APPLICATION OF CASH FLOW RETURN ON INVESTMENT IN TERMS OF FINANCIAL PERFORMANCE MEASUREMENT

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Abstract

Value based financial performance measures are generally presented as a major improvement over the traditional performance measures. By including a company´s cost of capital in their calculation they could be applied in order to evaluate the value creating potential of a company. On the other hand, proponents of modern financial measures highlight their correlation with company´s share return. Economic value added (EVA), market value added (MVA), cash flow return on investment (CFROI) among others represent the group of modern measures of company´s financial performance. The aim of this paper is to investigate the use of CFROI as a measure of company´s financial performance. The paper outlines the calculation of this measure and also evaluates its incremental information content above selected traditional measures.

Keywords: *value based performance measurement, cash flow, cash flow return on investment, earnings, share return, economic value added, shareholder wealth.*

1. Introduction

Traditional financial performance measures are often criticised for excluding a company's cost of capital, and are therefore considered inappropriate for the evaluation of value creation. Furthermore, traditional measures calculate an accounting profit according to the accounting guidelines. As a result of these limitations of traditional measures, value based financial performance measures were developed. The major difference between the traditional and value based measures is that the value based measures include a company's cost of capital in their calculation and they attempt to calculate the economic profit, rather than the accounting profit of a company. Economic profit considers the difference between the operating profit and the cost of the capital employed in generating those profits.

Proponents present the value based measures as a major improvement over the traditional measures, and report high levels of correlation between them and share returns. A number of empirical studies investigating EVA (as the most popular value based measure) report conflicting results, and it is consequently not clear whether this value based measure is able to outperform the traditional financial performance measures in explaining the variation in share returns. There is little empirical evidence of the role of CFROI. Based on the results of one study it appears as if the value based measure CFROI_Margin (difference between CFROI and the real cost of capital) is not able to outperform earnings in explaining the variation in market adjusted share returns. It is necessary to continue in research and bring empirical evidence of the role of CFROI in this context.

In this paper a value based financial performance measure Cash Flow Return on Investment (CFROI) is investigated. The paper also presents the results from the relative and incremental information content tests conducted for the measure CFROI. Incremental information content indicates whether one financial measure provides additional information over and above that provided by another measure. Relative information content refers to the information content of one financial measure compared to another.

2. Characteristics of the measure CFROI

The measure CFROI is associated with HOLT Value Associates which applies it in a money management context, and Boston Consulting Group (BCG) which focuses on its application in a corporate finance environment.

CFROI compares the inflation-adjusted cash flow generated by a company with the inflation-adjusted cash investment required to achieve it (Young, O´Byrne, 2011). By including the estimated lifetime of the company's depreciable assets and the expected residual value of its non-depreciable assets, an internal rate of return is calculated. This CFROI figure is then compared to the company's real cost of capital. If CFROI is less than the company's real cost of capital, additional investment would yield a negative NPV and the investment would not contribute to the creation of shareholder value. Alternatively, if the CFROI is greater than the real cost of capital an increase in investment would provide a positive NPV and shareholder value would be created.

The main characteristics of this measure are listed below:

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- The calculation of the measure is similar to that of an internal rate of return (IRR), but it should not be interpreted in the same way as an IRR.
- CFROI values are calculated for each financial year.
- Since its calculation is based on cash flows, it removes the influences of accrual accounting even more than EVA.
- The measure is inflation-adjusted.
- It focuses on the return offered to all the capital providers of the company and not only the shareholders.
- CFROI may be viewed as a return on investment (ROI). However, it is not calculated for individual projects, but rather for the company as a whole.

Calculation of CFROI

The four inputs required to calculate the measure are as follows (Madden, 1999):

42. The average life of the depreciating assets.

43. The total amount of assets (depreciating and nondepreciating assets) adjusted for inflation.

44. The inflation-adjusted cash flows generated by the assets over their lifetime.

45. The final inflation-adjusted residual value of the non-depreciating assets at the end of the asset lifetime.

The asset lifetime is the estimated average economic life of the tangible depreciating non-current assets of the company. This figure provides an indication of the remaining period over which the cash flow will be generated. It is calculated as follows[1]:

$$Asset\ life = \frac{Adjusted\ \tan gible\ non-current\ assets}{Depreciation\ on\ \tan gible\ non-current\ ass}$$

The inflation-adjusted total assets amount is calculated as the total of the depreciating and the non-depreciating assets. The inflation-adjusted depreciating assets amount is calculated as follows:

Current cost depreciating assets = Inflation-adjusted Tangible Non-current Assets + Construction in Progress + Inflation-adjusted Gross Leased Property + Adjusted Intangibles.

