

EVALUATION OF FINANCIAL PERFORMANCE ACCORDING TO FIRM SCALE: CASE OF MANUFACTURING SECTOR

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ABSTRACT

Purpose- Companies are classified as large, medium and small enterprises according to their scale. The purpose of the study discussed in this context is to compare the financial performance of the small, medium and large-scaled companies in manufacturing sector which has an important place in Turkey's economy, by addressing the 2014-2016 period.

Methodology- In the study, 19 financial ratios related to liquidity, financial structure, activity and profitability were used. Firstly weights of criteria were determined by using AHP method and then companies were ranked according to scale by TOPSIS method.

Findings- As a result of the analyzes, it was determined that small and medium scaled firms, although they have a significant volume in numerical terms, perform relatively poorly in terms of financial performance compared to large scale firms.

Conclusion- It is thought that the main cause of this situation for small and medium scaled companies is not being able to benefit from scale economies and capital shortage.

Keywords: Firm scale, AHP, TOPSIS, financial performance, manufacturing sector, Turkey.

JEL Codes: C02, C44, M21

1. INTRODUCTION

Companies are classified as large, medium and small enterprises according to their scale. These scales can provide some advantages to the firms. As a company grows in scale, the advantages of specialization in terms of labor and mechanization are also increasing in production process. The benefiting from scale economy in large-scale firms increases the firm's profit. Because, in large-scale companies, it is possible to obtain some inputs at a cheaper price due to the possibility of purchasing in high quantities. Thus, other conditions remaining the same, it is reduced production costs.

In the case of small-scale firms, the ability to focus on products and markets, the ability to specialize, the flexibility to enter markets with limited demand, the ability to react quickly to changes in market conditions and consumer preferences, and the ability to use qualified technology can be an advantage (Güngör, 2017: 22). However, in addition to these advantages, Gupta (1969) studied on the influence of firm scale on financial structure. It is found that small-scale firms have difficulties in finding funds because their inventory and cash turnover rates are high and average collections periods are low. In addition, there is a negative relationship between borrowing rate and firm scale. The reason for this negative relationship is that the financial risk of small firms is high. It is also found that the debt of small firms is mainly composed of short-term debt (Ata & Ag, 2010: 50).

2. LITERATURE REVIEW

In the literature, multi-criteria decision-making method is used to analyze the financial performance of businesses in different sectors. Meydan et al. (2016) assessed the financial performance of food companies traded in BIST for 2012. In this context, the financial ratios (liquidity, activity, financial structure and profitability ratios) of enterprises were taken as group and whole separately. The financial performances of the businesses were analyzed by using Gray Relational Analysis method in both cases. As a result, Ülker Gıda ranked first in overall financial performance and Penguin Food ranked last in ranking. Orçun and Eren (2017) evaluated the financial performances of technology companies traded in BIST covering the period 2010-2015 by using the TOPSIS method. As a result of the analysis, it was determined that the most successful companies in terms of performance are ASELS, LINK, ARMDA, LINK, INDES and DGATE respectively. Şit et al. (2017) analyzed the financial performances of BIST Main Metal Index companies during the 2011-2015 period. In the study,

frequently used ratios of liquidity, activity, financial structure, profitability and stock market performance ratios were determined and compared with TOPSIS management. As a result of the study, it was determined that financial performances of the companies operating in the sector vary from year to year.

3. DATA AND METHODOLOGY

The comparison of financial performances according to the scales of the companies gathered from financial ratios included in the Sectoral Balance Sheet Statistics published by The Central Bank of The Republic of Turkey (CBRT). In the determination of the scale ranges, "net sales" adopted by CBRT by BACH and "asset size" criteria used by European Union are taken as basis. Under the net sales criteria; companies with net sales of less than 10 Million Euros in 2016 are on the small scale, those between 10 Million Euros and 50 Million Euros are on the medium scale and those over 50 Million Euros are on the big scale. In sectors analyzed according to asset size criteria; Companies with a total of less than 10 Million Euros in 2016 are classified as small-scale, firms with a size between 10 Million Euros and 43 Million Euros are classified as medium-scale and those with a size greater than 43 Million Euros are classified as large-scale. In the CBRT study, 1467 small-scale, 1082 medium-scale and 508 large-scale firms were taken into account. In the study, 19 financial ratios related to liquidity, financial structure, activity and profitability were used. Because it requires a multi-criteria framework for performance evaluation, MCDM methods were utilized in the study. AHP is used to determine the weights of the criteria and TOPSIS methods were used in performance ranking.

