Statistical analysis of performance in SMEs

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Market economy is mainly characterized by private property. For entrepreneurs, private property allows action according to market realities, opportunities and strategies aimed to succeed. There is no doubt that all small and medium enterprise (SME) achievements are closely linked to profitability, as SMEs constitute a development engine that fuel country GDP. We examine the profitability implications of providing finance to 1233 Romanian SMEs during 2004–2008 based on financial structure ratios. In addition, we analyse the correlation between various return rates. We establish a correlation between performance and equilibrium of Romanian SMEs in five economic sectors: pharmaceutical, furniture manufacturers, leather garment, software and textiles.

Keywords: Assets, equity, sales, investment.

THE events of the previous economic period, characterized by dramatic changes at technical, economic, social, informational, educational, cultural and political levels, highlighted that small and medium enterprise sector is a basis for development of a modern, dynamic, and knowledge-based economy. Small and medium-sized enterprises (SMEs) are active factors within market economy. Their economic, social and political importance are the basis of modern economy. In addition, economic realities demonstrate the existence of strong complementary relationships between large companies and SMEs. Small businesses should be perceived as the main promoters of social and local integration across the European Union. Therefore, it is necessary to create an optimal environment for small firms and entrepreneurial initiatives. The rationale is straightforward: SMEs are often confronted with market imperfections and experience difficulties in obtaining financial resources or loans, especially in the start-up phase.

The present article aims to analyse the key statistical indicators of central tendency and performance rates in 1233 Romania SMEs for five economic sectors, during 2004–2008. In this respect, we examine the average, median and dispersion for each performance ratio. Another objective was to analyse the correlation between performance indicators. For the first time, we determine a correlation between performance and equilibrium of Romanian SMEs in five sectors: pharmaceutical, furniture manufacture, leather garment, software and textile sectors.

Literature review

Brief overview on determinants of entity profitability

Various studies include econometric models based on return on assets (ROA) ratio. Considering the important microstructure economic environments, one study[1] tackled the cross-correlation function of latent returns and market microstructure noise. In addition, it advances multiple volatility estimators that can adequately be applied to forecast stock and oil prices. Another study[2] analysed the significant determinants of return on assets in Sri Lankan microfinance institutions, namely operating expense ratio, cost per borrower ratio and debt to equity ratio. In the Indian manufacturing sector, cement industry is one of the oldest and established industries that contributes substantially to the overall industrial production and employment. Nevertheless, lower profitability ratios and unstable financial position registered by majority of entities have left the cement industry with little resources to aim renovation and modernization[3].

Another paper studied variables impacting firm profitability by using the seemingly unrelated regression method on a large sample of 87,000 observations from 12,530 non-financial microfirms operating in four industrial sectors[4]. The study considered profitability determinants and industry affiliation levels when examining hypotheses and shows that productivity is the most significant determinant of profitability. At the same time, another study[5] examined the relationship between financial reporting quality and acquisition profitability in a sample of 282 acquisitions registered in South Korea during 2001–2011. Studies found that firms with high-quality financial reporting achieve more profitable acquisitions, as measured by the bidder's announcement

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returns. One survey concludes that the topic of wintering systems with small environmental impact and a dependable supply of high quality feed should be studied further[6].

Performance in SMEs

Economic literature reports many studies on the performance of SMEs based on ratios like return on equity, return on assets, return on sales and other significant ratios. Thus, managerial decisions taken during the stages of the life cycle influenced the performance of Swedish SMEs[7]. One study[8] examined how cash flow influences the relationship between net working capital and firm performance. Results indicate that, when cash flow is not considered, the relationship between the two variables is concave. Once cash flow is included, the relationship becomes convex. Consequently, managers are asked to consider cash flow in order to improve company performance. Other studies[9] estimated performance efficiency of 94 manufacturing Turkish SMEs and concluded that the vast majority of SMEs are efficient, except for these active in the textile and chemical sectors.

A recent study[10] argued that asset tangibility, financial leverage, operating cash flow, profitability and sales growth are key drivers of working capital requirements for Indian manufacturing SMEs. Results indicate that profitability and sales' growth influence working capital requirements positively, whereas asset tangibility, financial leverage and operating cash flow influence it negatively. Another study investigated the relationships between information technology, organizational innovation and profitability on 267 Spanish manufacturing SMEs[11] and reported a positive correlation with performance ratios. The impact of company strategy, structure and environment on profitability was also studied using data from 184 French manufacturing SMEs[12].

