Question

Calculate both the average discrete and average continuous monthly returns for the following dividend adjusted share price and market index.

Period	Share Price	Market Index
August 2017	$ 1.55	1,175.00
September 2017	$ 2.10	1,200.00
October 2017	$ 2.45	1,305.00
November 2017	$ 2.85	1,505.00

Solution

1. Calculation of average discrete monthly return

Period	Returns on the stock	Returns on the market index	Monthly return of $1 invested in stocks	Monthly return of $1 invested in market Index
September 2017	35.48%	2.13%	1.35	1.02
October 2017	16.67%	8.75%	1.58	1.11
November 2017	16.33%	15.33%	1.84	1.28
Average value			**1.59**	**1.14**

For example,
Returns on the stock(September 2017)=(Share price(September 2017)-Share price(August 2017))/Share Price(August 2017)=(2.10-1.55)/1.55=0.3548 or 35.48%

Returns on the market index(September 2017)=(Market Index(September 2017)-Market index(August 2017))/Market Index(August 2017)=(1200-1175)/1175=0.0213 or 2.13%.

Monthly return of $1 invested on stocks(September 2017)=1+Returns on the stock (September 2017)=1+0.3548≈1.35

Monthly return of $1 invested in stocks(October 2017)=Monthly return of $1 invested in stocks (September 2017)*(1+Returns on the stocks(October 2017))=1.35*(1+0.1667)≈1.58

Monthly return of $1 invested in market index(September 2017)=1+Returns on the market index(September 2017)=1+0.0213≈1.02

Monthly return of $1 invested in market index(October 2017)=Monthly return of $1 invested in market index(September 2017)*(1+Returns on the market index(October 2017))=1.02*(1+0.0875)≈1.11.
Average value for Monthly return of $1 invested in stocks=(1.35+1.58+1.84)/3≈1.59
Average value for Monthly return of $1 invested in market index=(1.02+1.11+1.28)/3≈1.14

2. Calculation of average continuous monthly return

In order to calculate continuous returns we need to estimate the dependence between changing returns of shares and market index. This dependence can be described by the equation:

$$R_{it} = \alpha_i + \beta_i R_{mt}$$

where

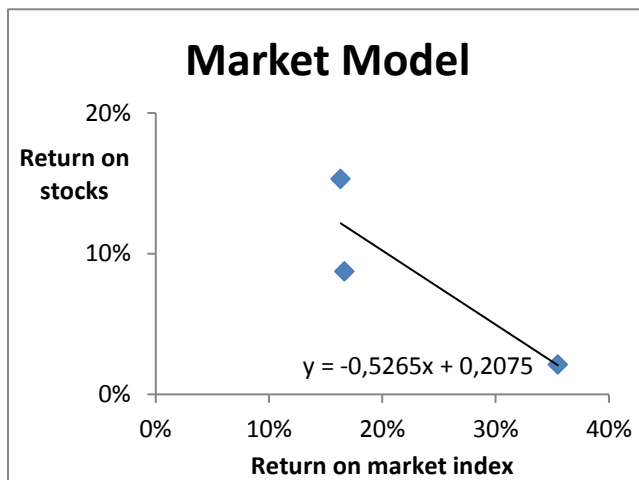α_i - the excess return;

R_{mt} - the market excess return.

We find coefficients α, β using the LINEST function of MS Excel.

Obtained parameters of regression analysis:

Coefficient	Slope coefficient
-1.4532	0.3552

Another way to get coefficients is constructing a graph and the trend-line

Variation of returns on stock with changing returns of market index:

According to regression analysis	According to trend line
32%	20%
23%	16%
13%	13%

The relationship between returns of shares and index market can be demonstrated by

$$R_{it} = -1.4532 + 0.3552R_{mt}$$