



Investigating the Effect of Internal Rate of Return on Cash Recycling on the Abnormal Returns of Companies Accepted in Tehran Stock Exchange

Bahareh Mohammad talebi ^{a*}, Mitra Mohammad talebi ^a, Mohammad Jahangiri ^b, Mahtab Eshghiaraghi ^c

^a Department of accounting, Arak Branch, Islamic Azad University, Arak, Iran

^b Deputy Director of Education, Research and Planning, General Directorate of Technical and Professional Training in Markazi Province

^c Department of Executive Management, Arak Branch, Islamic Azad University, Arak, Iran

ARTICLE INFO

Article history:

Received 13 July 2017

Accepted 12 August 2018

Keywords:

Internal Return,
Abnormal Returns,
Leadership Strategy

ABSTRACT

Return on investment is a driving force that motivates and is a reward for investors. Investment returns are important for investors, in order for the entire investment game to be realized. Evaluating efficiency is the only logical way (Before risk assessment) that investors can do to compare alternative and different investments. Measuring real returns (relative to the past) is needed to better understand investment performance. Particularly, the study of past returns has a major role in predicting and predicting future returns. Therefore, the present study seeks to "investigate the effect of the internal rate of return on cash recycling on unusual returns as well as the effect of cost leadership strategies variables on the relationship between the internal rate of return on cash recycle and the unusual returns in the period from 2009 to 2013. In this research, the sample consists of 72 companies that have been selected by systematic elimination method, which is a total of 360 years. In this research, linear regression and correlation coefficient were used to investigate the hypotheses of the research. EVIEWS software has been used to analyse the data and test the research hypotheses. According to the regression results, the following results were obtained:

1. An internal rate of return on cash recycling affects unusual returns.
2. The internal rate of return based on the recycling of cash The abnormal returns affect the strategy of cost leadership.

1 Introduction

Researchers in accounting, economics and finance are interested in identifying the best economic performance measures for businesses. Since the true economic performance measure is the firm's internal rate of return, which is unobservable, the goal is to find the best surrogate measure. Traditionally, accounting rates of return are used as proxies for the unobserved economic rates of returns. The informational role of accounting numbers has been front and center in empirical

* Corresponding author Tel.: +988633666852
E-mail address: m.mehr15@yahoo.com

tests. Earnings-based and cash flow-based measures are often used to evaluate performance due to the availability of accounting data in published financial statements. Earlier studies provide evidence on the usefulness of accounting rates of return [13]. Despite extensive research on the information content of accounting rates of return, the question of whether earnings based measures are superior to cash flow-based measures in explaining economic performance is inconclusive. Dechow [6] and Subramanyam and Venkatachalam [20] found that earnings dominate cash flows in explaining economic performance, while Barth et al. [2] and Bernard et al. [4] document the superiority of operating cash flows. In fact, Subramanyam and Venkatachalam [20] indicate that neither earnings-based nor operating cash flow-based metrics are value attributes [6], [20], [2], [4]. Earnings-based measures are burdened with measurement error due to the assumptions underlying the determination of accruals and the discretion allowed under generally accepted accounting standards (GAAP), while operating cash flow-based measures ignore investment in operating assets [10]. Another approach to estimating economic performance is the cash recovery rate (CRR) [12], [17], [9]. Similar to earnings-based measures of performance, CRR is estimated using financial statement data. However, CRR has a cash flow focus that considers active investment. Although there has been controversy regarding the use and specification of the CRR model, its proponents state that this performance measure does not suffer from “capital valuation” issues that arise due to accounting method choices [10]. In contrast to operating cash flow, i.e. the cash component of earnings, CRR does not ignore investment in operating assets. Using correlation analyses and Tobin’s q as their benchmark measure. We extend prior research on alternative performance measures by empirically testing whether return on assets (ROA), an earnings-based measure of performance or estimated internal rate of return (EIRR), a cash recovery-based measure of performance, is more useful in conveying information about firms’ economic performance using both cross-sectional and time-series analyses and various time intervals. Our study differs from prior studies in several ways. First, this study makes an important contribution with respect to the use of cash recovery-based measures of performance.