One empirical study[13] focused on the relationship between ownership structure, board composition and financial performance in a sample of Finnish SMEs based on data from 2000 to 2005. Entity performance is influenced by SMEs' capabilities and business model design[14]. Other studies investigated SMEs' performance in biopharmaceutical industry and found that the geographic dispersion of foreign subsidiaries and alliances have a negative influence on performance[15]. Regarding the

relationship between working capital and performance, it is shown that a decrease in inventories and number of days of commercial liabilities along with an improved payment collection from customers generate high profitability of Portuguese SMEs[16]. Moreover, brand attitude and corporate trust have a significant impact on purchase intentions for SMEs than for large firms[17].

One study conducted on Spanish SMEs reported the relationship between entrepreneur features, characteristics of firm, managerial attributes and business performance, active in service industry during the period 2010–2011 (ref. 18). Another paper analysed data from 223 manufacturing and trading SMEs, with a focus on the relationships between logistics of outsourcing, costs and performance, financial performance, and company context[19]. The link between innovation and organizational performance was studied on data retrieved from 877 SMEs located in Taiwan[20]. The research gap regarding intellectual capital is studied on the data provided by SMEs from New Zealand[21], with an emphasis on managers' perceptions about the importance and contribution of intangible assets for business activity.

In this paper, we study the statistical indicators of central tendency and the variation of performance ratios. We also examine the correlations between performance ratios and financial equilibrium ratios on data retrieved from 1233 Romanian SMEs during 2004–2008. The aim of our paper was to analyse the relationship among profitability, assets, liabilities and equity of the SMEs' sample pool active in five productive sectors: pharmaceutical, furniture, leather garment, software and textiles.

Research methodology and results

In an effort to highlight the performance of SMEs active in the Romanian market, we analysed the ratios of return on assets (ROA) and return on sales (ROS) across five economic sectors during 2004–2008. One thousand two hundred and thirty three sample units were selected with non-random survey method extraction. In this method, the sample had to comprise 20% of enterprises active in the period analysed. Then, we selected the enterprises using the following criterion: we chose one enterprise at every five ones. The structure of the sample pool is shown in Table 1.

We conducted the analyses using information from two web pages: the list of companies active in Romania and the Ministry of Finance website. Based on the data retrieved from the Ministry of Finance website, we computed ROA and ROS.

Analysis of central tendency and variation of performance ratios

First, we analysed statistical indicators of central tendency and the variation in ROA and ROS for each of the five

Table 1. Structure of the sample pool

Activity sector	Number of analysed companies
Pharmaceutical	34
Furniture manufacturers	780
Leather garment	36
Software	346
Textile	37
Total	1233

Source: Data retrieved from www.listafirme.ro.

Table 2. Overall mean, median and standard deviation regarding performance ratios

Sectors/variable	Pharmaceutical		Furniture		Leather		Software		Textile	
Indicators	ROS	ROA	ROS	ROA	ROS	ROA	ROS	ROA	ROS	ROA
Average	13.53	13.14	10.11	12.12	8.58	11.47	28.40	22.44	9.67	6.02
Median	8.74	8.76	3.62	5.35	4.57	5.08	20.66	19.66	5.81	3.26
Standard deviation	15.3	14.28	124.44	17.36	10.21	15.32	25.66	17.73	11.92	7.76