The inflation-adjusted non-depreciating assets are included in the total asset figure invested in the beginning of the period considered. At the end of the asset lifetime this value represents a cash inflow. The assets consist of:

Current cost non-depreciating assets = Monetary assets – Adjusted current liabilities + Investments and loans granted + Current cost inventories + Current cost land and improvements

The amount of inflation-adjusted gross cash flow should be a reflection of the total cash flow generated by the company's operations, and ignores the method of financing[2]. The amount is calculated as follows:

Net profit after tax

+ Depreciation and amortisation

+ Adjusted finance cost

+ Rental expense

+ / - Monetary holding gain / (loss)

- Cost of sales adjustment for replacement value of inventories

+ Net pension expense

+ Minority interest

+ Special item after tax

= **Inflation-adjusted gross cash flow**

Based on these inputs the company's CFROI value is calculated as the discount rate that would ensure that the present value of all the future cash flows (the equal annual inflation-adjusted gross cash flows, as well as the terminal non-depreciating assets amount) is equal to the initial investment (total non-depreciating and depreciating assets). The CFROI is then calculated as follows[3]:

$$CFROI = \frac{Sustainable\ cash\ flows}{Current\ \cos t\ gross\ investment}$$

The absolute level of a company's CFROI does not indicate whether the company is creating or destroying shareholder value. In order to determine this, the measure needs to be compared to a benchmark value (Martin, Petty, 2000). HOLT Value Associates (consulting firm that promotes CFROI) use a company-specific discount rate when evaluating CFROI. This discount rate is based on the CFROI level, the sustainable asset growth rate, as well as a market derived discount rate[4]. It has two major benefits over the CAPM. Firstly, it considers the expected future cash flows of the market, while the CAPM is based on historical information. Furthermore, the market derived discount rate is a product of the CFROI valuation model itself.

Company-specific discount rates are obtained in a similar way. By comparing with the market rate a risk differential can be calculated. The approach

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[1] Land and improvements, as well as construction in progress are excluded from this figure since no depreciation is provided on these items. The amortisation of goodwill should not be included in this figure.

[2] The figure is calculated for a specific financial year, and it is assumed that the same amount will be generated for each of the years included in the asset lifetime.

[3] The sustainable cash flow is calculated after subtracting a sinking fund depreciation amount from the inflation-adjusted gross cash flow. The amount of non-depreciating assets is also excluded from the calculation.

[4] The market derived discount rate is obtained by considering a large representative sample of companies. Firstly, the total market value of their equity and debt at a certain point in time is calculated. The next step is to estimate the expected future cash flow generated by these companies for the next financial period. These cash flow estimates are obtained by considering earnings expectations published by market analysts.

applied by HOLT Value Associates assumes that a company's risk is a function of its size and financial leverage, and that this risk cannot be eliminated by means of diversification. The risk differential can consequently be applied to evaluate the risk associated with a specific company.

In those cases where the CFROI value exceeds the company-specific discount rate, the company's NPV is positive (Fabozzi, Grant, 2000). Consequently,
shareholder value is created, while it is destroyed by CFROI levels below the discount rate (Young, O´Byrne, 2001).

It is also possible to compare CFROI to a real rate calculated for an industry (Martin, Petty, 2000). This enables to identify the greatest shareholder value creators in an industry. Furthermore, it is also important to consider whether a company is able to maintain or improve its level of CFROI.

B. J. Madden considers the application of inflation-adjusted cash flows for the CFROI calculation as one of the major benefits of this measure since it enables comparisons over time, and also between companies in different countries. He also suggests that CFROI solves the problem associated with accounting reserves. These reserves are usually easy to manipulate and could distort the financial performance of a company (Madden, 1999). According to the CFROI approach these reserves are excluded from the calculations.

Since it removes some of the accounting distortions, P. P. Peterson and D. R. Peterson also regard the use of cash flows instead of accounting figures as a benefit associated with CFROI (Peterson, Peterson, 1996).

A. Dzamba also indicates that CFROI represents the future risk exposure of the company, since it is a risk-adjusted discount rate. Because the CFROI calculation focuses on cash it may also be a more applicable measure for shareholders, who tend to focus on cash dividends (Dzamba, 2003).