Specifically, we use the active investment concept and continuous time analysis in deriving EIRR. We base the derivation of EIRR on the more realistic, U-shaped cash flows [1]. Second, our tests are more comprehensive since we use two benchmarks, stock returns and Tobin’s q , in addition to two competing performance measures, ROA and EIRR. Jacobson [13] and Landsman and Shapiro [15] only examine the relationship between ROI and one benchmark. Jacobson [13] used stock returns to proxy for economic ROA and finds ROI a valid performance measure. Landsman and Shapiro [15] used Tobin’s q as an economic return proxy and also find ROI to be significantly related. We use both proxies in our tests of the information content of EIRR and ROA. Third, we provide evidence using a more recent dataset [15]. This time period was one of growth, which is relevant in testing and explaining the relationships between our performance measures and the benchmarks over time. We test the relative and incremental information content of EIRR and ROA for (1) short intervals using a cross-section of firms for two years separately, 1993 and 2005 and (2) a long interval using time-series data from 1993 to 2005. The empirical results indicate that EIRR is consistently better at explaining Tobin’s q and stock returns over

short (year 1993 and year 2005) and long (year 1993-2005) time intervals. Contrary to prior studies [6], [18]. That report improvement in earnings, as a measure of performance relative to cash flows, over long measurement intervals, we find ROA to be less informative about companies' underlying profitability than the CRR-derived EIRR. Moreover, the robustness tests indicate that EIRR has more relative and incremental predictive power than ROA. Overall, our results provide evidence on the relative superiority of cash recovery-based measures as a summary measure that better reflects contemporaneous and future economic performance. This is generally consistent with studies that support the superiority of cash flows over earnings in predicting economic performance over varying horizons [2]. Market participants are interested in more relevant profitability measures. Providing empirical evidence on competing metrics that can proxy for economic performance is an important contribution. Specifically, the information content of ROA and EIRR as alternative measures of performance is useful to analysts, researchers and regulatory agencies. Earnings-and cash-based measures are used extensively in financial statement analysis [21], [7]. If there are better tools to estimate economic returns, analysts can incorporate these alternatives. From a research perspective, findings related to EIRR and ROA can provide additional information for future studies examining the usefulness of earnings measures. Accounting standards setters and regulators might benefit from the findings of this study given the interest and concern over the quality of earnings and how it affects various stakeholders.

2 Background Theory

Accounting rates of return are often used to proxy for the unobservable true economic performance measures of businesses. However, the informational role of accounting rates of return has been disputed in empirical tests. Researchers who maintain that accounting rates of return convey little information about economic rates of return have taken two distinct approaches. The first was an attempt to overcome the problems that separate accounting and economic rates of return [1]. According to this approach, there is a simple relationship between accounting and internal rates of return, where it is possible to derive the internal rate of return from a sequence of accounting data [2]. The second approach was to derive the unavailable internal rate of return from CRR as an alternative to using accounting rates of return [20]. In an effort to bridge the gap between accounting and economic measures of performance, researchers have focused on identifying the differences between accounting and internal rates of return. These differences included the rate of growth, the time shape of cash flows, depreciation procedures and the life span of investments [1]. Accounting rates of return are good surrogates for the unavailable internal rate of return in five specific cases: (1) when the reinvestment rate equals 100 percent [15]. (2) when annuity depreciation is used in a steadily growing firm [18]. (3) when cash flows are constant and continue indefinitely [8]. (4) when ROI is constant over the life of the project [2]. and (5) when the growth rate equals the rate of return. They label this stream of research as using "base-less procedures". Regardless of overcoming the various definition problems that separate economists and accountants, also they argue that economists and others who believe in the accounting rates of return are deceiving themselves. Indeed, the validity of accounting rates of return to measure business per-