Table 3. Descriptive statistics for the period 2004–2008

Statistical indicators	2004		2005		2006		2007		2008	
	ROS	ROA	ROS	ROA	ROS	ROA	ROS	ROA	ROS	ROA
Pharmaceutical										
Average	12.72	13.43	17.06	15.54	17.68	15.46	12.67	11.18	11.08	11.08
Median	7.79	8.73	11.59	11.81	11.92	11.9	7.85	7.63	5.74	5.74
Standard deviation	16.87	14.77	18.04	15.32	18.21	15.4	14.4	10.6	13.7	13.7
Furniture										
Average	10.07	17.55	8.9	13.65	8.66	12.27	17.06	9.81	5.86	5.86
Median	4.8	8.81	4.32	6.78	4.06	6.03	3.53	4.78	2.13	2.13
Standard deviation	14.98	23	19.92	18.43	13.09	16.09	276.63	13.57	11.1	11.1
Leather										
Average	9.29	14.91	9.19	12.06	9.69	13.27	6.99	8.61	7.73	7.73
Median	4.60	6.63	5.28	5.66	5.58	5.79	2.73	2.16	2.74	2.74
Standard deviation	11.28	19.41	11.44	13.98	10.84	18.74	8.55	11.70	8.88	8.88
Software										
Average	34.12	29.42	30.69	24.67	29.71	22.99	24	17.75	23.48	23.48
Median	27.97	30.3	21.79	23.82	23.29	20.69	16.74	14.93	17.38	17.38
Standard deviation	28.31	21	26.98	17.21	26.91	17.59	22.58	14.26	21.29	21.29
Textile										
Average	12.66	8.35	7.50	5.88	9.85	6.09	10.65	5.64	7.72	7.72
Median	8.7	4.65	3.44	1.64	5.81	3.77	7.52	3.31	2.52	2.52
Standard deviation	14.63	10.2	9.39	8.91	12.29	6.89	12.56	6.14	9.8	9.8

economic sectors. Table 2 contains overall mean, median and standard deviation computed for 2004–2008.

The table shows that entities from the software sector had the highest ROS and ROA, whereas the entities from the textile sector registered the lowest values. Higher values were also registered by entities from the pharmaceutical sector and the furniture sector. At the country level, we noticed a significant difference between the indicators for software entities and those from other sectors. Among the remaining economic sectors, pharmaceutical entities register high values. As the paired samples t test revealed no significant differences, we concluded that, for pharmaceutical entities, the average values of ROS and ROA were close. Given that this sector involves heavy use of technology, the value of total assets is similar to turnover value. Lower returns were registered for the textile sector (ROA) and leather sector (ROS). For SMEs within the textile sector, ROA values were lower than ROS values (paired samples test, $t = 5.805$, $P < 0.001$). In other words, company profitability in the textile sector does not rely significantly on the efficient operation of assets. This can be explained by the large degree of outsourcing. In the

leather garment sector, ROA was significantly higher than ROS (paired samples test, $t = 3.996$, $P < 0.001$). Here, high levels of ROA are not fully reflected by the net profit margin ratio. Moreover, in terms of ROA, there was a significant difference in the average values registered by entities from the pharmaceutical sector (independent samples test, $t = 5.768$, $P < 0.001$) and the leather sector (independent samples test, $t = 4.274$, $p < 0.001$) compared to the values registered by businesses in the textile sector. Therefore, we concluded that during 2004–2008, entities active in the pharmaceutical and leather garment sectors used their resources more efficiently than entities in the textile sector.

Table 3 presents the descriptive statistics of ROS and ROA for 2004–2008. The table shows that software SMEs reached the highest indicator values, followed by the pharmaceutical sector. During 2004–2008, outstanding results were also achieved by entities manufacturing furniture and leather garments. In all five years, textile enterprises recorded the lowest values for indicators. There are, however, some exceptions. For instance, in 2004, ROA of furniture enterprises increased.

Table 4. Correlation matrix corresponding to SMEs operating in the pharmaceutical sector

Ratios	ROA	ROS	FAR	CAR	IR	RR	ELR	DAR	DER
ROA	1	0.785**	−0.403**	0.403**	−0.400**	−0.048	0.389**	−0.377**	−0.091
ROS	0.785**	1	−0.240**	0.240**	−0.477**	0.017	0.375**	−0.358**	−0.084
FAR	−0.403**	−0.240**	1	−1**	0.234**	0.162*	0.023	−0.030	−0.028
CAR	0.403**	0.240**	−1**	1	−0.234**	−0.162*	−0.023	0.030	0.028
IR	−0.400**	−0.477**	0.234**	−0.234**	1	0.023	−0.305**	0.307**	0.089
RR	−0.048	0.017	0.162*	−0.162*	0.023	1	−0.198**	0.184*	−0.055
ELR	0.389**	0.375**	0.023	−0.023	−0.305**	−0.198**	1	−0.992**	−0.250**
DAR	−0.377**	−0.358**	−0.030	0.030	0.307**	0.184*	−0.992**	1	0.263**
DER	−0.091	−0.084	−0.028	0.028	0.089	−0.055*	−0.250**	0.263**	1

*Correlation coefficients significant with $P < 0.05$; **Correlation coefficients significant with $P < 0.01$.

