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IMPLEMENTATION OF RESIDUAL INCOME CONCEPT IN MEASURING COMPANY'S FINANCIAL PERFORMANCE

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ABSTRACT

The paper examines theoretical assumptions and factors regarding the implementation of residual income concept in measuring company's financial performance. Implementation of residual income concept has been empirically tested on a selected sample of Croatian companies. Findings resulting from conducted calculations have shown that only twelve (8.11%) out of 148 analysed companies recorded residual income for their owners within the observed period with a 6.80% average rate of residual income return compared to equity invested, while the equity invested in all other companies was impaired by an economic loss of 8.26%. If the entire sample is observed, there has been consolidated economic loss of 6.18%. Research results can be found useful by researchers, managers, teachers and others interested in measuring company's financial performance.

Key words: *residual income, ROE, financial performance*

1. INTRODUCTION

Traditionally, the return on investment is used as an overall measure of company's financial performance. ROI is a basis for deriving the assessment of a company's total profitability, profitability compared to the overall capital employed or only the equity. From the point of view of an owner, profitability measured by ROE does not reflect earned economic profit because capital cost is neglected. By implementing the residual income concept, under which residual income, having deducted invested capital cost (i.e. opportunity cost in practice), it can be defined whether a company records economic profit for its owners.

The paper aims at exploring relevant theoretical assumptions in connection with the application of the residual income concept in measuring company's financial performance and carries out empirical testing of financial data of those companies which stock is traded at the Zagreb Stock Exchange. Results obtained from the research conducted can be useful for accountants, managers, researchers, teachers and others interested in company financial performance measuring and evaluation.

This paper proceeds as follows: Chapter discusses a theoretical basis of the research conducted, identifies and briefly lists underlying concepts for measuring the rate of ROI and residual income. Chapter three explains the choice and scope of samples as well as the research methodology. Chapter four contains findings resulting from the empirical part of the research conducted, while the final chapter five provides an overview of the most important findings and conclusions stemming from the research.

2. THEORETICAL ASSUMPTIONS

Company's financial performance is primarily measured by calculating the return on investment (ROI). The very start of the ROI application was tied to the practice of US companies during the 1920s (Johnson & Kaplan, 1987 or Goetzman & Garstka 1999). ROI is a relative measure of business performance, under which the ratio between the profit and assets employed is used for determining the efficiency of invested capital in profit earning. Having put profit and invested capital in relation, ROI is obtained, representing an overall company financial performance indicator in an accounting period. ROI is set under the following formula (Horngren and others, 2009):

$$ROI = \frac{\text{profit}}{\text{investment}} \qquad (1)$$

Depending on circumstances as well as measuring and result evaluation objectives, there are different definitions of profit and investment. Therefore, ROI is used as a basis for deriving various measures such as return on assets (ROA), return on capital employed (ROCE) or return on equity (ROE). ROA is calculated under the operating profit/total asset ratio, which is used for calculating earnings from all financial resources entrusted to a company. ROCE measures company profit compared to long-term sources by dividing operating profit into capital and long-term liabilities. ROE measures a degree of equity earnings by comparing net profit and equity.

In terms of theoretical and practical calculations of ROI, there is no uniform approach to defining a time period nor, subsequently, the amount of in-

vestment. ROI can be calculated as an investment at the beginning and end of a period, and an investment calculated as an average set under the beginning and end balance.

The most frequent practical approach in analysing financial statements is the use of the end period balance, especially for the purpose of a comparative analysis, by comparing it to previous periods, competition or industry. Apart from practical reasons and in view of return rates being relative measures of financial performance, supporters of such an approach believe that the selection of the time period does not affect the distortion of the comparison findings.

Supporters of applying an average investment balance in calculating the rate of return support such an approach by using the logic of defining profit as a result of the year-round activity and believe that an investment should have the same treatment (Meigs and others, 2001 or Helfert, 1996).

The third approach opts for the use of the beginning investment balance supporting it by an argument that investments during a year usually do not generate earnings in that very year (Damodaran, 2007). Apart from the above stated the use of the beginning investment balance in calculating the rate of return is compatible with financial considerations in the application of concepts and techniques for evaluating financial asset ROI and in the capital budgeting process.

As it does not consider the cost of capital employed, measuring return by the rate of ROE does not reflect economic profit for owners. The evaluation of owner's economic earnings is conducted by residual income, under which net profit is reduced by the cost of invested capital.

