

FINANCIAL PROFITABILITY OF DEMERGED COMPANIES

C. DUGULEANĂ¹ L. DUGULEANĂ²

Abstract: *The paper presents a complete analysis of the evolution of the profitability of some Romanian companies that decided to demerge in 2013. The sample of companies was analyzed with statistical and econometric methods of panel data, in the sub-periods before and after demerger: 2005-2013 and 2014-2019. The main objective of research was to find out if the organizational management strategy was beneficial for obtaining better economic and financial performance. The research results were extended to the population to characterize the financial situation of all Romanian companies in the same situation as those in the sample.*

Key words: *financial indicators, profitability, cross-section fixed effects, panel data models.*

1. Introduction

Companies often choose the partial division strategy for ensuring the sustainability of their economic activity. The demerger decision may be caused by some economic shocks, such as the economic crisis that began in 2008.

The financial performance of companies has been studied in numerous scientific articles, which have highlighted the positive influence of demerger on companies. Several studies have also addressed the positive consequences of the mergers by evaluating financial performance before and after (Pazarskis et al., 2021; Pazarskis et al., 2018; Pantelidis et al., 2018), using ROA, ROE and Net Profit Margin indicators, but also other ratios.

Like the merger actions, the demergers are expected to have positive effects on the companies that have decided on the partial division. Managers expect by demerger the resumption of a new development of the company, by eliminating the accumulated negative synergies. This type of action takes place in the maturity phase of a company's life cycle.

In our research we analyse the ROA profitability ratio according to ROE, the degree of indebtedness and the net profit margin of the companies that decided to demerge in 2013, as a result of the economic crisis that in Romania, was felt especially since 2009.

¹ *Transilvania* University of Braşov, cduguleana@unitbv.ro, ORCID ID 0000-0001-5248-9264

² *Transilvania* University of Braşov, ldugul@unitbv.ro, ORCID ID 0000-0001-9154-5214

ROA analyses the performance of generating income based on assets: $ROA = \text{Net Profit} / \text{Assets}$. ROE is the profitability ratio that considers only capital: $ROE = \text{Net Profit} / \text{Equity}$. The degree of indebtedness is calculated as the ratio between the volume of debts and the total assets. The net profit margin is an important indicator of the general financial situation of the company, as a ratio between profit and sales turnover.

2. Objectives

Our paper considers a data panel consisting of 21 companies that split in 2013. This data panel is balanced because the companies have all the indicators for all the years of the analysed period, 2005-2019. In 2013, 33 companies have demerged, but only 21 companies declared all their financial indicators. The stochastic character of the sampling was ensured by choosing them in the sample of companies demerged in 2013.

The extension of the results of the sample can only be considered if the condition of representativeness is met. For this we check the limit error of the sample using formula (1) and the proportion p for alternative characteristic, which in the worst case is 0.5. The correction coefficient in the finite population is $(1-n/N)$, where n is the number of observations, i.e. 21 companies * 15 years = 315, N is 33 * 15 = 495, and the sampling ratio $n/N = 63.64\%$.

$$\Delta_w = z \sqrt{\frac{p(1-p)}{n-1} \left(1 - \frac{n}{N}\right)} \cdot 100 = 3.33\% \quad (1)$$

We can use the sample to extend the results to the population level, because the limit error is less than 5%, and the condition of representativeness is respected.

The main purpose of this research is to show whether the financial indicators after demerger are at least at the same level as before or even higher. For this purpose we use statistical methods and econometric models of the panel data, to demonstrate that there were positive consequences of the demerger on the economic and financial performance of the companies split in 2013. The extended results of the sample for all Romanian companies demerged in the same year can be supported by econometric models.

3. Methodology

The variation at panel data level is of three types: overall, between companies and within companies, meaning over time. The overall variation is based on the number of observations. The between variation refers to the statistics of companies, meaning the cross sections, regardless of time period, and the within variation refers to the summary statistics of the number of years regardless of company.

The Pool OLS model considers α , the intercept and β slope to be the same for all companies. The Pooled OLS model does not take into account periods or cross-section

effects. The Pool OLS model cannot be used because the companies are not homogeneous.

Heterogeneity that can be observed or not, can be identified using panel data models, either with company-specific effects, or with temporal effects, or both. These types of effects are either fixed or random.