When calculating CFROI, gross investments are included. Accumulated depreciation amounts are added back to the book values of the assets employed to generate cash flows. As a result of this, the measure removes the problem of heavily depreciated assets as well as different depreciation policies (Martin, Petty, 200).

The primary advantages and disadvantages of CFROI could be summarized as follows:

Table 1: Advantages and disadvantages of CFROI

Advantages
The conversion of accounting profits into cash flow figures.
The use of inflation-adjusted total cash flows rather than the depreciated book values.
The recognition of the life time of the assets utilised to generate the cash flows.
The expression as a return percentage, rather than a monetary amount[5].

Disadvantages
Complexity of its calculation (a large number of accounting adjustments need to be completed).
In the case of start-up operations large capital outlays are usually combined with low or negative cash flows, so CFROI may not be the ideal performance measure to apply.
A company consists of a large portfolio of different projects with varying levels of CFROI. The company value for CFROI is an average for the portfolio and it is difficult to identify projects with low or high levels of CFROI.
Difficulties to communicate it to all levels of a company.
Since the inflation adjustments are only estimates, the quality of the estimates could greatly influence the measure.

The CFROI approach mixes operating and financing decisions. As a result it is not always possible to determine whether changes in CFROI are the result of operating changes, or financing changes. It is, therefore, important to include the level of financial leverage when comparing different companies (Clinton, Chen, 1998).

3. Relationship between CFROI and share returns

The objective of this part of the paper is to evaluate the relative and incremental information content of CFROI in order to determine whether it is able to outperform other traditional financial performance measures in explaining the variation in a company's market adjusted share returns. The study was carried out on a sample of Slovak companies, using these traditional financial performance measures: earnings before extraordinary items (EBEI) and operating cash flow (CFO). When CFROI is applied to evaluate a company's shareholder value creation, it is usually compared to the inflation-adjusted cost of capital. The difference between a company's CFROI and its real cost of capital is the CFROI margin.

In order to investigate the relative and incremental information content of this CFROImargin and the measures CFO and EBEI, the CFROImargin is partitioned into its contributing components using the approach applied by Biddle (Biddle, Bowen, Wallace, 1997):

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[5] This ensures even greater comparability between different companies, since the measure is not influenced by the size of the investment.

CFROI margin = CFO + Accrual + ATInt – Capital Charge + AcctAdj + InflAdj + CVAAdjreal + CFROIAdj

where:

Accrual = The total operating accruals of the company

ATInt = Interest expense after provision for tax

Capital Charge = The capital charge based on the cost of capital and the invested capital at the beginning of the financial year

AcctAdj = The accounting adjustments to NOPAT and ICt-1 to calculate EVAnom

InflAdj = Inflation adjustments included to calculate EVAreal

CVAAdjreal = The adjustments made to EVAreal to calculate CVAreal

CFROIAdj = The difference between CVAreal and the company's CFROIMargin

The measures CFO, EBEI, and CFROI$_{margin}$, as well as their contributing components, are calculated for 60 Slovak companies during a 10-year period from 2005 to 2014.

Table 2: Descriptive statistics on the dependent and independent variables in the relative information content tests of CFROI$_{margin}$

Descriptive Statistics				
	Market Adj. Return	EBEI	CFO	CFROI$_{margin}$
Mean	0,14	0,32	0,25	-0,009
Median	0,02	0,18	0,16	-0,006
St. Deviation	0,70	0,57	0,52	0,149
Correlations				
	Market Adj. Return	EBEI	CFO	CFROI$_{margin}$
Market Adj. Return	1			
EBEI	0,28	1		
CFO	0,18	0,28	1	
CFROI$_{margin}$	0,31	0,37	0,07	1

The measures EBEI and CFO have the highest mean and median values. The lowest mean and median values are observed for the measure CFROImargin, all close to zero. If the correlations are considered, all are found to be statistically significant at the 1% level. The highest correlation between the dependent variable and an independent variable is observed between the market adjusted return and CFROImargin. It is also interesting to note that the correlation between the market adjusted return and EBEI is higher than in the case of CFO.

Table 3: Descriptive statistics on the dependent and independent variables in the incremental information content tests of CFROI$_{margin}$ (see Table section at the end of the paper).