A wider implementation of the residual income concept, as an extension of the ROI criterion, occurred after WW2 (Johnson & Kaplan, 1987). The origin of residual income, known as super normal rent, is ascribed to David Ricardo, a classical economist from late 18th and early 19th centuries (IMA, 1997). During the 1990s, residual income was redefined and renamed into the economic value added and economic profit. Basically, EVA is built on residual income while performing the adjustment of accounting data to obtain approximate economic values as to profit and invested asset. Key adjustments regard cost capitalisation contributing to the long-term company value such as the cost of research and development, marketing, training, employee development etc. Apart from the data published, the calculation of the economic added value should also be based on in-house data, which limits the application of its implementation for outside analysts and analyses of a larger sample.

Residual income is set based on the accounting values according to the following formula (Horngren and others, 2009):

$$Residual\ income\ (RI) = income - (required\ rate\ of\ return \times investment) \quad (2)$$

By applying a more precise formula based on the above, residual income is set by decreasing net profit by the cost of capital invested, under which capital cost is calculated by multiplying beginning balance equity values by a required rate of return representing opportunity investment cost, as shown below:

$$RI_t = net\ profit\ t - (cost\ of\ equity \times equity_{t-1}) \quad (3)$$

The established residual income and invested capital ratio results in a rate equal to the ROE/required rate of return difference. Therefore, residual income can alternatively be calculated by using the formula below:

$$RI_t = equity_{t-1} \times (ROE - cost\ of\ equity) \quad (4)$$

Setting equity cost is based on three factors: risk-free rate, market risk premium and company specific risk (Koller and others, 2010). Equity cost is most frequently assessed under the CAPM model (Capital Asset Pricing Model). Under the implementation of the CAPM model, equity cost is determined by increasing a risk-free rate for the risk premium multiplied by the beta coefficient as shown below (Koller and others, 2010):

$$E(R_i) = r_f + \beta_i [E(R_m) - r_f] \quad (5)$$

where:

$E(R_i)$ = expected return (equity cost)

r_f = risk-free rate

β_i = stock's sensitivity to market

$E(R_m)$ = expected return of the market.

Under the CAPM model, the risk-free rate and the risk premium are defined as a difference between expected market return and the risk-free rate, they are equal for all companies, while the beta, showing the intensity of stock profitability trend compared to the profitability trend of the overall market, is the only changing factor in calculating the equity cost of an individual company. The assessment of the risk-free rate includes the amount of yield in the highly liquid state securities (bonds or notes). The assessment of the market risk premium is based on extrapolating historic rates of return by considering current market forecasts, while the quantification of the beta coefficient is based on composite market indices trends including S&P, MSCI and alike (Koller and others 2010).

3. DATA SOURCES, SAMPLE SELECTION AND METHODOLOGY

The empirical part of the research was conducted by using financial data of joint-stock companies which securities are listed at the Zagreb Stock Exchange. Data processing was based on the 2012 financial statements as most of the 2013 ones were not submitted at the time of the research. The sample included 91.36% of joint-stock companies (148 of 162) from the Zagreb Stock Exchange listing, 2.47% was left out on the grounds of not submitting their 2012 financial statements, 1.85% of companies were not considered in light of the initiated bankruptcy proceedings and 4.32% due to recorded losses exceeding their share capital. Joint-stock companies were grouped in line with the Decision on the National Classification of Activities 2007 – NKD 2007 (Official Gazette no. 58/07), adjusting the name of activities to suit the needs of analytical processing in this paper.

The calculation of ROE and CAPM used the beginning balance sheet data of the analysed joint-stock companies (as of 1 January of the current year). The use of the initial equity values enabled the comparison of ROE and the residual income/invested equity ratio, which made the analysis consistent.

The following parameters should have been defined by the assessment of CAPM: risk-free rate, market risk premium and beta coefficient.

In view of the undeveloped long-term state bond market, the assessment of the risk-free rate was based on the treasury notes of the Ministry of Finance due in 364 days. In light of the pronounced interest rate volatility for said treasury notes in 2012, a risk-free rate was applied by calculating a median interest rate achieved at one-year treasury notes auctions in the period 2005-2012 (http://www.mfin.hr).

The market risk premium (5%) was calculated as an arithmetic mean in the 4.5-5.5% range (according to: Koller and others, 2010).

Beta coefficients are not calculated for stocks listed at the Zagreb Stock Exchange. In light of a modest number of joint-stock companies on this market, their calculation would not provide a reliable basis for measuring systematic risk. As an estimate, the paper used beta coefficients calculated under the S&P indices by activities for emerging markets (Damodaran Online, http://pages.stern.nyu.edu/~adamodar/).