For our panel data, the fixed effects are the production capacities of the companies, which have an initial production capacity, a certain skilled workforce, and a specific management staff. Their markets for goods and services have certain competitive characteristics. Random effects for companies can be considered as consequences of the dynamic nature of economic activity, which is influenced by a lot of external factors. Stability of production against fluctuations, characteristics of the external environment, market conditions, network logistics, relationships, openness and economic conditions are random.

Panel data models may consider the separate heterogeneity of cross-sections or period as individual specific effects. When we consider only the cross-section effects or the period effects, we use a single dimension of the panel data, and the models are called one-way models. When the two dimensions are used, both the cross-section and the period effects, they are two-ways models.

While the Fixed Effects model describes the intercepts varying across companies (LSDV model) or over time period (Within model), the Random Effects model looks for the differences in the error variance components across companies or time period, and eliminates the heteroscedasticity.

We may check the significance of the Fixed Effects model compared to the Pooled OLS with the F-test for Fixed Effects. We will also check for the Random Effects models, which assumes that the cross-section effects (heterogeneity) are not correlated with any regressor. The Breusch-Pagan LM test for random effects uses the Lagrange multiplier (LM) to test the existence of homoscedasticity (H_0), comparing the Pool OLS with the random-effects models.

Then we will use the Hausman test to choose the best model between the fixed-effects model and the random-effects model. The random effects model is preferred to the corresponding fixed effects model if it does not reject H_0 of individual effects unrelated to any regressor. The Pasaran CD test answers to the question of the existence of cross-sectional dependence of residuals.

4. Results and Discussions

4.1. Profitability of panel data and for all Romanian companies Demerged in 2013

The panel data has 21 companies, with data recorded for the period 2005-2019. It is a short panel with number of years less than the number of companies (cross-sections).

The companies in the panel all have acted in the same regulatory economic environment. When a company splits, it changes major. Panel data are consistent with the year after the division, 2014, when the entities change. Analysing the financial indicators of the panel data, we find the changes in the after sub-period 2014-2019 (6 years) compared with the before demerger sub-period 2005-2013 (9 years), in Table 1.

The extension of the sample results for all Romanian companies that demerged in the same year consists in calculating the limit errors and the confidence intervals for each period with a probability of 95%. For each variable we calculated the error limit, Δ , based on the formula (2), where σ^2 is the variance of each variable; $z=1.96$ for a probability of 95%, N is the product of all Romanian companies number demerged in 2013 and the number of years for each period, and n is the number of observations for each period. The n/N selection ratio is the same, i.e. 63.64% for each period.

$$\Delta = z \sqrt{\frac{\sigma^2}{n-1} \left(1 - \frac{n}{N}\right)} \quad (2)$$

*Statistics of the average indicators of the panel data,
and extension at population level*

Table 1

ROA	panel data			
	Periods	2005-2019	2005 - 2013	2014 - 2019
Mean		6.5%	5.3%	8.3%
Median		3.5%	3.0%	3.8%
Maximum		86.0%	84.8%	86.0%
Minimum		-83.9%	-83.9%	-56.4%
Std. Dev.		20.7%	22.3%	18.0%
Observations		315	189	126
Limit error P=95%		1.4%	1.9%	1.9%
Lower limit		5.1%	3.4%	6.4%
Upper limit		7.9%	7.2%	10.2%

ROE	panel data			
	Periods	2005-2019	2005 - 2013	2014 - 2019
Mean		12.3%	8.6%	17.8%
Median		10.7%	12.7%	9.3%
Maximum		933.6%	532.8%	933.6%
Minimum		-849.8%	-781.4%	-849.8%
Std. Dev.		121.5%	123.2%	119.2%
Observations		315	189	126
Limit error P=95%		8.1%	10.6%	12.6%
Lower limit		4.1%	-2.1%	5.2%
Upper limit		20.4%	19.2%	30.4%

Indebtedness degree	panel data			
	Periods	2005-2019	2005 - 2013	2014 - 2019
Mean		52.7%	56.4%	47.2%
Median		45.0%	54.9%	35.8%
Maximum		398.6%	398.6%	155.1%
Minimum		0.7%	0.7%	0.8%
Std. Dev.		43.8%	47.6%	36.9%
Observations		315	189	126

Indebtedness degree	panel data			
	Periods	2005-2019	2005 - 2013	2014 - 2019
Limit error P=95%		2.9%	4.1%	3.9%
Lower limit		49.8%	52.3%	43.3%
Upper limit		55.6%	60.5%	51.1%

