

# Earnings growth for negative EPS – Investment Basics XXXII

## INTRODUCTION

A basic mathematical principle poses a problem of extensive impact for the financial analyst. In this article an effort is made to briefly describe the problem and suggest methods to overcome it.

## DESCRIPTION OF THE PROBLEM

The basic principle concerned is that of dividing a positive number by negative number resulting in a negative number (and vice versa) and likewise dividing a negative number by a negative number resulting in a positive answer.

The problem emerges especially in the case of calculating the earnings growth (percentage change of earnings per share [EPS]). As negative EPS figures are reported at times the simple and widely applied formula of  $(EPS_t - EPS_{t-1})/EPS_{t-1}$  is problematic should the  $EPS_{t-1}$  be negative and the  $EPS_t$  positive since it results in a negative percentage change. Furthermore, a loss in year  $t-1$  followed by a bigger loss in year  $t$ , will result in a positive percentage change.

In addition nil earnings reported in year  $t-1$  poses the problem of division by nil resulting in an infinite number. Likewise any number just a fraction bigger than nil tends to blow up the earnings percentage change considerably.

## METHODS OF ADDRESSING THE PROBLEM

In confronting the problem it is important to consider whether a single company is being analyzed or whether trends and characteristics of a number of companies are being studied.

Should the financial analyst be working with a single company the best solution is to apply a formula where the absolute value of the denominator is used, i.e.  $(EPS_t - EPS_{t-1})/|EPS_{t-1}|$ . The following simple examples in Table 1 illustrate the possible outcomes. Column c illustrates the outcome where the absolute value of the denominator is not used and column d illustrates the outcome suggested in this article (i.e. where the absolute value of the denominator is used).

**TABLE 1**  
Earnings per share percentage change

Year <sub>t</sub>	Year <sub>t-1</sub>	Percentage change	
		No absolute value used	Absolute value used
a	b	c	d
30	20	50%	50%
30	-20	-250%	250%
-30	20	-250%	-250%
-30	-20	50%	-50%
20	30	-33%	-33%
20	-30	-167%	167%
-20	30	-167%	-167%
-20	-30	-33%	33%

The problem can also be eliminated by using a scaling factor such as the share price. The formula applied to calculate percentage change will then be the following:

$(EPS_t - EPS_{t-1})/P_{t-1}$ . By using the latter the problem of a blown up percentage due to a very low denominator is reduced at the same time.

If trends or growth rates of a number of companies are being studied two more alternatives could be of use. Firstly companies reporting losses can be taken out of the sample entirely.

However, the extend to which a bias is thus incorporated and the implication thereof regarding the findings of the study concerned are points of debate.

In stead of eliminating companies reporting losses the earnings of all companies included in a particular study can be "pooled" per year. In this fashion growth rates for arbitrary periods can be calculated for the "market" as it were.

## UNACCEPTABLE METHODS

After having suggested ways and means of overcoming our mathematical problems of division it should be noted that adjusting the data by interpolating to replace the loss figures results in nothing but an incorrect solution. Furthermore replacing the loss by the smallest of fractions blows up the percentage change as discussed previously.

Great care should be taken, especially when working with data of considerable magnitude and computerising calculations, that none of the above discussed aspects are unintentionally ignored.