Under the equity cost calculations by applying said parameters, the cost of capital was estimated, depending on the activity, in the scope of 7.2 – 13%. If the consolidated result of the entire sample is observed, the estimated weighted cost of the equity is 9.4%.

4. EMPIRICAL FINDINGS

Calculations conducted on the selected sample found that more than a half of observed companies in 2012 recorded positive financial results (net profit) i.e. a positive rate of ROE. However, only 12 companies recorded economic profit for their owners (residual income). Table 1 shows a summary of the number and structure of companies with residual income and economic loss for equity holders.

Table 1: Return on equity and residual income of joint-stock companies in 2012

Operating result	ROE		Residual income	
	No. of companies	%	No. of companies	%
Positive value	78	52.70%	12	8.11%
Negative value	70	47.30%	136	91.89%
Total	148	100.00%	148	100.00%

Source: Calculated by the author

Calculation results show that 91.89% of companies, with an 86.15% share in total sample capital, recorded only 33.79% of consolidated net profit i.e. only 1.27% return on the invested capital. In total, companies recording economic loss did not compensate for 8.26% of cost incurred by equity holders.

Table 2 shows results from calculating ROE and residual income for companies which recorded such income for their owners. Companies are aligned according to the highest recorded residual income and equity ratio, shown by a return by the unit of invested equity. Out of 12 companies recording residual income, three falls under food and beverage production, two are engaged in hospitality industry, while the other activities are represented by one joint-stock company. Joint-stock companies recording residual income participate with 13.85% in the sum of the equity of all the companies encompassed by the analysis, while their net profit accounts for 66.21% of consolidated financial result of all observed companies.

Table 2: Joint-stock companies with recorded residual income

Joint-stock company	Business activity	Capital 1.1.2012. (in HRK 000)	Net profit in 2012 (in HRK 000)	ROE	RI	RI/Capital x 100
A	Hospitality	233,434	64,605	27.68%	44,530	19.08%
B	Food and beverage production	624,482	131,128	21.00%	78,984	12.65%
C	Food and beverage production	179,750	33,291	18.52%	15,586	8.67%
D	Electronic industry	865,381	132,933	15.36%	60,674	7.01%
E	Telecommunications	11,018,637	1,695,546	15.39%	747,943	6.79%

Joint-stock company	Business activity	Capital 1.1.2012. (in HRK 000)	Net profit in 2012 (in HRK 000)	ROE	RI	RI/Capital x 100
F	Trade	920,611	134,945	14.66%	58,074	6.31%
G	Electrical equipment manufacturing	71,281	9,980	14.00%	3,565	5.00%
H	Food and beverage production	683,165	80,486	11.78%	31,298	4.58%
I	Clothing manufacturing	850,907	126,099	14.82%	38,030	4.47%
J	Hospitality	137,381	16,833	12.25%	5,018	3.65%
K	Insurance	309,402	34,429	11.13%	5,036	1.63%
L	Banking	162,573	17,246	10.61%	2,614	1.61%
Total		16,057,004	2,477,521	15.43%	1,091,351	6.80%

Source: Calculated by the author

If the entire sample is observed, total equity of all joint-stock companies in 2012 encompassed by the analysis amounts to HRK 115,919 million, while the recorded rate of ROE is only 3.23%, which resulted in the economic loss of 6.18% of total equity following the deduction of the cost of equity holders. Table 3 shows the consolidated results stemming from the calculation of ROE and residual income grouped by activities.

Table 3: Consolidated financial result by activities

Activity	No. of companies	Capital 1.1.2012. (in HRK 000)	Profit in 2012 (in HRK 000)	ROE	RI	RI/Capital x 100
Banking	12	32,896,974	2,369,396	7.20%	-591,332	-1.80%
Shipbuilding	1	224,809	-29,227	-13.00%	-49,572	-22.05%
Oil distribution	1	3,199,597	95,848	3.00%	-249,708	-7.80%
Electronic industry	2	947,903	117,121	12.36%	19,013	2.01%
Pharmaceutical industry	2	295,050	-14,880	-5.04%	-40,992	-13.89%
Financial services	6	1,606,208	-139,484	-8.68%	-284,846	-17.73%
Construction	8	2,251,401	-569,648	-25.30%	-861,204	-38.25%
Hospitality	30	9,114,187	81,513	0.89%	-702,307	-7.71%
Oil industry	1	14,365,000	678,000	4.72%	-1,045,800	-7.28%
Engineering	3	1,015,005	-614,998	-60.59%	-725,126	-71.44%
Publishing	1	369,579	508	0.14%	-30,906	-8.36%
Chemical industry	4	1,435,934	-191,054	-13.31%	-334,647	-23.31%
Metal industry	2	81,024	1,476	1.82%	-7,356	-9.08%
Insurance (property and life)	5	2,821,693	199,426	7.07%	-3,736	-0.13%
Real-estate	3	243,585	15,187	6.23%	-8,197	-3.37%
Transport	5	4,950,022	-650,004	-13.13%	-1,093,031	-22.08%
Electrical equipment manufacturing	3	2,139,088	178,011	8.32%	-32,689	-1.53%