formance is ultimately an empirical issue [3]. Following this debate and based on the market efficiency hypothesis, Jacobson [13] examines the validity of accounting rates of return. Jacobson [13] uses ROI as an earnings-based measure and examines its relation with stock returns, where stock returns are used as a proxy for the economic ROA. Despite the weak correlation between ROI and stock returns, Jacobson [13] suggests that ROI is a useful and perhaps the best available indicator of business performance. Landsman and Shapiro [15] argue that the low correlation in Jacobson [13] may result more from limitations in the empirical tests than from defects in the measure itself, i.e. the stock market responds to innovations in ROI and not to the level of measure. In addition, they argue that Jacobson's use of the unexpected ROI in his tests picks up transitory earnings instead of permanent earnings and this introduces measurement error. Consequently, Landsman and Shapiro [15] offer an alternative specification by examining the relationship between accounting rates of return and Tobin's q for a sample period 1979-1983 [3], [20]. Landsman and Shapiro [15] results support the findings of Jacobson [13]. Their analysis reveals a statistically significant relationship between ROI and Tobin's q . Although the overall evidence in Landsman and Shapiro suggests that accounting rates of return are good proxies for business performance, testing the association between Tobin's q and different estimates of the internal rate of return may lead to different conclusions. [15]. Ijiri [11,12], in a series of seminal papers, suggest a measure of the unavailable internal rate of return that is derived from the CRR. Ijiri [11] defines CRR as the ratio of the sum of funds from operations, proceeds from disposal of long-term assets, interest expense and the decrease in current assets (if it occurs) to the average beginning and ending gross total assets [11]. Subsequent to Ijiri's work, many researchers further developed the CRR approach to estimate the internal rate of return [12], [19], [10]. Salamon [17] states that "with the CRR it is clear that we are closer than ever before to having an empirical measure of the profit performance of firms which is directly linked to the discounted cash-flow rate of return" Some researchers criticized Ijiri's [11,12] CRR approach. Stark [16] shows that the CRR, as defined theoretically by Ijiri, is impossible to observe from published financial statements. Stark demonstrates that the empirical definition of CRR is inconsistent with the theoretical CRR used in Ijiri [11,12] and Salamon's [17] mathematical models. In addition, Jacobson [13] argue that the CRR, as defined in Ijiri's work, is unsuitable for discounting and conversion into the firm's internal rate of return [11]. Lee and Stark [16] suggest the use of conventional cash flow definitions when empirically defining the CRR. Therefore, Lee and Stark [16] define the CRR as the ratio of the entity's cash flows to the average of opening and closing gross fixed assets [14]. These two different calculations of CRR spurred a number of studies that can be classified into two main groups. The first group includes studies that are based on Ijiri's definition of CRR-capital concept and uses discrete time analysis [5]. The second group uses the concept of "active investment", based on Lee and Stark [16] definition of CRR, and uses continuous time analysis [10].

3 Research Methodology

This research is categorized based on purpose and is a type of applied research. The method of data collection in this research is library method and the statistical population includes all accepted companies Tehran Stock Exchange, which is from 2009 to 2013. A total of 72 companies

were selected as systematic research samples. For data analysis, Eviews software was used.

The hypotheses of this research are presented as follows: The main hypothesis: The internal revenues-based revenues impact on unusual returns.

First sub-hypothesis: The internal rate of return on unrealized returns has an impact on the cost leadership strategy (net sales to net book value of machinery and equipment).

Second sub hypothesis: The internal rate of return on unrealized revenues affects the cost leadership strategy (the ratio of total staff to total assets).

The applied variables can be stated as follows:

Dependent variable: Abnormal return

Unusual returns are equal to the difference between firm returns and market returns, to determine the abnormal returns of the market adjusted model (simple market model) [18]

$$ABR_{it} = R_{it} - R_{mt} \quad (1)$$

That:

R_{it} : The stock return rate i at time t

R_{mt} : annual market rate at time t

Annual stock return rate:

The return on equity for sample companies is calculated as follows:

$$R_{it} = \frac{P_{it} + D_{it} - P_{i0}}{P_{i0}} \times 100 \quad (2)$$

That:

P_{it} : stock price i at the end of time t

P_{i0} : stock price i at the beginning of time t

D_{it} : Dividends paid by i at time t

Annual Market Rate:

In this research, the market rate will be calculated based on the total stock market index.

$$R_{mt} = \frac{I_{mt} - I_{m0}}{I_{m0}} \quad (3)$$

That:

I_{mt} : Total stock index at the end of time t

I_{m0} : Total stock index at the beginning of time t

Independent variable: Internal rate of return

X₂ The internal rate of return based on cash returns is obtained using Stark and Lee [16].

$$\frac{\text{CRR}(G^2T^2 + \pi^2)(1 - e^{-GT})(e^{-iT} + 1)}{G(e^{-GT} + 1)(i^2T^2 + \pi^2)} = 1 \quad (4)$$

Where CRR is the cash reposeure rate that derives from the ratio of cash flows from the business unit to the gross margin of the fixed assets at the beginning and end of the period:

Business Unit Cash Flow = Funds from Investment Activity + Funds from Operating Activities

Average unmatched fixed assets = total assets - current assets + accumulated depreciation of fixed assets

G: The annual rate of growth in a company's assets that derives from the log of the net ratio of fixed-term assets to gross fixed assets of the first period.

