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# Risk Management by Choosing Stock in Portfolio

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**Abstract**
Portfolio Management requires a process that engages the expertise of the various stake holders in the organization and a system to provide the analytical support for the process. A well-thought-out process tailored for the organization takes care of the people issues and ensures buy-in for the selected portfolio strategy. Most of the existing portfolios are not developed to handle a portfolio of assets /securities when considering risks and opportunities. This is due to the fact that the expertise required developing portfolio of assets /securities are not processed by individual. When using these single portfolio processes, it is up to the experience of the organization and foremost project managers to find links between assets/securities in portfolio. The scope of a single security investment seems insufficient, and a more holistic. Therefore, existing risk management processes are considered insufficient due to the focus on a single asset/security risk management. In this study it is tried to conclude different levels of risks and opportunities within a portfolio of assets/Securities that can be managed by identifying positive or negative relation between each other.
**Keywords**: Portfolio, Risk, Risk Management, Stock Prices

## Introduction

A portfolio is a collection of entities among which there may be several inter dependencies. An entity can be a single physical asset (such as a producing field in the oil and gas industry or a manufacturing plant in another industry), a business unit (which may include several assets), or a financial security. The interdependency may exist between any two entities in the portfolio and may affect specific performance measures of the portfolio. Interdependencies among entities in a portfolio can be informational, or they can be physical or operational.

The concept of informational interdependency between two entities builds on the concept of relevance between two uncertainties. An informational interdependency exists between entities A and B in the form of relevance when at least one uncertainty about entity A is relevant to at least one uncertainty about entity B. This includes the special case in which the expert or decision maker believes that entities A and B share a specific uncertainty. (An uncertainty A, is relevant to an uncertainty B; if knowing the value or outcome of uncertainty A, we would assign a different probability distribution to uncertainty B, (Skaf, Dec 1999)

For example, consider two prospects A and B in an unproven play (a play is a group of prospects and any related fields having common hydrocarbon sources, migration relationships, reservoir formations, seals, and trap types (Skaf, Dec 1999). If the uncertainty about geologic success for prospect A is relevant to the uncertainty about geologic success for prospect B, an informational interdependency exists between prospect A and prospect B. Many forms of risk correlation among entities would thus fall under this category of interdependency. Other instances of informational interdependency are opportunities for learning, process improvement, and the like. The category of physical or operational interdependencies includes the use or sharing of the same physical resources, competencies, or skills. Examples of physical interdependencies are a producing field tied to a specific processing facility for another field or assets competing for the same capital and human resources.

**Purpose of the Study**

Purpose of the study to identify entities having same or different level of uncertainty and their mutual interdependency. This will lead to mark the combination of entities (firms/ assets) which can be placed in a portfolio and to minimize risk.

For this purpose three sectors are taken:

a. Oil sector
b. Auto
c. Banking
d. Machine

**Research Question**

How to minimize risk by choosing securities in portfolio?

**Literature Review**

Risk is defined as a barrier to success and however few other argue that risk is related to concepts of chance such as the probability of loss or the probability of ruin. Risk can also be viewed as having a positive effect. (Bedrad, Sep 2004) defined risk as exposure to loss/gain, or the probability of occurrence of loss/gain multiplied by its respective magnitude. The (PMBOK, July 2013) defined risk as an uncertain event or condition that, if it occurs, has a positive or negative effect on a project's objectives. When put into context, it seems that risk can have a two-dimensional meaning, namely a negative as well as a positive implication. Risk is usually considered as a negative word with negative implications. However, it can have positive meaning with positive implications. How well one can plan, execute, and control the assets in a portfolio and how well one can manage the relationships with all the stakeholders involved in the portfolio constitutes the success or failure of the portfolio.

In today's highly complex market environment, there is clearly a need for better understanding of how securities are related to each other and what the implications may be of their interrelations. Different process steps may have multiple interactions that are difficult to understand. This is interaction complexity which refers to the fact that the different process steps cannot be separated without affecting overall process performance. (Skaf, Dec 1999) described portfolio risk management as focusing more on strategic issues for a portfolio of projects and the ability to achieve strategic objectives. Clearly there is a need for a shift in focus for risk management in a portfolio environment .Risk management discussions have mostly focused on managing risks in single Investment. Managing investments in multi securities/assets refers to the management of investment portfolios and not just the management of single security separately (olsson, Nov 2008) Therefore, risk management philosophy and framework must be capable of quickly re-evaluating of options against surprise developments and provide a systematic basis for its re-structuring.