Net profit margin	panel data			
	Periods	2005-2019	2005 - 2013	2014 - 2019
Mean		-14.2%	-26.8%	4.6%
Median		4.6%	4.7%	3.9%
Maximum		180.0%	180.0%	76.6%
Minimum		-1516.8%	-1516.8%	-203.3%
Std. Dev.		163.4%	208.4%	34.6%
Observations		315	189	126
Limit error P=95%		10.9%	18.0%	3.7%
Lower limit		-25.1%	-44.8%	0.9%
Upper limit		-3.3%	-8.8%	8.3%

The average annual ROA before demerger was 5.3%, and after the division it had a higher average level of 8.3%. The limits of the confidence intervals increased after the division and the ROA is in the range [6.4%, 10.2%] with a probability of 95%.

The average annual ROE before the division was 8.6%, and after the division it increased to an average annual level of 17.8%. The limits of confidence intervals are much higher than before demerger, ROE being comprised in the range of [5.2%, 30.4%] with a probability of 95%.

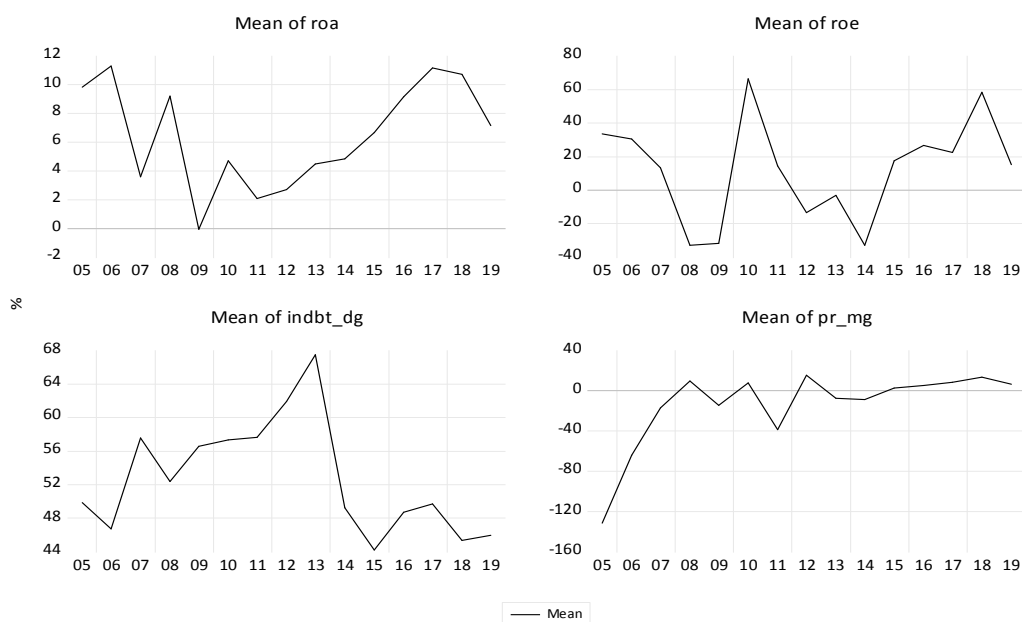


Fig. 1. The average indicators of the panel data in the period 2005-2019

The annual level of indebtedness was on average 56.4% before demerger, and after the division it decreased to 47.2% on average. The positive effect of the split is also observed in its confidence interval which decreased the limits after the split, the interval being [43.3, 51.1%] with a probability of 95%.

We note that the average annual net profit margin before demerger was -26.8%, and after the demerger was an average positive annual level of 4.6%. In the post-division sub-period the average annual net profit margin of Romanian companies demerged in 2013 is in the range [0.9%, 8.3%] with a probability of 95%.

It is obvious why the division decision was a good organizational management strategy for the companies; the fate of the companies changed for the better after the division.

In Figure 1, the evolution of these indicators shows their positive trend in the second sub-period.

4.2. ROA Modeling in the sub-periods before and after Demerger

We analyze the behavior of companies and their decision to divide in crucial moments of their life cycle. The purpose of the analysis is to show whether the companies have changed for the better.