T: The period when investments are active, which is derived from the fixed asset ratio at the expense of depreciation

I: The estimated internal rate of return obtained through the integration of the above relation.

II: the number of pips that is equal to the result of dividing the number 22 to 7

E-GT: Natural logarithm of growth rate at the time when investments are active.

E-iT: The natural logarithm of the estimated internal rate of return at the time when the investments are active.

Adjuster variable:

Leader spending strategy indicators are as follows:

- 1) Net sales to net book value of machinery and equipment
- 2) The ratio of the total number of employees to total assets

Control variables:

- 1) Financial leverage: The total debt is divided into total assets.
- 2) Return on Assets: The dividend after tax is deducted from the total assets.
- 3) Operating cash flow: From operating cash divisions to shares.

4 Analysis of Research Hypotheses

4.1 Test and analyse the main hypothesis

The main hypothesis: The internal rate of return on cash reuse affects the unusual returns of companies. The results of the estimation show that the probability of the t statistic for the constant coefficient and the coefficients of the internal rate of return, return on assets and cash flow to cash recycling on the unusual returns of the companies Less than 5%; therefore, the estimated coefficient of the above variable is statistically significant and for the variable of the financial leverage variable to cash outflow on the unusual returns of the companies, the probability of the t test is greater than 5% There-

fore, the estimated coefficient of the above variable is not statistically significant. Therefore, with 95% confidence, the first hypothesis for this variable is rejected. The adjusted adjustment coefficient shows the explanatory power of independent variables that can explain 41% of the variations of the dependent variable. The probability of F statistic indicates that the whole model is statistically significant and considering the hypothesis such as the variables of internal rate of return, return on assets and cash flow to cash recycling on the abnormal returns of companies in a meaningful model is. Therefore, the assumption H_0 is rejected, that is, the internal rate of return on cash reuse affects the abnormal returns of companies.

Table 1: The results of the main hypothesis

ABR _{it} = $\beta_0 + \beta_1$ IRR _{it} + β_2 DAM _{it} + β_3 BD _{it} + β_4 VNA _{it}					
		Estimated coefficient	Standard error	T test stats	Probability t test
The width of the origin	β_0	48/78560	16/51603	2/953833	0/0034
Internal Rate of Return	IRR _{it}	16/36953	7/195606	2/274934	0/0237
Degree of financial leverage	DAM _{it}	-40/52960	23/56451	-1/719942	0/0865
Asset returns	BD _{it}	-64/44122	27/43031	-2/349271	0/0195
Operating cash flow	VNA _{it}	-0/009634	0/002358	-4/084991	0/0001
Coefficient of determination		0/421066	F statistics	3/074677	Durbin Watson
Adjustment coefficient		0/414476	F Possibility	0/003602	2/456694

The regression equation is as follows.

$$ABR_{it} = 48.78560 + 16.36953IRR_{it} - 40.52960DAM_{it} - 64.44122BD_{it} - 0.009634VNA_{it}$$

Table 2: The results of the first sub-hypothesis

ABR _{it} = $\beta_0 + \beta_1$ IRR _{it} + β_2 DAM _{it} + β_3 BD _{it} + β_4 VNA _{it}					
		Estimated coefficient	Standard error	T test stats	Probability t test
Net sales to net The value of the office machinery and equipment					
The width of the origin	β_0	43/71843	17/13396	2/551566	0/0116
Internal Rate of Return	IRR _{it}	8/117388	3/447435	2/354616	0/0212
Degree of financial leverage	DAM _{it}	-33/87350	21/01481	-1/611887	0/1088
Asset returns	BD _{it}	-52/28441	35/68507	-1/465162	0/1447
Operating cash flow	VNA _{it}	-0/004078	0/002199	-1/853995	0/0654
Coefficient of determination		0/456937	F statistics	3/641376	Durbin Watson
Adjustment coefficient		0/444486	F Possibility	0/005413	2/055405