Moreover, pharmaceutical entities attained high returns in 2008.

Analysis of correlation regarding ROS and ROA

Based on data retrieved from the official website of the Ministry of Finance, we determined the indicators mentioned below:

Model 1: Fixed assets ratio (FAR) = fixed assets/total assets. Model 2: Current assets ratio (CAR) = current assets/total assets. Model 3: Inventory ratio (IR) = inventories/total current assets. Model 3: Receivables ratio (RR) = receivables/total current assets. Model 4: Equity to total liabilities ratio (ELR) = equity/(equity + liabilities). Model 5: Total debt to assets ratio (DAR) = total debts/total assets. Model 6: Debt to equity ratio (DER) = total debts/equity.

We considered two significance thresholds for correlation coefficients 0.01 and 0.05. The first threshold shows that the correlation coefficient is equal to 0 with a probability of 99%, whereas the second threshold shows that the correlation coefficient is equal to 0 with a probability of 95%. Table 4 presents the correlation matrix for the SMEs from the pharmaceutical sector.

In terms of SMEs operating in the pharmaceutical sector, we have identified positive correlations between the following ratios:

- ROA and ROS (0.785), indicating that an increase in assets (e.g. investments in real estate, debts, inventory purchase) is matched by an increase in sales, therefore investments and acquisitions carried out by those entities are effective.
- ROA and equity to total liabilities ratio (0.389). If one cannot establish a relationship between equity and net profit, the two elements are interdependent.
- ROS and equity to total liabilities ratio (0.375). A positive correlation indicates that increasing liabilities are connected to higher turnover, and increasing net profit is linked to higher net wealth of entities.

- ROA and current assets ratio (0.407) show that net profit growth is matched by a growth in current assets and vice versa.
- ROS and current assets ratio (0.244). This positive correlation indicates that increasing assets is matched by increasing sales and increasing current assets is matched by increasing profit and vice versa.

However, significant negative correlations were established between the following:

- ROA and inventories ratio (−0.4), meaning that an inventory increase corresponds to a decrease in net profit.
- ROS and inventories ratio (−0.477). In addition to what we have already observed regarding the direct correlation between net profit and current assets and the indirect correlation between net profit and inventories, this negative correlation indicates that increasing current assets is matched by decreasing sales.
- ROA and fixed assets ratio (−0.403) and return on sales and fixed assets ratio (−0.240). Although net profit is directly connected to current assets, it is indirectly connected to fixed assets. Therefore, in this sector, technology investment leads to lower net profit.

Table 5 shows the correlation matrix for the SMEs from the furniture sector. In terms of the SMEs operating in the furniture sector, we have identified positive correlations between the following ratios:

- ROA and equity to total liabilities ratio (0.42). As in the case of pharmaceutical enterprises, net profit and equity are directly connected.
- ROA and total current assets ratio (0.27). Similar to the case of pharmaceutical SMEs, an increase in current assets corresponds to the net profit.

In addition, we note the positive correlation between ROA and debt to equity ratio (0.02), ROS and return on current assets (0.02), ROS and equity to total liabilities ratio (0.08).

Table 5. Correlation matrix corresponding to the SMEs in the furniture sector

Ratios	CAR	ELR	FAR	RR	ROA	ROS	DAR	DER	IR
CAR	1	−0.04	−1**	−0.03	0.26	0.02	0.05	0.04	−0.05
ELR	−0.04	1	0.04	0	0.42**	0.08	−0.97**	−0.14	−0.2
FAR	−1**	0.04	1	0.03	−0.26	−0.02	−0.05	−0.04	0.05
RR	−0.03	0	0.03	1	−0.02	0.01	0	0.03	−0.42*
ROA	0.26	0.42**	−0.26	−0.02	1	0.12	−0.4*	0.02	−0.27
ROS	0.02	0.08	−0.02	0.01	0.12	1	−0.07	0	−0.05
DAR	0.05	−0.97**	−0.05	0	−0.4*	−0.07	1	0.13	0.2
DER	0.04	−0.14	−0.04	0.03	0.02	0	0.13	1	−0.02
IR	−0.05	−0.2	0.05	−0.42*	−0.27	−0.05	0.2	−0.02	1

*Correlation coefficients significant with $P < 0.05$; **Correlation coefficients significant with $P < 0.01$.

