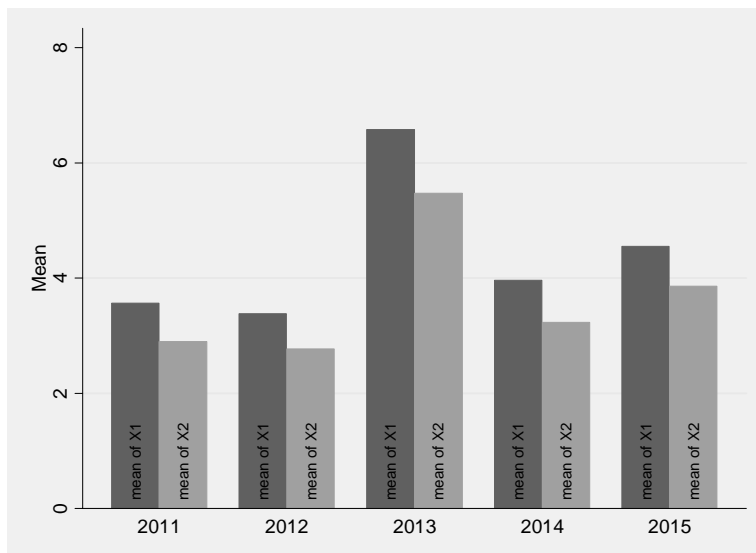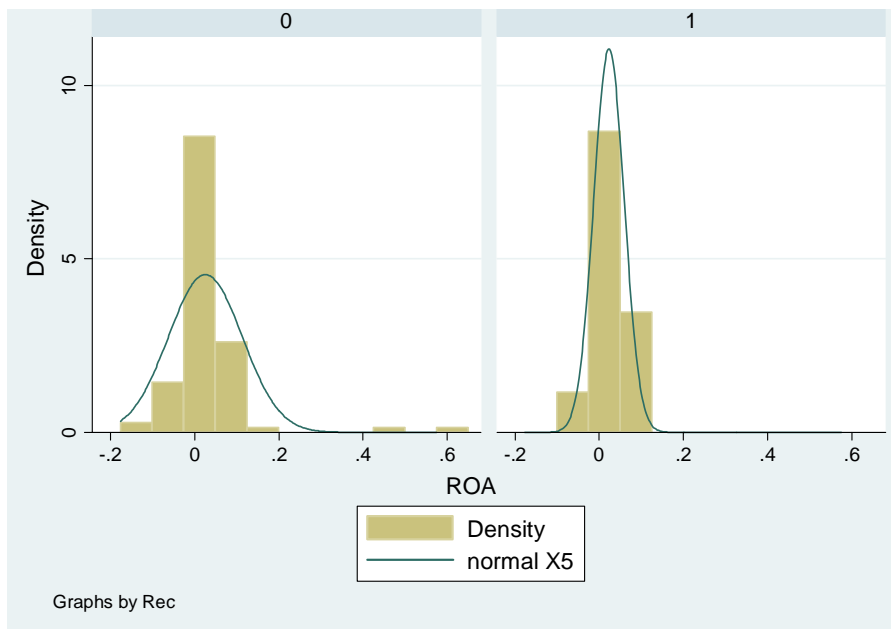

Source: authors' calculations

Figure 1. Mean of current and liquid ratios
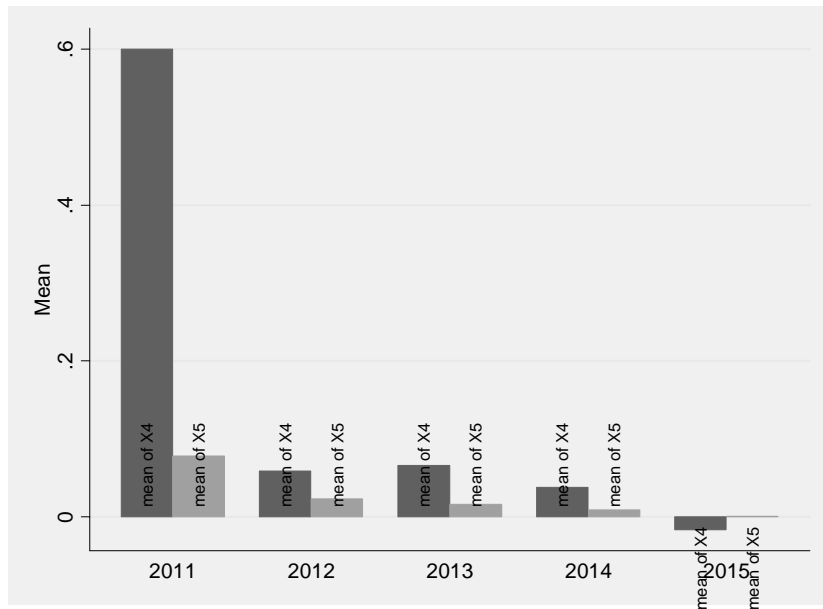
Source: authors' calculations