4.2 Test and analyse the first hypothesis

First sub-hypothesis: The internal rate of return on cash revenues affects the unusual returns of

companies with cost leadership strategies (net sales to net book value of machinery and equipment). The results of the estimation show that the probability of t for the constant coefficient and the coefficient of the internal rate of return is to recover cash from the unusual returns of companies with the strategy of net sales to net book value of machines and equipment less than 5%. Therefore, the estimated coefficient of the above variable is statistically significant and for the variables of the degree of financial leverage, return on assets and cash flow to cash recycling on the unusual returns of companies with the strategy of net sales to net book value of machinery and probability test equipment T is more than 5%. Therefore, the estimated coefficient of the above variables is not statistically significant. Therefore, with 95% confidence, the first hypothesis for this variable is rejected. The adjusted adjustment coefficient shows the explanatory power of independent variables that can explain 44% of the variations of the dependent variable. The probability of the F statistic is that the whole model is statistically significant. Considering the hypothesis because the internal rate of return is significant in the model. Therefore, the assumption H_0 is rejected, that is, the internal rate of return on cash revenues affects the unusual returns of companies with cost leadership strategies (net sales to net book value of machinery and equipment).

The regression equation is as follows:

$$ABR_{it} = 43.71843 + 8.117388IRR_{it} - 33.87350DAM_{it} - 52.2844BD_{it} - 0.004078VNA_{it}$$

4.3 Testing and analysing the second hypothesis

Second hypothesis: Internalized cash-based cash-flow rates affect the unusual returns of companies with cost leadership strategies (ratio of total employees to total assets).

Table 3: The results of the second hypothesis

ABR _{it} = β_0 + β_1 IRR _{it} + β_2 DAM _{it} + β_3 BD _{it} + β_4 VNA _{it}					
The ratio of the total number of employees to total assets		Estimated coefficient	Standard error	T test stats	Probability t test
The width of the origin	β_0	6/287269	12/94697	0/485617	0/6278
Internal Rate of Return	IRR _{it}	8/756030	3/532252	2/478880	0/0184
Degree of financial leverage	DAM _{it}	18/04725	6/046053	2/984963	0/0080
Asset returns	BD _{it}	8/562657	12/65839	0/676441	0/4997
Operating cash flow	VNA _{it}	-0/001504	0/002971	-0/506243	0/6133
Coefficient of determination		0/403788	F statistics	2/166336	Durbin Watson
Adjustment coefficient		0/390070	F Possibility	0/025232	2/122840

The results of the estimation show that the probability of t for the coefficient of internal rate of return variables and the degree of financial leverage to cash recycling on the unusual returns of companies with the ratio strategy. The total number of employees to total assets is less than 5%. Therefore, the estimated coefficient of the above variable is statistically significant and for the variables of return on assets and cash flow to cash recycle on the unusual returns of companies with the ratio of total staff to total Asset probability t is more than 5%. Therefore, the estimated coefficient of the above variables is not statistically significant. Therefore, with 95% confidence, the first hypothesis for this variable is rejected. The adjusted adjustment coefficient shows the explanatory

power of independent variables that can explain 39% of the variations of the dependent variable. The probability of F statistics indicates that the whole model is statistically significant and is considered significant in the model due to the hypothesis of the internal rate of return and the degree of financial leverage. Therefore, the assumption H_0 is rejected, ie, the internal rate of return on cash reuse affects the unusual returns of companies with cost leadership strategies (ratio of total employees to total assets). The regression equation is as follows:

$$ABR_{it} = 6.287269 + 8.756030IRR_{it} + 18.04725DAM_{it} + 8.562657BD_{it} - 0.001504VNA_{it}$$

5 Conclusions and suggestions

The results of this study are consistent with theoretical foundations. Today, accounting information systems in the circulation of the activities of organizations and the economic environment of our country play a significant role. Many economic decisions are based on information from these systems. The major share of stock exchanges dedicated to buying and selling corporate stocks is influenced by the figures and accounting information. After designing and testing the hypothesis of the research, it was concluded that the internal rate of return based on cash recycling affects the abnormal returns. Since the internal rate of return on cash retrieval has the content of information and is therefore related to economic decisions, it is therefore suggested to investors and creditors in their decisions on the rate of return internally based cash recycle also use. It is suggested to Tehran Stock Exchange organization to use appropriate structures and mechanisms to control and monitor the performance of listed companies in Tehran Stock Exchange because of the lack of efficient and effective regulatory and effective regulatory and supervisory systems in the capital market of Iran Provides abuse by some of the contributors.