Table 6. Correlation matrix for SMEs operating in the leather garments sector

Ratios	RCA	REL	RFA	RR	ROA	ROS	RDA	RDE	RI
RCA	1	−0.02	−1**	−0.21	0.19	0.1	0.04	0.09	0.11
REL	−0.02	1	0.02	0.1	0.46*	0.42*	−0.99**	−0.24	−0.28
RFA	−1**	0.02	1	0.21	−0.19	−0.1	−0.04	−0.09	−0.11
RR	−0.21	0.1	0.21	1	0.14	0.1	−0.11	−0.12	−0.81
ROA	0.19	0.46*	−0.19	0.14	1	0.78**	−0.45	−0.13	−0.41*
ROS	0.1	0.42*	−0.1	0.1	0.78**	1	−0.43	−0.13	−0.28*
RDA	0.04	−0.99**	−0.04	−0.11	−0.45	−0.43	1	0.24	0.29
RDE	0.09	−0.24	−0.09	−0.12	−0.13	−0.13	0.24	1	0.04
RI	0.11	−0.28	−0.11	−0.81**	−0.41*	−0.28*	0.29	0.04	1

*Correlation coefficients significant with $P < 0.05$; **Correlation coefficients significant with $P < 0.01$.

Moreover, there were significant negative correlations between the following ratios:

- Receivables ratio and inventories ratio (−0.42) show that increasing receivables are linked to lower inventories.
- ROA and debt to assets ratio (−0.4). Negative correlation indicates that high interest rates on loans contracted by SMEs are linked to low net profit.

Furthermore, we noticed a negative correlation between ROA and inventories ratio (0.27) and between ROS and inventories ratio (0.05). Table 6 displays the correlation matrix for the SMEs from the leather garments sector.

The significant positive correlation between ROA and ROS (0.78) indicates that an increase in assets is mirrored by an increase in sales, hence by a revenue growth. We also found significant positive correlations between ROA and equity to total liabilities ratio (0.46) and between ROS and equity to total liabilities ratio (0.42), which show that an increase in liabilities is linked to higher turnover, while a net profit increase is linked to higher net wealth and vice versa. In addition, we found positive correlations between ROA and current assets ratio (0.19) and between ROA and receivables ratio (0.14).

Regarding the delivery of leather products, we noticed that receivables and inventories were indirectly linked (i.e. −0.81). Negative correlations were established between ROA and inventories ratio (−0.41) and between

ROS and inventories ratio (0.28), suggesting that an increase in net profit is connected to an efficient use of inventories. Also, we notice the negative correlation between ROS and debt to equity ratio (−0.13). Table 7 presents the correlation matrix of SMEs activating in the software sector during 2004–2008.

There were significant positive correlations between ROA and equity to total liabilities ratio (0.44), and between ROS and equity to total liabilities ratio (0.34). The direct connection between net profit and equity or between total turnover and assets represents a normal course of action within companies manufacturing customized software packages. Moreover, the significant positive correlation between ROA and ROS (0.67) suggests that an increase in sales is matched by an increase in wealth. We found a significant negative correlation between ROS and inventories ratio (−0.32) and between equity to total liabilities and debt to assets (−0.74). The first correlation indicates that a decrease in net profit is linked to an increase in inventories, which reflects the specificity of the activity within the software sector. The second correlation indicates that a decrease in equity is linked to an increase in interest costs and bank loans, thus impacting profit. We also noticed correlations between ROA and receivables (−0.16) and between ROA and inventories (−0.25).

Table 8 shows the correlation matrix of SMEs operating in the textile sector. In the textile sector, we noticed significant positive correlations between the fixed assets

Table 7. Correlation matrix corresponding to the SMEs operating in the software sector