Existing risk management processes are considered insufficient due to the focus on a single asset/Security. Portfolio management can be applied at two main levels of portfolio decisions in an upstream organization: the corporate portfolio of business units and the business unit portfolio of assets and projects .The portfolio strategy for a specific business unit are fully developed as the collection of asset strategies (project strategies) for all the assets (projects) in that business unit's portfolio. (Mezan. A .Skaf, 1999). Business units of major companies operating oversee large portfolios of assets and manage these assets through exploration, development, and production. Financial risk is the risk that a potential client's economic condition will deteriorate in either the short or long term it is also referred to as client business risk. A firm can invest in securities for anticipated future return, but the investment is usually involved with very high risk. The project's value primarily depends on the expected future net cash flows and the risk associated with those cash flows. From the investment's point of view, the firm will attempt to minimize the risks to achieve value-maximization of the project.

(shue, Nov 2010)Investors can take account for the interplay between asset returns when evaluating the risk of a portfolio. For example, an insurance contract can serve to reduce risk by a compensatory pay-off when another part of the portfolio is faring poorly. Diversification is an alternative way to limit the risk level of investment portfolio. In the same manner, systematic reduction of unique risk could be treated as a tool for a successful investment portfolio. In the first phase where the investor devoted efforts in developing portfolio it is faced with two possible situations, i.e. success and failure. The investment portfolio failure can be caused by either external factors such as a catastrophe event or internal ones such as unable to analyze assets to be placed in portfolio. This can be called as risk "Type I technological risk." If investment portfolio succeeds in the first phase, the process will advance into the second phase, i.e. commercialization. In the second phase, firms encounter the risk which market status of the commercialized technology may be attacked by other emerging and superior companies. Two possible situations in this phase can happen. If fortunate, the commercialized technology can successfully establish portfolio standards and dominate. Otherwise, a substitutive and superior assets combination may appear and dominates over the existing unfortunately. We call the uncertainty about

whether the newly developed portfolio can survive well after commercialization "Type II technological risk."

**Research Methodology**

Following research methodology was adopted for the study:

- The study aimed to investigate the impact of securities/ assets to be maintained in a portfolio to minimize portfolio risk.
- For study purpose stock price of companies in oil sector is taken as independent variable and stock prices of automobile , bank and machinery is taken as dependent variable
- The stock prices of companies is taken from February 2014 to April 2014 as a secondary source.
- Regression analysis was used to test the hypothesis
- E-view was used to analyze the data.

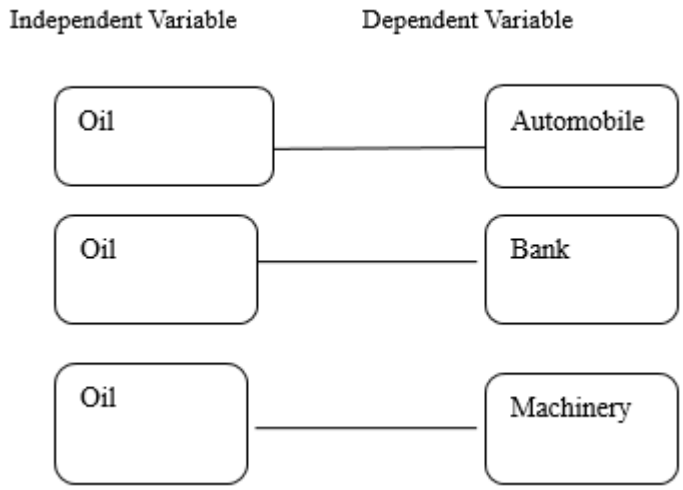
**Sampling**

Non probability sampling technique was used in the study in which sample size of 101 was taken consideration.

**Significance**

Study has significance for banks and financial institutions in categorize investors on the basis of income level, age gender, occupation and marital status and to formulating investment schemes beneficial for both , investors and financial institutions.