References

- [1] Aboody, D., Hughes, J. and Liu, J., *Measuring value relevance in a (possibly) inefficient market*, Journal of Accounting Research, 2002, **40**(4), P. 965-986.
- [2] Barth, M.E., Cram, D. and Nelson, K., *Accruals and the prediction of future cash flows*, The Accounting Review, 2014, **74**(6), P. 27-58.
- [3] Beaver, W., *Financial Reporting: An Accounting Revolution*, Prentice-Hall, Englewood Cliffs, NJ. 2013.
- [4] Bernard, V.L., *Accounting-based valuation methods, determinants of market-to-book ratios, and implications for financial statement analysis*, working paper, University of Michigan, Ann Arbour, MI. 2015.
- [5] Chung, K., Ghicas, D. and Pastena, V., *Lender's use of accounting information in the oil and gas industry*, The Accounting Review, 2016, **6**(8), P. 885-895.
- [6] Dechow, P.M., *Accounting earnings and cash flows as measures of firm performance: the role of accounting accruals*, Journal of Accounting and Economics, 2013, **18**(1), P. 3-42.
- [7] DeFond, M.L. and Hung, M., *An empirical analysis of analysts' cash flow forecasts*, Journal of Accounting and Economics, 2010, **35**(2), P. 73-100.

- [8] Gordon, L.A. and Hamer, M.M., *Rates of return and cash flow profiles: an extension*, The Accounting Review, 1988, **63**(3), P. 514-521.
- [9] Griner, E.H. and Stark, A.W., *Cash recovery rates, accounting rates of return and the estimation of economic performance*, Journal of Accounting and Public Policy, 1988, **7**(4), P. 293-312.
- [10] Griner, E.H. and Stark, A.W., *On the properties of measurement error in cash recovery rate based estimates of economic performance*, Journal of Accounting and Public Policy, 2009.
- [11] Ijiri, Y., *Cash-flow accounting and its structure*, Journal of Accounting, Auditing and Finance, 1987, **1**(4), P. 341-348.
- [12] Ijiri, Y., *Convergence of cash recovery rate*, in Ijiri, Y. and Whinston, A. (Eds), Quantitative Planning and Control, Academic Press, New York, NY, 2011, P. 259-267.
- [13] Jacobson, R., *The validity of ROI as a measure of business performance*, American Economic Review, 2015, **77** (3), P. 470-478.
- [14] Jennings, R., *A note on interpreting incremental information content*, The Accounting Review, 2014, **6**(5) P. 925-932.
- [15] Landsman, W.R. and Shapiro, A.C., *Tobin's Q and the relation between accounting ROI and economic return*, Journal of Accounting, Auditing and Finance, 1995, **10**(1), P. 103-120.
- [16] Lee, T. A., and A. W. Stark. *Ijiri's cash flow accounting and capital budgeting*. Accounting and Business Research, 1987, **17**(66), P. 125-131.
- [17] Salamon, G.L., *On the validity of accounting rates of return in cross section analysis: theory, evidence, and implications*, Journal of Accounting and Public Policy, 1988, **7**(4), P. 267-292.
- [18] Stauffer, T.R., *The measurement of corporate rates of return: a generalized formulation*, Bell Journal of Economics and Management Science, 2007, **2**(2), P. 434-469.
- [19] Steiger, J.H., *Tests for comparing elements of a correlation matrix*, Psychological Bulletin, 2015, **87**(3), P. 245-251.
- [20] Subramanyam, K.R. and Venkatachalam, M., *Earnings, cash flows, and ex post intrinsic value of equity*, The Accounting Review, 2016, **82**(2), P. 457-481.
- [21] Wernerfelt, B. and Montgomery, C.A., *Tobin's Q and the importance of focus in firm performance*, American Economic Review, 1988, **78**(1), P. 246-250.