Figure 2. Mean of net profit margin and return on assets ratios

Source: authors' calculations

Figure 3. Histogram of return on assets

Figure 3 presents histograms of return on assets on non-recession (denoted with 0) and recession period (denoted with 1). As it can be noticed from the figure, this ratio has higher dispersion (standard deviation) in non-recession period.

Correlation analysis presented on table 6 denotes that firms with higher current ratio have higher profit margin, return on assets, cash flow ratio, are more able to convert sales into cash, use less debt and have lower assets turnover than counterparties.

Firms with higher profit margin have higher return on assets, cash flow ratio, are more able to convert sales and net income to cash, and use less debt than counterparties.

Firms with higher return on assets have higher cash flow ratio, are more able to convert sales and net income into cash and use less debt than counterparties.

Firms that use more debt have higher assets turnover, lower cash flow ratio and are less able to convert sales into cash.

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11
X1	1.00										
X2	**0.90**	1.00									
X3	0.16	**0.21**	1.00								
X4	**0.37**	**0.41**	**0.21**	1.00							
X5	**0.34**	**0.38**	**0.32**	**0.92**	1.00						
X6	-0.05	-0.09	**-0.34**	-0.17	-0.18	1.00					
X7	**-0.71**	**-0.70**	**-0.24**	**-0.37**	**-0.32**	**0.46**	1.00				
X8	**0.32**	**0.32**	0.11	**0.43**	**0.36**	0.00	**-0.30**	1.00			
X9	0.02	-0.03	0.12	**0.26**	**0.23**	0.09	0.08	**0.41**	1.00		
X10	**0.50**	**0.50**	**0.24**	**0.47**	**0.45**	-0.01	**-0.44**	**0.89**	**0.38**	1.00	
X11	**-0.27**	**-0.27**	**0.28**	-0.15	0.06	-0.01	**0.46**	**-0.19**	0.11	-0.08	1.00

Source: authors' calculations. Significance level = 0.05 is denoted with bold

Table 6. Spearman's rank correlation

3. Conclusions

The purpose of this study was to analyze effects of economic recession on financial performances of selected firms for the period 2011-2015. Due to the economic recession was manifested just in 2012, statistics results were not relevant enough. For example, while two-sample *t* test showed that there is no statistical significance between two sub-periods for selected ratios, year-after-year analysis provides

opposite results. Thus, analyzing the period 2012-2011, liquidity was decreased by 4.5%, profit margin by 90%, or return on assets by 75%.

Moreover, analyzing the period 2013-2012 (one year after the recession), liquidity was increased by 97.5%, profit margin by 16.7%, or return on assets remained unchanged. Results imply that firms have been focused more on liquidity rather than on profitability. Hence, this is relevant evidence that financial performances were affected by the economic recession.

The study found also following results:
- On average, firms were liquid and profitable;
- On average, assets were financed more with equity rather than debt;
- Firms with higher profit margin have higher return on assets, cash flow ratio, are more able to convert sales and net income to cash, and use less debt than counterparties;
- Firms with higher return on assets have higher cash flow ratio, are more able to convert sales and net income into cash and use less debt than counterparties; and
- Firms that use more debt have higher assets turnover, lower cash flow ratio and are less able to convert sales into cash.

The study has its own limitations. Hence, for further studies it is suggested to:
- Increase numbers of observations and use more advanced methodology,
- Extend the time period, and
- Add new variables as measures for financial performance and economic recession.

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