The ROA variable is the best indicator to characterize the company's ability to generate revenue and represents a key indicator to describe a better change after dissolution. The ROE variable characterizes the management's ability to make a profit. The degree of indebtedness (INDBT_DG) characterizes debt management as a source of financing, and the rate of net profit margin (PR_MG) is influenced by the external economic environment.

4.2.1. Analysis of correlations

Due to the inconsistency of the individuals, the panel will be considered in the two sub-periods: 2005-2013 and 2014-2019. We choose to model the ROA variation according to the financial rates: ROE, degree of indebtedness (INDBT_DG) and net profit margin (PR_MG).

The analysis of the correlations between the variables is presented in Table 2.

Correlation analysis

Table 2

Variables	ROA			ROE			INDBT_DG		
	2005-2019	2005-2013	2014-2019	2005-2019	2005-2013	2014-2019	2005-2019	2005-2013	2014-2019
ROA	1	1	1						
ROE	0.281	0.285	0.270	1	1	1			
INDBT_DG	-0.493	-0.531	-0.389	-0.033	-0.026	-0.036	1	1	1
PR_MG	0.289	0.290	0.595	0.071	0.076	0.106	-0.203	-0.196	-0.431

In the period 2005-2019 and in the two sub-periods, ROA was directly and weakly influenced by ROE. The correlation of indebtedness (INDBT_DG) with ROA is inverse, as

expected and weak; was higher in the first sub-period, before demerger. The correlation of ROA with net profit margin (PR_MG), is positive as expected, but weak in the pre-division sub-period and of medium intensity in the post-division sub-period.

Regarding the correlation coefficients, we can conclude that the degree of indebtedness reduces its negative influence on ROA, and the influence of the markets becomes more important with the higher positive correlation on ROA. Reorganized companies manage debt differently than before and position themselves in markets by better addressing their segments.

4.2.2. ROA panel data models

Based on the Pool OLS model, all the Lagrange Multiplier tests for random effects reject the null hypothesis of no effects for cross-section effects model and for both period and cross-section random effects model. The Redundant Fixed Effects Tests show that the one way fixed effects of cross-section and the two-ways cross-section and period fixed effects are not redundant. These tests show that these fixed effects models are superior to Pool OLS model. The Hausman test applied for cross-section random effects model rejects H_0 and the cross-section fixed effects model is superior to the cross-section random effects model. The dependence cross-correlation is not a problem for the short panel and for all the models in Table 3, the Pesaran CD accept H_0 of no cross-section dependence in residuals.

ROA panel data models

Table 3

ROA – dependent variable	Pool OLS 2005-2019	2005-2019		2005-2013	2014-2019
		Cross-section FE model (GLS- Cross weights)	Cross-section FE model (GLS- Cross weights)	Cross-section FE (GLS- Cross weights)	Cross-section FE (GLS- Cross weights)
		a_i^{***}	a_i^{***}	a_i^{***}	a_i
C	0.175 (0.015)	0.181 (0.011)	0.186 (0.011)	0.134 (0.016)	0.207*** (0.020)
ROE	0.043 (0.008)	0.025 (0.004)	0.028 (0.005)	0.025 (0.004)	0.018** (0.008)
INDBT_DG	-0.212 (0.022)	-0.237 (0.020)	-0.229 (0.021)	-0.132 (0.027)	-0.282*** (0.040)
PR_MG	0.023 (0.006)	0.021 (0.005)	0.028 (0.005)	0.030 (0.006)	0.131*** (0.022)
DUM* INDBT_DG	-	0.043 (0.012)			
DUM*PR_MG	-	0.067 (0.023)			
R ²	34.4%	61.9%	60.8%	65.7%	80.0%

(...) In brackets are the standard error of coefficients. The asterisks represent significance at the 10% (*), 5% (**), and 1% (***) confidence levels.

The cross-sectional FE model for the period 2005-2019, as well as the sub-period models have negative coefficients for the INDBT_DG estimator, for the inverse correlation with ROA, as expected. The influence of INDBT_DG on ROA is greater after the demerger than before, which shows that debt management is a major pressure issue for the new company. The ROE and PR_MG coefficients are positive, as expected. The PR_MG coefficient is higher in the second sub-period model: at 1 percentage point (pp) increase in PR_MG, the ROA increases by an average of 13 percentage points (pp) compared to 3 pp in the first sub-period model, the other variables being constant. The influence of ROE at 1 pp increase is about 1.8 pp on the ROA, being lower than in the first sub-period. ROA and ROA theoretical values based on fixed cross-sectional models of sub-periods are presented for each company and for the panel, in Figure 2.