Activity	No. of companies	Capital 1.1.2012. (in HRK 000)	Profit in 2012 (in HRK 000)	ROE	RI	RI/Capital x 100
Food and beverage production	26	11,637,576	419,411	3.60%	-552,327	-4.75%
Furniture production	3	562,810	-185,585	-32.97%	-234,549	-41.67%
Clothing manufacturing	5	480,186	-147,116	-30.64%	-190,333	-39.64%
Paper production	1	152,089	2,644	1.74%	-10,740	-7.06%
Transport equipment production	1	703,571	56,025	7.96%	-13,629	-1.94%
Recreation	1	423,257	23,916	5.65%	-18,621	-4.40%
Telecommunications	1	11,018,637	1,695,546	15.39%	747,943	6.79%
Press	1	13,041	-85,790	-657.85%	-86,898	-666.35%
Trade	12	3,510,889	28,348	0.81%	-305,186	-8.69%
Management activities	5	8,516,267	423,103	4.97%	-351,877	-4.13%
Traffic services	3	944,610	-15,918	-1.69%	-101,405	-10.74%
Total	148	115,919,992	3,741,775	3.23%	-7,160,060	-6.18%

Source: Calculated by the author

The unequal distribution of companies by activities, of which some sectors are represented by only one or a few companies, does not enable the analysis of financial efficiency of individual sectors and inter-sector comparisons. Consolidated financial results of all the companies provide a basis for making judgment on total investment efficiency for the observed capital market.

5. CONCLUSION

The basic purpose and objective of this paper was focused on the research of relevant theoretical assumptions regarding the implementation of the residual income concept in measuring company financial performance and on the empirical testing based on financial data of the companies which stock is traded on the Zagreb Stock Exchange.

Empirical research findings show that the residual income concept is suitable for measuring owner's economic profit, especially when the analyses are based solely on company's available financial statements. The residual income concept can also be applied to measuring financial performances of the entire stock market, while in case of developed markets with a higher number of companies by individual activities; it is possible to conduct analyses by sectors.

Results of conducted calculations show that in the observed period only 12 (8.11%) of 148 analysed companies recorded residual income for their owners at a 6.8% average rate of achieved residual income in relation to invested capital, while the capital invested in all other companies was reduced by the economic loss of 8.26%. If the entire sample is observed, there has been con-

solidated economic loss of 6.18%. As the residual income concept is based on decreasing net profit by equity cost, which in some years may encompass results of extraordinary profit and losses, caution is advised in the interpretation of obtained results.

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PRIMJENA KONCEPTA REZIDUALNE DOBITI U MJERENJU FINANCIJSKE PERFORMANSE PODUZEĆA

SAŽETAK RADA

U radu je provedeno istraživanje teorijskih postavki i činitelja vezanih uz primjenu koncepta rezidualne dobiti u mjerenju financijske performanse poduzeća. Primjena koncepta rezidualne dobiti empirijski je testirana na odabranom uzorku hrvatskih poduzeća. Rezultati provedenih obračuna pokazuju da je u promatranom razdoblju samo dvanaest (8,11%) od 148 analiziranih društava ostvarilo rezidualnu dobit za svoje vlasnike uz prosječnu stopu ostvarene rezidualne dobiti od 6,80% u odnosu na uloženi kapital, a kapital uložen u sva ostala društva umanjen je za ekonomski gubitak od 8,26%. Promatra li se cjelokupni uzorak, ostvaren je konsolidirani ekonomski gubitak od 6,18%. Rezultati provedenog istraživanja mogu biti korisni istraživačima, menadžerima, nastavnicima i ostalim zainteresiranima za područje mjerenja financijskih performansi poduzeća.

Ključne riječi: *rezidualna dobit, ROE, financijske performanse.*