**Theoretical Model**




**Hypothesis**

Ho1 : There exist no relation between stock price of Automobile and stock price of Oil companies.
H1 : There is relation between stock price of Automobile and stock price of Oil companies .
Ho2 : There exist no relation between stock price of Bank and stock price of Oil companies.
H2 : There is relation between stock price of Bank and stock price of Oil companies.
Ho3: There exist no relation between stock price of Machinery and stock price of Oil companies.
H3: There is relation between stock price of Bank and stock price of Oil companies.

**Data Analysis**

***Statistical Model***

Portfolio = f (Oil, Automobile, Banks, Machine)

***Equations***

Automobile = $\beta o + \beta 1(Oil) + \varepsilon$…(Equation –I)
Bank = $\beta o + \beta 2(Oil) + \varepsilon$ …….(Equation –II)
Machinery = $\beta o + \beta 3(Oil) + \varepsilon$ ……(Equation-III)

**Correlation Matrix**

| | Oil | Auto | Bank | Machine |
|---|---|---|---|---|
| **Oil** | 1.000000 | 0.519378 | 0.521740 | 0.289001 |
| **Auto** | 0.519378 | 1.000000 | 0.328064 | 0.316360 |
| **Bank** | 0.521740 | 0.328064 | 1.000000 | 0.266684 |
| **Machine** | 0.289001 | 0.316360 | 0.266684 | 1.000000 |

**Statistical Description**

| | Oil | Auto | Bank | Machine |
|---|---|---|---|---|
| **Mean** | 0.165277 | 0.516378 | 0.136134 | 0.225332 |
| **Median** | 0.331677 | 0.693772 | 0.101669 | -0.021967 |
| **Maximum** | 2.615218 | 3.460029 | 4.543633 | 5.288377 |
| **Minimum** | -2.150694 | -2.266418 | -3.270666 | -3.368683 |
| **St. Dev** | 1.158715 | 1.402586 | 1.337801 | 1.719196 |
| **Skewness** | 0.039010 | 0.050429 | 0.555156 | 0.506992 |
| **Kurtosis** | 2.256716 | 1.955765 | 4.998782 | 3.460964 |
| **Jarque-Bera** | 1.442941 | 2.843216 | 13.50547 | 3.205011 |
| **Probability** | 0.486037 | 0.241326 | 0.001168 | 0.201391 |
| **Sum** | 10.24715 | 32.01544 | 8.440335 | 13.97061 |
| **Sum Sq. Dev** | 81.89980 | 120.0021 | 109.1725 | 180.2938 |
| **Observations** | 62 | 62 | 62 | 62 |

**Hypothesis 1**

Ho : There exist no relation between stock price of Automobile and stock price of Oil companies.

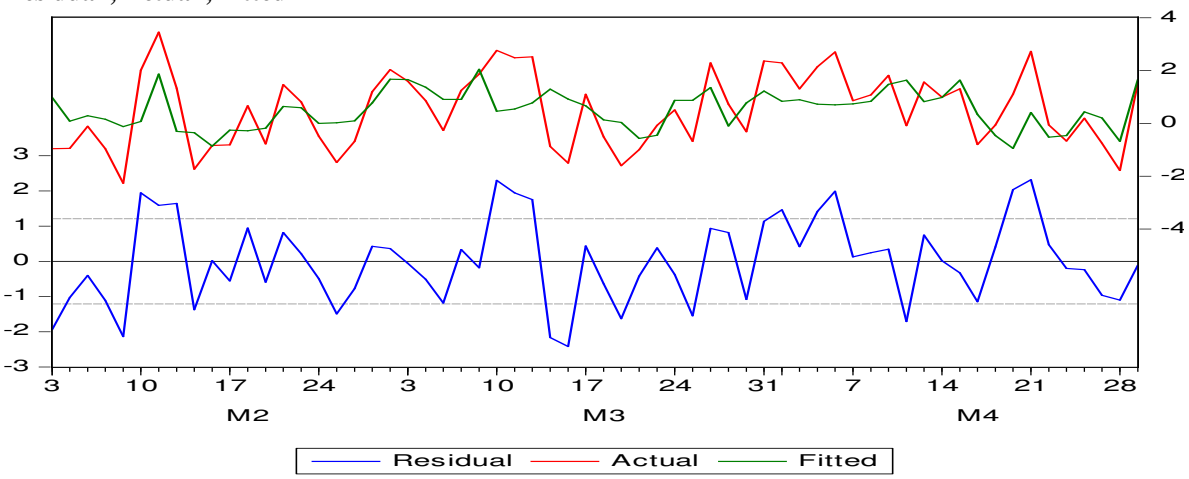
H1 : There is relation between stock price of Automobile and stock price of Oil companies