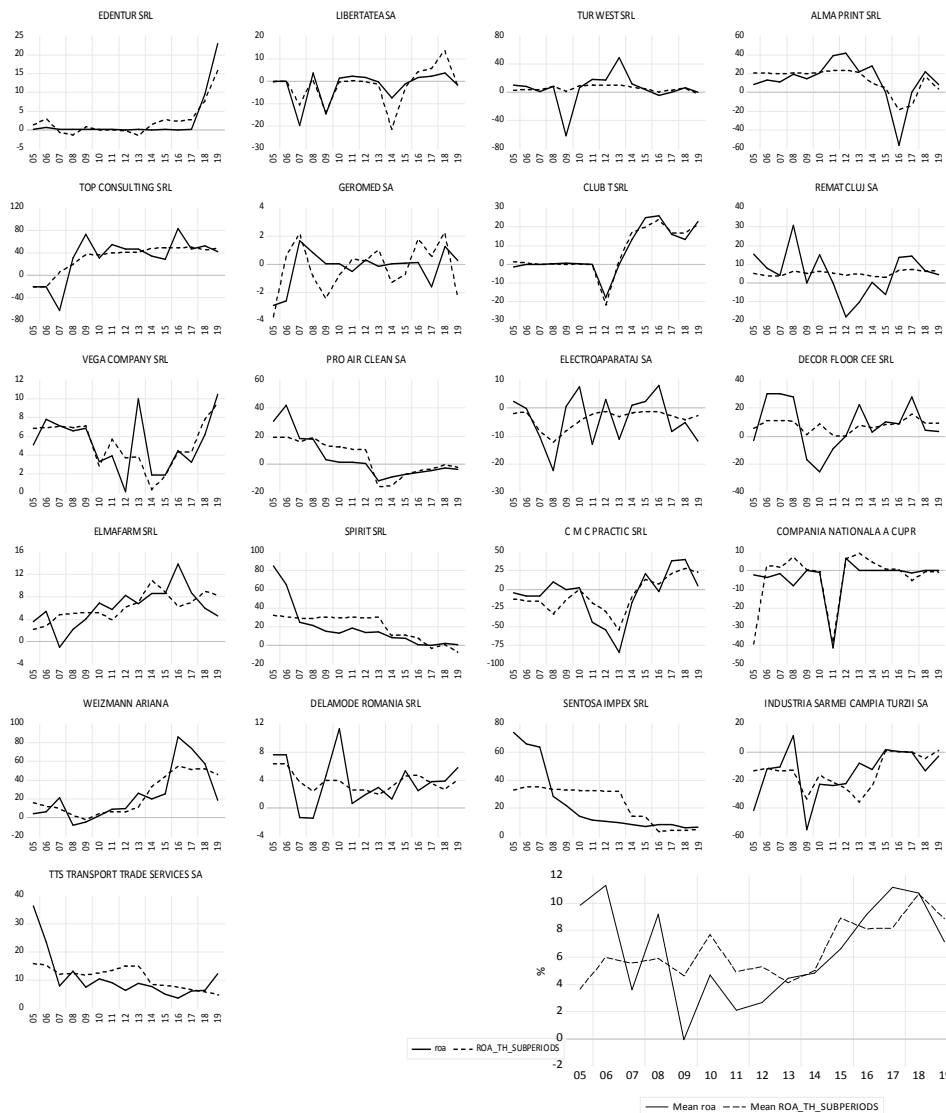


Fig. 2. ROA cross-section FE models of sub-periods for companies and panel data

We can also use a dummy variable in the cross-sectional FE model, with the value 0 for the years 2005-2013 and the value 1 for the years 2014-2019. We notice that after splitting the pressure of the degree of indebtedness decreases by +4.3 pp on average, and the effect of the net profit margin is amplified by 6.7 pp. Both consequences are positive on the variation of ROA showing a better evolution than the sub-period before demerger. The identified sub-period models describe the upward evolution of ROA after the year of demerger 2013, for each company and also at the panel data level, as average ROA, and theoretical average ROA of all companies.

5. Conclusions

Our research highlights the levels of financial indicators of Romanian companies that have decided to split, in two sub-periods: 2005-2013, including the economic crisis of 2008 and 2014-2019, after the split. We can conclude that all indicators change for the better in the 2014-2019 sub-period, proving that the division decision was the best course of action.

