Logarithmic returns are important in finance because they provide a more accurate measure of the percentage change in the value of an asset over a period of time. This is particularly important when analyzing financial data because the compounding effect of returns over time can have a significant impact on the value of an asset.

Logarithmic returns are also useful because they are additive. That is, the logarithmic return of a portfolio composed of multiple assets is simply the sum of the logarithmic returns of each individual asset. This makes it easy to calculate the overall performance of a portfolio over a period of time.

**A number of powerful arguments are put forward to justify the use of logarithmic returns:**

i) Logarithmic returns can be interpreted as continuously compounded returns. This means that, for nonstochastic processes, such as the returns on risk-free fixed interest securities held to maturity, when logarithmic returns are used, the frequency of compounding does not matter and returns across assets can more easily be compared.

ii) Using continuously compounded (logarithmic) returns is advantageous when considering multi-period returns as the continuously compounded multi-period return is simply the sum of continuously compounded single period returns. Continuously compounded returns are time additive and it is easier to derive the time series properties of additive processes than multiplicative processes. In this context some studies have shown that using simple returns to estimate returns over longer periods can be quite unsatisfactory .

iii) The use of logarithmic returns prevents security prices from becoming negative in models of security returns .

iv) If a security price follows geometric Brownian motion4 (a very popular model of security price movements used, for example, in the Black-Scholes option pricing model) then the logarithmic returns of the security are normally distributed.

v) For forecasting future cumulative returns, continuous compounding of the expected logarithimic return will give a better guide to median future cumulative returns (the return that investors are likely to realise) than compounding expected simple returns.

vi) Logarithmic returns are approximately equal to simple returns. Inspection of the formula connecting logarithmic and simple returns RLt = ln(1+ RSt) shows that as long as RSt is not too large then logarithmic and simple returns are very similar in size. Whilst this is true, it is important not to wrongly deduce from this that the mean of a set of returns measured using logarithmic returns is necessarily very similar to the mean of the same set of returns measured using simple returns