PORTFOLIO DIVERSIFICATION ENIGMA

1. Using the past 10 years of annual return data (provided in Exhibit - 1) for the S&P CNX Nifty Index and the CNX Bank Index, calculate the mean standard deviation and covariance/correlations for each asset class.

|  |  |  |
| --- | --- | --- |
| **In December** | **S&P CNX Nifty Index** | **CNX Bank** |
| 2003 | 72 | 110 |
| 2004 | 10 | 33 |
| 2005 | 38 | 33 |
| 2006 | 41 | 33 |
| 2007 | 53 | 63 |
| 2008 | -51 | -49 |
| 2009 | 74 | 78 |
| 2010 | 18 | 29 |
| 2011 | -24 | -31 |
| 2012 | 28 | 57 |
|  |  |  |
| Mean | 25.9 | 35.6 |
| Std Deviation | 39.82029075 | 47.37369 |
| correlation | 0.948797719 |  |
| Covariance | 1789.844444 |  |

With the help of these numbers, estimate the portfolio risk and return for Kaushesh’s existing portfolio.

**For existing portfolio the Expected return is estimated as follows:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Asset Class** | Weightage | Return | Weighted return |
| **S&P CNX Nifty Index** | 60% | 25.90% | 15.5400% |
| **CNX Bank Index** | 40% | 35.60% | 14.2400% |
| **Expected Return of the portfolio** | | | 29.7800% |

The Standard deviation of the portfolio is Estimated as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| **Asset Class** | Weightage | Std Deviation | Weighted SD |
| **S&P CNX Nifty Index** | 60% | 39.82 | 23.8921745 |
| **CNX Bank Index** | 40% | 47.37 | 18.9494767 |
| **Portfolio Std Deviation** | | | 42.8416511 |

2. After adding a new asset class (gold), what is your assessment of portfolio risk and return? Estimate the resulting portfolio position in terms of risk and return using the data in Exhibits -1. How does a diversified portfolio position compare with that in Question 1?

|  |  |  |  |
| --- | --- | --- | --- |
| **In December** | **S&P CNX Nifty Index** | **CNX Bank** | **Gold** |
| 2003 | 72 | 110 | 17 |
| 2004 | 10 | 33 | 13 |
| 2005 | 38 | 33 | 9 |
| 2006 | 41 | 33 | 36 |
| 2007 | 53 | 63 | 15 |
| 2008 | -51 | -49 | 25 |
| 2009 | 74 | 78 | 12 |
| 2010 | 18 | 29 | 26 |
| 2011 | -24 | -31 | 28 |
| 2012 | 28 | 57 | 6 |
|  |  |  |  |
| Mean | 25.9 | 35.6 | 18.7 |
| Std Deviation | 39.82029075 | 47.37369 | 9.59224224 |

**For the new portfolio the Expected return is estimated as follows:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Asset Class** | Weightage | Return | Weighted return |
| **S&P CNX Nifty Index** | 50% | 25.90% | 12.9500% |
| **CNX Bank Index** | 30% | 35.60% | 10.6800% |
| **Gold** | 20% | 18.70% | 3.7400% |
| **Expected Return of the portfolio** | | | 27.37% |
|

The Standard deviation of the portfolio is Estimated as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| **Asset Class** | Weightage | Std Deviation | Weighted SD |
| **S&P CNX Nifty Index** | 50% | 39.82 | 19.91 |
| **CNX Bank Index** | 30% | 47.37 | 14.211 |
| **Gold** | 20% | 9.592242 | 1.91844845 |
| **Portfolio Std Deviation** | | | 36.0394484 |

As can be seen the portfolio return of the new portfolio is now 27.37% as against the expected return of the portfolio of 29.78%. However the SD of the new portfolio is quite lower than the Earlier portfolio. While the SD was earlier 42.84%. the same ahs now been significantly reduced to 36.03% (Eugene Brigham & Michael Ehrhardt, 2010).

3. Estimate the Sharpe Ratio for the diversified portfolio (gold and equity) versus an all-equity portfolio using the results from Questions 1 and 2.

Sharpe Ratio is also known as reward variability ratio**.** This measures the risk premium of the portfolio relative to the total amount of risk in the portfolio. This index measures the slope of the risk-return line. The larger the index value, the better the performance (Lumby, 2000).

**Sharpe Ratio = **

This Sharpe ratio is known to act as an index which assigns a value as highest to that portfolio which has the highest risk to variability ratio and assign lower value to the portfolio or asset which has the lowest risk to volatility ratio.

The Sharpe ratio of the existing portfolio and the new diversified portfolio is estimated a follows:

For the existing portfolio the Sharpe ratio is:

Sharpe Ratio =  = (29.78%-8.11%)/ 42.84 = .505

For the new diversified portfolio the Sharpe Ratio is :

Sharpe Ratio =  = (27.37%-8.11%)/ 36.03 = .5345

Comment on the results obtained and the implications they carry with regard to the significance of diversification.

As can be seen the Sharpe ratio estimated for the existing portfolio of only equities were lower at .5050 and the same has increased to .535 approx. as the portfolio is diversified. The diversification has made sure the risk has reduced more than the reduction in the returns and hence improved the risk to volatility ratio.

4. Based on your data analysis, should Kaushesh diversify his portfolio or continue to remain invested in equity only?

From the diversification of the existing portfolio the following things has bene observed:

1. Equities were having higher risk in terms of standard deviation and the same was reduced for the new portfolio.
2. The return of the news portfolio has declined slightly as compared to the earlier returns expected but the same has been compensated in terms of Risk reducing and hence the Sharpe ratio of the new diversified portfolio has become higher. Hence it can be said that the Risk to reward variability has increased and which has shown that the new portfolio is more consistent and the coefficient of variation is now lower as well (Luenberger, 2012).
3. Hence on the basis of these observations it can be said that the variations of the new portfolio is now lower for the diversified portfolio and hence more consistent. It is also known that including more assets might be able to reduce the risks further. It must be remembers that only firm specific or industry specific risk can be diversified and reduced. Market risks which affects the whole asset on trade won’t be however reduced under diversification of portfolios.

From the above analysis it is quite clear that Kaushesh must be advised to diversify the portfolio and include assets such as gold which has lower returns but it also helps in making the returns more stable and brings down the overall risk of the investment. Hence diversifying is helpful (Bodie, 2012).

# Bibliography

Bodie, K. a. (2012). *Investment* (10th ed.). Chicago: McgrawHill-Irwin.

Eugene Brigham & Michael Ehrhardt. (2010). *corporate finance* (13th ed ed.). Chicago: Mcgrawhill Irwin.

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Lumby, S. a. (2000). *The Fundamentals of Investment Appraisal.* London: Thomson Learning .