Ratios	CAR	ELR	FAR	RR	ROA	ROS	DAR	DER	IR
CAR	1	−0.04	−0.97**	−0.03	0.09	0.18	−0.43	−0.04	−0.03
ELR	−0.04	1	0.04	−0.09	0.44**	0.34**	−0.74**	−0.26	−0.19
FAR	−0.97**	0.04	1	0.02	−0.09	−0.18	0.47	0.04	0.02
RR	−0.03	−0.09	0.02	1	−0.16	0.01	0.08	0.04	−0.22
ROA	0.09	0.44	−0.09	−0.16	1	0.67**	−0.32	0.08	−0.25
ROS	0.18	0.34**	−0.18	0.01	0.67**	1	−0.37	0.11	−0.32**
DAR	−0.43	−0.74**	0.47	0.08	−0.32	−0.37	1	0.24	0.18
DER	−0.04	−0.26	0.04	0.04	0.08	0.11	0.24	1	−0.04
IR	−0.03	−0.19	0.02	−0.22	−0.25	−0.32**	0.18	−0.04	1

*Correlation coefficients significant with $P < 0.05$; **Correlation coefficients significant with $P < 0.01$.

Table 8. Correlation matrix corresponding to SMEs operating in the textile sector

Ratios	RCA	REL	RFA	RR	ROA	ROS	RDA	RDE	RI
RCA	1	−0.47**	−0.98**	−0.1*	0.33**	0.07*	−0.01	0.06*	0.07*
REL	−0.47**	1	0.53**	−0.25**	−0.05	0	−0.85**	−0.22**	−0.01
RFA	−0.98**	0.53**	1	0.05*	−0.34**	−0.09*	−0.01	−0.07*	−0.13*
RR	−0.1*	−0.25**	0.05*	1	−0.1*	−0.18*	0.31**	−0.01	−0.62**
ROA	0.33**	−0.05*	−0.34**	−0.1*	1	0.7**	−0.15*	0.01	−0.12*
ROS	0.07*	0	−0.09*	−0.18*	0.7**	1	−0.06*	0.17*	−0.09*
RDA	−0.01	−0.85**	−0.01	0.31**	−0.15*	−0.06*	1	0.26**	−0.1*
RDE	0.06*	−0.22**	−0.07*	−0.01	0.01	0.17*	0.26**	1	0.03
RI	0.07*	−0.01	−0.13*	−0.62**	−0.12*	−0.09*	−0.1	0.03	1

*Correlation coefficients significant with $P < 0.05$; **Correlation coefficients significant with $P < 0.01$.

ratio and equity to total liabilities ratio (0.53) and between ROA and current assets ratio (0.34). Both correlations suggest that an increase in fixed assets and in current assets are linked to an increase in equity and net profit. We also noticed a positive correlation between ROS and debts to equity ratio (0.17). In terms of negative correlations, we have found one between receivables ratio and inventories ratio (−0.62), which suggests that an increase in receivables is mirrored by a decrease in inventories. Moreover, the negative correlation between ROA and fixed assets ratio (−0.34) indicates that increasing fixed assets are connected to a decreasing net profit.

Conclusion

Performance analysis is particularly important in the case of small and medium enterprises since an important part of their assets is invested in stocks, receivables, current assets or fixed assets. Consequently, an efficient management could significantly improve SMEs profitability. Though the policy impact of the five economic sectors on SME profitability is highly important, no studies have examined this relation. The aim of our paper is to provide empirical evidence on the effect of different types of activity on profitability using a sample comprising 1233 SMEs active in Romania during 2004–2008.

In all economic sectors we found significant correlations between equilibrium ratios and profitability, except

in the textile sector. Results emphasize the important role of investing in assets as these impact SME profitability. Our research highlights the importance of current assets and fixed assets management in maximization of profitability, thus paving the way for future research. Furthermore, our study is relevant for external stakeholders like investors and banks, who play a key role in short-term financing of SMEs sectors.

By analysing the main statistical indicators of central tendency and the variability of performance ratios like ROS and ROA for each economic sector, the study revealed that entities developing customized software registered the highest values of indicators. This sector was followed by the pharmaceutical sector. During some years, SMEs operating in the furniture and leather sectors achieved higher levels of indicators. In all five years, textile SMEs registered the lowest values for indicators. Correlation coefficients revealed that profit growth is linked to increasing debt, however an increase in inventories cannot be achieved in an environment of growing debts. Normally, a net profit growth should be mirrored by equity increase, while the link between the two ratios suggests that net profit is not reinvested in the business activity. If the assets value increases, small and medium enterprises are forced to reduce the current asset value, therefore showing limited financial capacity.