4. FINDINGS

In this part of the study, the financial performance of the manufacturing sector is calculated and interpreted according to firm scale for 2014-2016 period.

4.1. Determination of Weights of Financial Ratios

The weight of each criterion is determined by AHP method in comparing financial performances according to firm scale. Here, we have been interviewed by expert academics and sector managers when creating pair-wise comparison matrices. Then the answers are analyzed in Super Decision program and the importance ratings of each criterion were determined. The consistency rate (CR) was calculated as 0,06. The weights of the financial ratios are shown in Table 1.

Table 1: Weights of Financial Ratios

Basic Ratios	Weights	Sub-Ratios	Weights
Liquidity Ratios	0.261	L1 Current Ratio	0,088
		L2 Quick Ratio	0,076
		L3 Cash Ratio	0,059
		L4 Inventory Dependency Ratio	0,038
Financial Structure Ratios	0.175	F1 Total Debt/Assets	0,032
		F2 Equity/Assets	0,043
		F3 Short Term Liabilities/Total Liabilities	0,058
		F4 Net Tangible Assets/Equity	0,042
Activity Ratios	0.247	A1 Inventory Turnover	0,058
		A2 Receivable Turnover	0,041
		A3 Net Working Capital Turnover	0,049
		A4 Equity Turnover	0,044
		A5 Asset Turnover	0,055
Profitability Ratios	0.317	P1 Net Profit/Equity	0,066
		P2 EBIT/Assets	0,039
		P3 Net Profit/Assets	0,042
		P4 Operating Profit/Net Sales	0,046
		P5 Gross Profit /Net Sales	0,055
		P6 Net Profit /Net Sales	0,069

4.2. Evaluation of Financial Performance with TOPSIS Method

As shown in Table 2, the top line of the decision matrix contains weight values indicating the importance of each criterion. Weight values are obtained by evaluating questionnaires containing pair-wise comparisons through AHP approach. Three decision points (firm scale) and 19 evaluation criteria (financial ratios) are used in the study. In the first stage (3x19) dimensional decision matrices are created in the application of the TOPSIS method.

Table 2: Decision Matrices

2014																			
	L1	L2	L3	L4	F1	F2	F3	F4	A1	A2	A3	A4	A5	P1	P2	P3	P4	P5	P6
Small	141,	81,0	18,3	203,	69,3	30,6	49,4	106,	5,08	4,82	2,63	3,55	0,87	7,12	4,91	1,75	6,48	17,9	2,08
Mediu	152,	95,5	22,4	198,	66,5	33,4	49,1	88,7	7,38	5,29	5,05	4,83	1,26	11,3	7,75	3,72	7,08	16,2	3,21
Large	184,	113,	31,6	158,	59,4	40,5	41,6	72,2	6,47	5,86	4,36	4,01	1,25	13,4	10,0	5,77	8,13	18,2	5,46
2015																			
	L1	L2	L3	L4	F1	F2	F3	F4	A1	A2	A3	A4	A5	P1	P2	P3	P4	P5	P6
Small	142,	80,2	18,6	212,	70,1	29,9	50,1	106,	4,1	4,6	2,1	3,5	0,8	7,0	5,4	1,5	7,5	19,0	2,1
Mediu	152,	95,8	23,1	197,	67,2	32,8	49,6	88,9	6,0	5,0	4,8	4,8	1,2	10,6	8,1	3,4	7,7	16,8	2,9
Large	180,	112,	30,4	167,	60,6	39,4	42,6	68,9	6,2	5,8	4,6	3,8	1,2	11,6	10,0	4,6	9,0	19,2	4,3
2016																			
	L1	L2	L3	L4	F1	F2	F3	F4	A1	A2	A3	A4	A5	P1	P2	P3	P4	P5	P6
Small	142,	77,5	18,0	205,	69,9	30,1	50,0	97,2	3,7	4,4	1,8	3,0	0,8	4,5	4,5	0,8	7,3	19,2	1,2
Mediu	156,	95,6	21,6	183,	66,5	33,5	48,8	82,9	5,5	4,9	4,3	4,4	1,1	7,9	7,2	2,6	7,9	17,0	2,5
Large	178,	111,	30,4	175,	61,3	38,7	42,9	65,9	5,9	5,5	4,2	3,7	1,2	11,8	9,7	4,6	9,7	19,9	4,4

After the decision matrices are created using the formula $r_{ij} = \frac{a_{ij}}{\sqrt{\sum_{k=1}^m a_{kj}^2}}$ a normalized decision matrix is obtained and is shown in Table 3.