Dependent Variable: AUTO
Method: Least Squares
Date: 05/24/14 Time: 07:32
Sample (adjusted): 2/03/2014 4/29/2014
Included observations: 62 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.412470 | 0.155061 | 2.660052 | 0.0100 |
| OIL | 0.628690 | 0.133540 | 4.707865 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.269753 | Mean dependent var | 0.516378 |
| Adjusted R-squared | 0.257582 | S.D. dependent var | 1.402586 |
| S.E. of regression | 1.208520 | Akaike info criterion | 3.248396 |
| Sum squared resid | 87.63119 | Schwarz criterion | 3.317013 |
| Log likelihood | -98.70027 | Hannan-Quinn criter. | 3.275337 |
| F-statistic | 22.16399 | Durbin-Watson stat | 1.415080 |
| Prob(F-statistic) | 0.000015 | | |

**Residual , Actual , Fitted**




The value of R square indicate that the two securities have 26 % significant relation between oil and

auto sector industries however 74 % significant is dependent upon other variables which may affect significantly.

**Hypothesis 2**

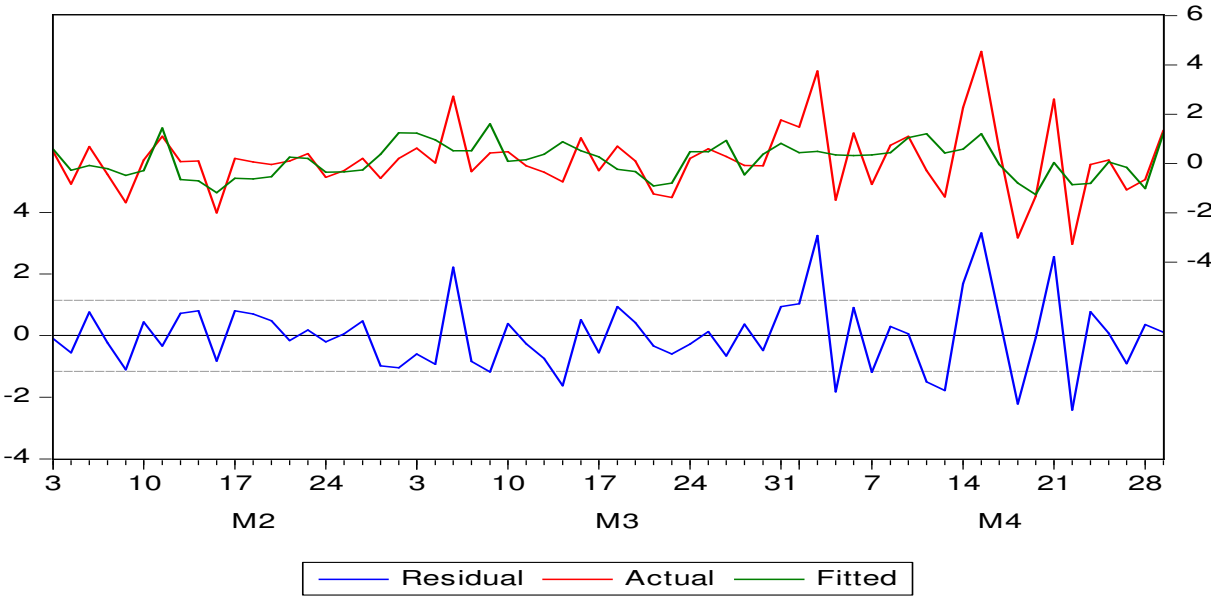
Ho : There exist no relation between stock price of Bank and stock price of Oil companies.
H2 : There is relation between stock price of Bank and stock price of Oil companies.