One limitation of the study is that it focuses on a period of economic expansion (i.e. 2004–2008). From our

point of view, the robustness of our findings is interesting, yet it would be appropriate to replicate the study during a period of economic downturn for comparison. Because of the liquidity and financial constraints arising in periods of economic crisis, differences could be registered. In crisis periods, late payments or lack of payments during commercial transactions increase significantly and, because of this, the positive correlation identified between assets investment and profitability could differ. Therefore, future investigations developed on this topic could bring important contributions to the literature.

1. Diebold, F. X. and Strasser, G., On the correlation structure of microstructure noise: a financial economic approach. *Rev. Econ. Stud.*, 2013, **80**, 1304–1337.
2. Dissanayake, D. M., The determinants of return on assets: evidences from microfinance institutions. *J. Art. Sci. Commer.*, 2012, **2**, 26–35.
3. Sima, B., An analysis of profitability trend in Indian cement industry. *Econ. Aff.*, 2015, **60**, 171–179.
4. Darush, Y., Profitability determinants among micro firms: evidence from Swedish data. *Int. J. Manage. Financ.*, 2013, **9**, 151–160.
5. Yao, J. and Alles, L., Industry return predictability, timing and profitability. *J. Multinational Financ. Manag.*, 2006, **6**, 122–141.
6. Beukes, P. C., Gregorini, P., Romera, A. J. and Dalley, D. E., The profitability and risk of dairy cow wintering strategies in the Southland region of New Zealand. *Agric. Syst.*, 2011, **104**, 541–550.
7. Yazdanfar, D. and Öhman, P., Life cycle and performance among SMEs: Swedish empirical evidence. *J. Risk Financ.*, 2014, **15**, 555–571.
8. Afrifa, G. A., Net working capital, cash flow and performance of UK SMEs. *Rev. Account. Financ.*, 2016, **15**, 21–44.
9. Bulak, M. E. and Turkyilmaz, A., Performance assessment of manufacturing SMEs: a frontier approach. *Ind. Manag. Data Syst.*, 2014, **114**, 797–816.
10. Singh, H. P. and Kumar, S., Working capital requirements of manufacturing SMEs: evidence from emerging economy. *Rev. Int. Bus. Strat.*, 2017, **27**, 369–385.
11. Bayo-Moriones, A., Billón, M. and Lera-López, F., Perceived performance effects of ICT in manufacturing SMEs. *Ind. Manage Data Syst.*, 2013, **113**, 117–135.
12. Ambroise, L., Prim-Allaz, I., Teyssier, C. and Peillon, S., The environment-strategy-structure fit and performance of industrial servitized SMEs. *J. Ser. Manage.*, 2018, **29**, 301–328.
13. Lappalainen, J. and Niskanen, M., Financial performance of SMEs: impact of ownership structure and board composition. *Manage. Res. Rev.*, 2012, **35**, 1088–1108.
14. Pucci, T., Nosi, C. and Zanni, L., Firm capabilities, business model design and performance of SMEs. *J. Small Bus. Enterprise Dev.*, 2017, **24**, 222–241.
15. Li, L., Li, D. and Shi, W., Internationalization, internalization and the performance of US biopharmaceutical SMEs. *Multinational Bus. Rev.*, 2011, **19**, 65–93.
16. Pais, M. A. and Gama, P. M., Working capital management and SMEs profitability: Portuguese evidence. *Int. J. Manage. Finance*, 2015, **11**, 341–358.
17. Moon, Y. K. and Byungho, P., Sustainable corporate social media marketing based on message structural features: firm size plays a significant role as a moderator. *Sustainability*, 2018, **10**, 1167.
18. Rodríguez-Gutiérrez, M. J., Moreno, P. and Tejada, P., Entrepreneurial orientation and performance of SMEs in the services industry. *J. Organ. Change Manag.*, 2015, **28**, 194–212.
19. Solakivi, T., Töyli, J., Engblom, J. and Ojala, L., Logistics outsourcing and company performance of SMEs: evidence from 223 firms operating in Finland. *Strategic Outsourcing: Int. J.*, 2011, **4**, 131–151.
20. Lin, C. Y. Y. and Chen, M. Y.-C., Does innovation lead to performance? An empirical study of SMEs in Taiwan. *Manage. Res. News*, 2007, **30**, 115–132.
21. Steenkamp, N. and Kashyap, V., Importance and contribution of intangible assets: SME managers' perceptions. *J. Intellect. Capital*, 2010, **11**, 368–390.