Table 3: Normalized Decision Matrices

2014																			
	L1	L2	L3	L4	F1	F2	F3	F4	A1	A2	A3	A4	A5	P1	P2	P3	P4	P5	P6
Small	0,50	0,48	0,42	0,62	0,61	0,50	0,60	0,68	0,46	0,52	0,36	0,49	0,44	0,37	0,36	0,24	0,51	0,59	0,31
Mediu	0,54	0,56	0,52	0,60	0,58	0,55	0,60	0,56	0,66	0,57	0,70	0,67	0,63	0,59	0,57	0,52	0,56	0,53	0,48
Large	0,66	0,67	0,73	0,48	0,52	0,66	0,51	0,46	0,58	0,63	0,60	0,55	0,63	0,70	0,73	0,81	0,64	0,60	0,81
2015																			
	L1	L2	L3	L4	F1	F2	F3	F4	A1	A2	A3	A4	A5	P1	P2	P3	P4	P5	P6
Small	0,51	0,47	0,43	0,63	0,61	0,50	0,60	0,68	0,43	0,51	0,30	0,49	0,43	0,40	0,38	0,25	0,53	0,59	0,37
Mediu	0,55	0,57	0,54	0,59	0,58	0,55	0,60	0,57	0,62	0,55	0,68	0,67	0,63	0,61	0,57	0,57	0,55	0,52	0,51
Large	0,65	0,66	0,71	0,50	0,52	0,66	0,51	0,44	0,64	0,65	0,66	0,54	0,64	0,67	0,71	0,77	0,64	0,60	0,76
2016																			
	L1	L2	L3	L4	F1	F2	F3	F4	A1	A2	A3	A4	A5	P1	P2	P3	P4	P5	P6
Small	0,51	0,46	0,43	0,62	0,61	0,50	0,61	0,67	0,41	0,51	0,28	0,46	0,41	0,30	0,35	0,14	0,50	0,59	0,22
Mediu	0,56	0,57	0,52	0,56	0,58	0,56	0,59	0,57	0,61	0,57	0,68	0,68	0,62	0,53	0,55	0,49	0,54	0,52	0,48
Large	0,64	0,67	0,73	0,53	0,53	0,65	0,52	0,45	0,66	0,64	0,67	0,56	0,65	0,79	0,75	0,85	0,66	0,61	0,84

The weighted standard decision matrix is obtained by multiplying the normalized values by weights ($V_{ij} = w_{ij} \times R_{ij}$) and is shown in Table 4.

Table 4: Weighted Standard Decision Matrices

2014																			
	L1	L2	L3	L4	F1	F2	F3	F4	A1	A2	A3	A4	A5	P1	P2	P3	P4	P5	P6
Small	0,04	0,03	0,02	0,02	0,02	0,02	0,03	0,02	0,02	0,02	0,01	0,02	0,02	0,02	0,01	0,01	0,02	0,03	0,02
Mediu	0,04	0,04	0,03	0,02	0,01	0,02	0,03	0,02	0,03	0,02	0,03	0,02	0,03	0,03	0,02	0,02	0,02	0,02	0,03
Large	0,05	0,05	0,04	0,01	0,01	0,02	0,03	0,01	0,03	0,02	0,03	0,02	0,03	0,04	0,02	0,03	0,03	0,03	0,05
2015																			
	L1	L2	L3	L4	F1	F2	F3	F4	A1	A2	A3	A4	A5	P1	P2	P3	P4	P5	P6
Small	0,04	0,03	0,02	0,02	0,02	0,02	0,03	0,02	0,02	0,02	0,01	0,02	0,02	0,02	0,01	0,01	0,02	0,03	0,02
Mediu	0,04	0,04	0,03	0,02	0,01	0,02	0,03	0,02	0,03	0,02	0,03	0,03	0,03	0,04	0,02	0,02	0,02	0,02	0,03
Large	0,05	0,05	0,04	0,01	0,01	0,02	0,03	0,01	0,03	0,02	0,03	0,02	0,03	0,04	0,02	0,03	0,03	0,03	0,05
2016																			
	L1	L2	L3	L4	F1	F2	F3	F4	A1	A2	A3	A4	A5	P1	P2	P3	P4	P5	P6
Small	0,04	0,03	0,02	0,02	0,02	0,02	0,03	0,02	0,02	0,02	0,01	0,02	0,02	0,02	0,01	0,00	0,02	0,03	0,01
Mediu	0,05	0,04	0,03	0,02	0,01	0,02	0,03	0,02	0,03	0,02	0,03	0,03	0,03	0,03	0,02	0,02	0,02	0,02	0,03
Large	0,05	0,05	0,04	0,02	0,01	0,02	0,03	0,01	0,03	0,02	0,03	0,02	0,03	0,05	0,02	0,03	0,03	0,03	0,05