The correlations between the majority of the CFROImargin components are statistically significant at the 1% level, while the correlation between capital charge and accruals is significant at the 10% level. Only the correlations between the market adjusted return and inflation adjustments, accounting adjustments and accruals, accounting adjustments and inflation adjustments and CFROI adjustments and interest expenses are not significant.

The relative information content of the measures is evaluated by comparing the adjusted R^2 values for regressions based on the following equation:

Dt = b0 + b1 Xt / MVEt-1 + b2 Xt-1 / MVEt-1 + et

where:

Dt = The market-adjusted return for period t,

X = One of the three measures CFO, EBEI, and CFROImargin

MVEt-1 = The market value of the equity

The results from the relative information content tests are provided in Table 4.

Table 4: Tests of the relative information content of selected measures

	EBEI	CFO	CFROImargin
Adj. R^2	0,05	0,03	0,07

CFROI$_{margin}$ has a higher adjusted R^2 value (0,07) than the other measures. The EBEI values yields the second largest adjusted R^2 value (0,05). It is followed by the CFO (0,03). In terms of relative information content, CFROI$_{margin}$, therefore, once again appears to outperform the other measures, but the difference between the results for EBEI and CFROI$_{margin}$ are not so significant.

4. Conclusions

In this paper an introduction to a value based financial performance measure CFROI was provided. This measure compares the inflation-adjusted cash flows generated by a company with the inflation-adjusted cash investment required to achieve it. By including the estimated lifetime of the depreciable assets and the expected residual value of the company's non-depreciable assets an internal rate of return is calculated and compared to the company's inflation-adjusted cost of capital. If a company is able to generate CFROI values in excess of its real cost of capital, it is argued that shareholder value should be created. Amongst the benefits ascribed to CFROI the focus on cash flow and the inclusion of the inflation adjustments are considered to be particularly valuable. The complexity of its calculation, and the fact that it exhibits some of the same problems associated with IRR measures, however, are mentioned as limiting factors.

Furthermore, in this paper the information content of the measure CFROI was compared to that of the measures EBEI and CFO to determine whether

CFROI is able to outperform the traditional measures in explaining market adjusted share returns.

In order to evaluate the shareholder value creating potential of a company, the difference between its CFROI value and its real cost of capital (CFROImargin) was calculated. The analysis was carried out on a sample of Slovak companies to evaluate the relative information content of the individual measures, as well as the incremental information content of the CFROI components.

The results of the analysis indicate that CFROImargin is able to outperform earnings as a traditional measure of financial performance in explaining the variation in market adjusted share returns. I tis important to note, that there is not a huge difference between the result for EBEI and CFROImargin, on the other hand, EBEI is better in explaining the market adjusted share returns than CFO. The results from the incremental information content tests indicate that the adjustments required in order to calculate CFROImargin do have statistically significant incremental information content.

These further research areas could be identified:

• Apply the test for other companies in the Slovak republic – make a comparison among sectors.

• Apply the test for a longer period.

• Apply the test for companies in other countries and compare the results.

• Apply the test including other value based measures, too and compare the results.

Table 3: Descriptive statistics on the dependent and independent variables in the incremental information content tests of CFROI$_{margin}$

	Descriptive Statistics								
	Market Adj. Return	CFO	Accruals	Interest expenses	Capital charge	Account ing Adj	Inflation Adj	CVA Adj real	CFROI Adj
Mean	0,14	0,31	-0,07	0,08	0,41	-0,06	0,01	0,11	0,04
Median	0,02	0,15	-0,03	0,03	0,18	-0,02	0,01	0,05	-0,03
Std.dev.	0,78	0,68	0,61	0,18	0,59	0,22	0,35	0,20	0,71
	Correlations								
	Market Adj. Return	CFO	Accruals	Interest expenses	Capital charge	Account ing Adj	Inflation Adj	CVA Adj real	CFROI Adj
Market Adj. Return	1								
CFO	0,18	1							
Accruals	0,06	-0,50	1						
Interest expenses	0,11	0,25	-0,11	1					
Capital charge	0,15	0,54	-0,02	0,72	1				
Accounting Adj	-0,08	-0,17	-0,007	-0,33	-0,38	1			
Inflation Adj	0,005	-0,12	0,075	0,28	0,06	0,003	1		
CVA Adj real	0,12	0,54	-0,12	0,61	0,58	-0,21	0,36	1	
CFROI Adj	-0,08	-0,08	-0,17	0,008	0,31	-0,37	-0,59	-0,33	1

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