

The Influence Of Higher Moments And Non-Normality On The Sharpe Ratio: A South African Perspective


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ABSTRACT

Although the general assumption is that daily and monthly return data are normally distributed (Aparicio & Estrada, 2001), the correct statistical distribution of returns must first be established (Linden, 2001), as it constitutes one of the elementary building blocks that will ensure accurate financial analyses (Taylor, 1986). The assumption of normality is also critical when constructing reference intervals for variables (Royston, 1991). By evaluating the pre-, during and post- 2007-2009 financial crisis periods, this paper found that non-normality can be present in all data frequencies, especially in higher data frequencies. Further evidence also illustrated that the deviation from normality escalated over the crisis period and remained higher after the crisis, compared to the pre-crisis period. By comparing the traditional Sharpe ratio with adjusted versions, based on Gaffaoui's (2012) methodology, this paper accentuates that the presence of non-normality and higher moments can influence the Sharpe ratio's performance rankings.

Keywords: Emerging Market; Higher Moments; Normality; Sharpe Ratio

1. INTRODUCTION

 Emerging markets tend to be more exposed to shocks which are induced by events, such as exchange rate devaluations, regulatory changes, political and global economic crises (SARB, 2010; Bekaert, Erb, Harvey & Viskanta, 1998). Even so, emerging markets are generally associated with high expected returns and lower correlation with other markets, making it a desirable option to promote greater portfolio diversification (Bekaert, Erb, Harvey & Viskanta, 1998). This emphasises the necessity to identify suitable investment options in emerging markets by means of a performance evaluation process. However, critical findings suggest that the traditional mean-variance analysis approach will not be suitable, as emerging market returns can have significant kurtosis and skewness (Bekaert, Erb, Harvey & Viskanta, 1998). This argument is emphasised by Hentati, Kaffel and Prigent (2010), who stated that one of the greatest criticisms of the standard mean-variance analysis approach is that it ignores the higher moments, and that variance will, therefore, provide a flawed perception of actual risk (Harlow, 1991). This implies that traditional performance measures, like the Sharpe ratio, will tend to overestimate the real risk inherent in the asset classes under evaluation (Brooks & Kat, 2002). Also, very different portfolio allocations will be possible, with the presence of non-normal returns, when comparing the traditional mean-variance framework to more advanced performance measures (see for example: Wong, Phoon & Lean, 2008; Cvitanic, Lazrak, Martellini & Zapatero, 2003; Lamm, 2003; Popova, Morton & Popova, 2003; Terhaar, Staub & Singer, 2003; Fung & Hsieh, 1999). Additionally, the study by Harris and Mazibus (2010) argued that volatility modelling can assist investors in improving portfolio allocation and performance. However, due to the presence of fat tails within return distributions, several volatility models have been found to be inconsistent in describing the empirical features of equity indices or option prices (see for example Chernov, Ghysels, Gallant & Tauchen, 2003; Eraker, Johannes & Polson, 2003; Andersen, Benzoni & Lund, 2002; Bates, 2000; Bakshi, Cao & Chen, 1997). Other fundamental analyses have also examined the statistical distributions of traditional financial ratios and have found that these ratios may provide bias information if not adjusted for the presence of non-normality (see for example Nikkinen & Sahloström, 2004; Mcleay & Omar, 2000; Deakin, 1976; Horrigan, 1965). Overall, these findings emphasise the importance to refrain from assuming that returns are normally distributed, as it can lead to inaccurate results and unsuccessful investment decisions.