Then ideal (A^+) and negative ideal (A^-) solutions were created. For the A^+ set, the largest value in each column of the V matrix is chosen as the smallest value in each column of the V matrix for A^- set. The sets are shown in Table 5 for the purposes of the criteria.

Table 5: Ideal (A^+) and Negative Ideal (A^-) Solutions

2014																			
A^+	0,05	0,05	0,04	0,01	0,01	0,02	0,03	0,01	0,03	0,02	0,03	0,02	0,03	0,04	0,02	0,03	0,03	0,03	0,05
A^-	0,04	0,03	0,02	0,02	0,02	0,02	0,03	0,02	0,02	0,02	0,01	0,02	0,02	0,02	0,01	0,01	0,02	0,02	0,02
2015																			
A^+	0,05	0,05	0,04	0,01	0,01	0,02	0,03	0,01	0,03	0,02	0,03	0,03	0,03	0,04	0,02	0,03	0,03	0,03	0,05
A^-	0,04	0,03	0,02	0,02	0,02	0,02	0,03	0,02	0,02	0,02	0,01	0,02	0,02	0,02	0,01	0,01	0,02	0,02	0,02
2016																			
A^+	0,05	0,05	0,04	0,02	0,01	0,02	0,03	0,01	0,03	0,02	0,03	0,03	0,03	0,05	0,02	0,03	0,03	0,03	0,05
A^-	0,04	0,03	0,02	0,02	0,01	0,02	0,03	0,02	0,03	0,02	0,03	0,02	0,03	0,03	0,02	0,02	0,02	0,02	0,03

Distances (S_i^+) from the positive-ideal solution, the distances from the negative-ideal solution (S_i^-), the performance scores and the rankings of the manufacturing sector firm scales by years are presented in Table 6.

Table 6: Performance Scores and Rankings of Scales by Years

2014				
Scale	S^+	S^-	(C) Score	Ranking
Small	0,064	0,003	0,052	3
Medium	0,035	0,036	1,045	2
Large	0,008	0,062	7,424	1
2015				
Scale	S^+	S^-	(C) Score	Ranking
Small	0,057	0,004	0,072	3
Medium	0,028	0,036	1,319	2
Large	0,006	0,056	9,318	1
2016				
Scale	S^+	S^-	(C) Score	Ranking
Small	0,076	0,039	0,553	3
Medium	0,040	0,012	0,805	2
Large	0,005	0,045	8,806	1

Findings indicate that large scale firms show better financial performance compared to medium and small scale firms during the related period. This situation is thought to be caused by scale economies.

Scale economies are defined as the decrease in average cost while the production capacity measured by unit output is increasing. In other words, they are reductions in unit costs resulting from the increased transaction scale.

As a matter of fact, the larger the scale of a company's facility, the greater the bargaining power of the company in the international market, and therefore the firm is able to obtain the production factors it buys at lower prices (Güngör, 2017: 23). This situation also contributes positively to the profitability ratios. According to this, while medium and large scaled companies reached the highest performance values in 2015, it is seen that the small sized companies reached the highest performance value in 2016. This is thought to be the contribution of incentives and credit guarantee funds that the government has explained.

5. CONCLUSION

Increasing competition conditions are pushing companies. One of the industries holds an important place in Turkey's economy is the manufacturing sector. In this study, the financial performances of small, medium and large scale companies in manufacturing sector were compared over the period 2014-2016.

In the study, liquidity, financial structure, activity and profitability ratios are used. Firstly, the weights of the ratios were determined by using AHP method and then the performance scores of the scales were calculated and sorted by TOPSIS method. As a result of the analysis, it was determined that SMEs perform considerably poorly in terms of financial performance compared to large scale firms even though they are in significant numbers. The most important problem of the small and medium-scaled firms in Turkey is the lack of sufficient working capital. This increases costs, making it difficult to fulfill obligations and to work at full capacity. Therefore, the findings are consisted with expected results. In this respect, SMEs' access to finance at low cost will be beneficial in terms of enabling them to sustain their activities.

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