ROA in the range [3.4%, 7.2%] in 2005-2013 increased to the range [6.4%, 10.2%] in 2014-2019. ROA econometric models are consistent with its evolution and describe the influence of factors on its variation. Fixed cross-section models are the best for modeling panel data; they take into account the characteristics of each company. We see in Figure 2 the estimated ROA intervals for the population level.

We can also have an overview of the other financial indicators evolution for the Romanian companies. In the sub-period 2005-2013, ROE between [-2.1%, 19.2%] reached the range [5.2%, 30.4%] in the sub-period 2014-2019, with a probability of 95%.

The confidence interval of indebtedness from [52.3%, 60.5%] in the sub-period 2005-2013 decreased to the interval [43.3, 51.1%] with a probability of 95%, in 2014-2019. The average annual level of indebtedness degree of 56.4% before demerger is not even included in the new range after splitting. The net profit margin before demerger was negative in the sub-period 2005-2013 in the range [-44.8%, -8.8%], and after demerger the situation changed for the better and the new range is [0.9%, 8.3%] with a probability of 95%.

The conclusion is that the driving forces of the recovery of economic activity of companies are inside them, not outside, as shown by the fixed effects of the model.

The research has its limitations due to the consideration of companies regardless of their field of activity. Meanwhile, research is an example of using statistical methods and econometric panel data models to discover and model the complex relationships between the variables that describe the financial situation of companies.

References

- Basak, R., 2017. Corporate restructuring through demerger: a case study on Hindustan Unilever Limited. *International Journal of Business Ethics in Developing Economies*, 5, pp. 22-28.

- Greene, W., 2006. *Econometric Analysis of Panel Data*, NYU Stern School of Business. Class Notes. <http://people.stern.nyu.edu/wgreene/Econometrics/PanelDataNotes.htm>, <http://people.stern.nyu.edu/wgreene>
- Kharatyan, D., Lopes J. C., and Nunes A., 2017. Determinants of Return on Equity: Evidence from Nasdaq 100. *Digital Repository, FINANCE*. Instituto Politécnico de Bragança. <http://hdl.handle.net/10198/21197>
- Kirchmaier, T., 2003. *The Performance Effects of European Demergers*. London School of Economics, Centre for Economic Performance, Discussion Papers no. 566. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=432000, http://eprints.lse.ac.uk/20047/1/The_Performance_Effects_of_European_Demergers.pdf
- Mallick, A.K., Rakshit, D., 2006. Corporate Restructuring through Demerger: A case study. *Finance India*, 20, pp. 1321-1338.
- Nuray, I., 2015. Analysis of the Factors that Determine the Profitability of the Deposit Banks in Turkey. *Journal of Applied Finance & Banking*, 5(3), pp. 175-186. https://www.sciencpress.com/Upload/JAFB/Vol%205_3_12.pdf
- Panda, B. and Rao, P. H., 2012. Corporate restructuring: Demerging impact. *SCMS Journal of Indian Management*, 9(1), pp. 80-87. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2782754
- Pantelidis, P., Pazarskis, M., Drogalas, G., and Zezou, S., 2018. Managerial decisions and accounting performance following mergers in Greece. *Investment Management and Financial Innovations*, 15(1), pp. 263–276. <https://www.businessperspectives.org/journals/investment-management-and-financial-innovations/issue-274/managerial-decisions-and-accounting-performance-following-mergers-in-greece>
- Pazarskis, M., Vogiatzoglou, M., Koutoupis, A., & Drogalas, G., 2021. Corporate Mergers and Accounting Performance during a Period of Economic Crisis: Evidence from Greece. *Journal of Business Economics and Management*, 22(3), pp. 577–595. <https://journals.vgtu.lt/index.php/ JBEM/article/view/13911/10301>
- Pazarskis, M., Drogalas, G., & Koutoupis, A., 2018. Mergers and accounting performance: Some evidence from Greece during the economic crisis. *Accounting and Management Information Systems*, 17(1), pp. 31-45. https://cig.ase.ro/jcig/art/17_1_2.pdf
- Rakshit, D., Ghosh, S., 2010. Demerger: Sailing with the Global Wind. *NSHM Journal of Management Research and Application*, 2, pp. 22-31.