Dependent Variable: BANK
Method: Least Squares
Date: 05/24/14 Time: 07:30
Sample (adjusted): 2/03/2014 4/29/2014
Included observations: 62 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.036575 | 0.147650 | 0.247718 | 0.8052 |
| OIL | 0.602378 | 0.127157 | 4.737259 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.272212 | Mean dependent var | 0.136134 |
| Adjusted R-squared | 0.260083 | S.D. dependent var | 1.337801 |
| S.E. of regression | 1.150756 | Akaike info criterion | 3.150442 |
| Sum squared resid | 79.45438 | Schwarz criterion | 3.219059 |
| Log likelihood | -95.66370 | Hannan-Quinn criter. | 3.177383 |
| F-statistic | 22.44163 | Durbin-Watson stat | 2.266581 |
| Prob(F-statistic) | 0.000014 | | |

**Residual, Actual, Fitted**




The value of R square indicate that the two securities have 26 % significant relation between oil and bank sector industries however 74 % significant is dependent upon other variables which may affect significantly.

**Hypothesis 3**

Ho: There exist no relation between stock price of Machinery and stock price of Oil companies.
H3: There is relation between stock price of Bank and stock price of Oil companies

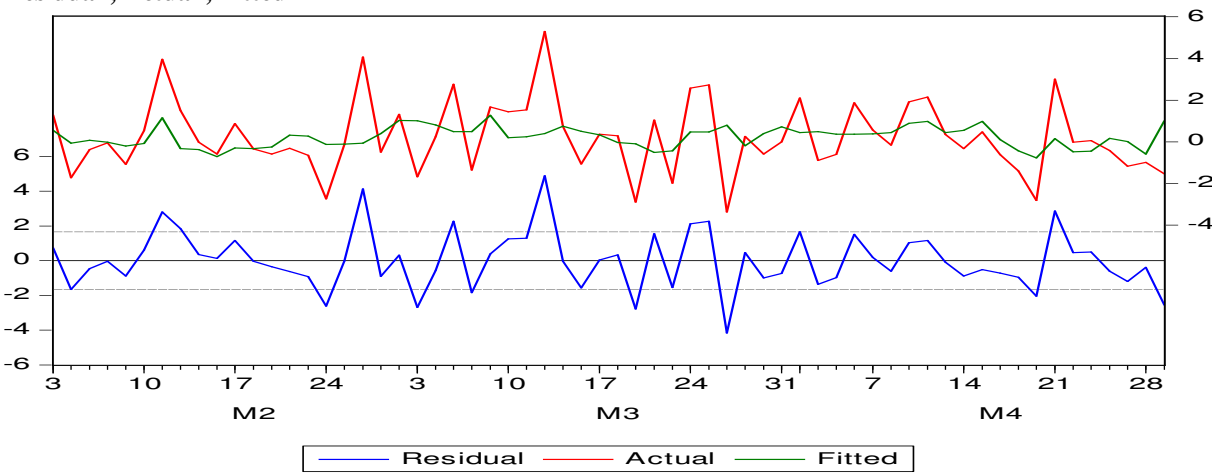
 

Dependent Variable: MACH
Method: Least Squares
Date: 05/24/14 Time: 07:31
Sample (adjusted): 2/03/2014 4/29/2014
Included observations: 62 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.154463 | 0.212924 | 0.725436 | 0.4710 |
| OIL | 0.428794 | 0.183373 | 2.338377 | 0.0227 |

| | | | |
|---|---|---|---|
| R-squared | 0.083522 | Mean dependent var | 0.225332 |
| Adjusted R-squared | 0.068247 | S.D. dependent var | 1.719196 |
| S.E. of regression | 1.659495 | Akaike info criterion | 3.882630 |
| Sum squared resid | 165.2353 | Schwarz criterion | 3.951247 |
| Log likelihood | -118.3615 | Hannan-Quinn criter. | 3.909570 |
| F-statistic | 5.468006 | Durbin-Watson stat | 2.081404 |
| Prob(F-statistic) | 0.022718 | | |

**Residual , Actual , Fitted**




The value of R square indicate that the two securities have 26 % significant relation between oil and machine sector industries however 74 % significant is dependent upon other variables which may affect significantly.

## RECOMMENDATIONS

a. Positive relation between independent and dependent variable.
b. The percentage change in stock price of auto and Machine is proportionate to percentage change in stock price of oil
c. The percentage change in stock price of bank has less effect on percentage change in stock price of oil.

## Limitations and Scope for Further Study

a. The study was conducted in short period of time therefore there is a room to explore the topic more in detail.
b. Further variables such as derivatives can be explored for further area of research.

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