

AN EMPIRICAL STUDY OF IMPACT OF INFLATION ON SELECT ASSET CLASSES BY USING MARKOWITZ APPROACH

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ABSTRACT:

This study has been emphasized on the global asset classes which were designed based on the markowitz approach by considering global inflation with asset classes such as equity, bond, realty and gold. The study period is confined to 2010 to 2014. Bivariate correlation has been applied to all the asset classes to inflation and risk has been measured by considering global asset allocation index as the bench mark. Granger causality test has been applied and found that the select asset class returns were not effected by the global inflation during the study period. Augmented Dickey Fuller has been applied to convert stationary. The overall portfolio returns were successfully beaten the inflation during the analysis period. Hence, Markowitz approach can be used to invest in various asset classes globally. This study is useful to the pension funds, global mutual funds, FII's and investment banker.

Keywords: inflation, MSCI, realty index, bond index, gold, asset allocation index.

INTRODUCTION:

Foreign assets and liabilities in equity investments measured at market value are positively correlated over the business cycle. The close movement of assets and liabilities, in turn, reflects strong correlation equity prices and moderate co-movement of gross outflows and inflows. Markowitz approach is considered to evaluate possible causes of these correlations and investment duration with lower risk. A complete market model with diminishing returns to capital predicts cross-country correlation between goods strengthens this correlation, and cross-border financial costs lead to negative correlation between gross capital outflows and inflows. Finally, from portfolio equity, gold, realty and bond assets with global perspective is viewed. This model suggests that asset should be more closely correlated in portfolio equity. For this purpose, in portfolio management by considering the Markowitz approach, how the inflation impact on these select asset classes. The effect of inflation on these asset classes shows the actual performance of these assets in the market by using Markowitz approach. Markowitz approach is one of the best approach that is to be considered to calculate the lower risk and higher expected returns on these asset classes. In this study we have focussed on these global asset classes and their relationship with the inflation for a period of 5 years is considered. For any new or existing investor who is willing to invest on these assets can go through this study, so as to check performance of these asset classes globally, with zero risk and expected returns on it. This portfolio is truly based on true information considered for previous 5 years and the data obtained is accurate as per our study, if any, inconvenience we regret.

OBJECTIVES:

- To know the relationship of the inflation on global select asset classes.
- To measure the inflation impact on select asset class returns.
- To measure the risk, returns of asset classes and compare with the inflation.
- To measure the asset class performance with efficient frontier of Markowitz approach.

SCOPE: This analysis has been confined for the period of 2010 to 2014. The focus of the analysis is to measure the portfolio return of global asset classes by adopting markowitz approach. msci has been considered as global equity asset class. pimco has been considered as bond asset class. realty has been considered from us stock exchange Dow jones. Gold has been considered as London stock exchange. Monthly inflation data of 181 countries were considered as global inflation and designed global portfolio with four securities and fixed the inflation to design the markowitz approach. This portfolio focusses on the impact of global inflation on these global asset classes.

EMPIRICAL STUDY:

Global inflation, MSCI, gold, Realty index, Global composite bond index, Global asset allocation index.

NEED:

Investors can also invest their investments globalwise where as investing in nationalwise with the help of portfolio management, by using markowitz approach. markowitz approach is one of the best approach for investing their finance in right asset classes. by considering this approach global four classes such as gold ,pimco ,reality ,msci with the inflation. The major need of this portfolio construction is to show the effect of inflation on these asset classes, the risk and returns are the major parts that every investor focusses before investing, this study reduces the investor worries ,and helps them in investing in right asset classes globally. A recent impact and performance of these assets to inflation is calculated by using Markowitz approach, as it is one of the best approach that minimizes the availability of risk in an investment made and expected higher returns is considered on the investment made. IT emerges the present need of an investor view in finalizing the major area where investment is to be made where he can gain easily higher returns and with less risk involved in the investment he made. These assets are always in demand not only in indian markets but also global markets, hence investment on these assets has a wider scope of higher returns compared to any other assets. These assets hold more value than compared to other assets.

RESEARCH METHODOLOGY:

Granger Causality Test: Clive Granger test is applied for predicting the future values of a time series using past values of another time series. a series of t-tests and F-tests is performed values of X that those X values provide statistically significant information about future values of Y.

$$Y_t = a_0 + a_1 Y_{t-1} + \dots + a_p Y_{t-p} + b_1 X_{t-1} + \dots + b_p X_{t-p} + u_t$$

$$X_t = c_0 + c_1X_{t-1} + \dots + c_pX_{t-p} + d_1Y_{t-1} + \dots + d_pY_{t-p} + v_t$$

Where,

x is time series, y is granger cause

Bivariate Correlation: This test involves the analysis of two variables (often denoted as X, Y), for the purpose of determining the relationship between (x,y). In order to see if the variables are related to one another, or not.

$$r = \frac{\sum f_{uv} - \frac{(\sum f_u)(\sum f_v)}{n}}{\sqrt{\sum f_u^2 - \frac{(\sum f_u)^2}{n}} \times \sqrt{\sum f_v^2 - \frac{(\sum f_v)^2}{n}}}$$

1. **Risk :** Risk is the potential of losing something of value. Risk refers to the ability of an investor to deal with the perception of handling risk.

$$\text{Risk} = \text{slope}(x,y)$$

2. **Return:** The term “return” refers to the income and the capital gains relative on an investment. It is usually quoted as a percentage.

$$\text{Return} = 100 / \text{base price} * (\text{Present price} - \text{base price})$$

LIMITATIONS:

1. In the year 2011 Janmonthly data is not considered for the gold asset class.
2. Pimco has been considered as a global bond asset class.
3. The calculation of global inflation 181 countries monthly inflation data has been considered.
4. Grangercausality test has been applied on non-stationary data for the analysis

REVIEW OF LITERATURE:

Ronald q.doeswijk and trevin w.lam : This study deals with global market portfolio for the period 1990-2012 by estimating the market capitalization for the eight asset classes Where as my study is limited four global asset classes and also applied the relationship between gold and inflation during the study period 2010-2014 using marcowitz approach.

Basile N Shudzeka; Hyceinth N. Kum: In this study they deals with mid and large gap for a sample of 10 swedish companies according to OMX index classification, This study explained only 10 swedish multinational companies whereas my study explaining equity index globally.

edris Hussein Seid: This study explained inflation for only one country i.e, Ethiopia using demographic and health survey data with macro variables(GDP & inflation) whereas my study deals with four global asset classes by using marcowitz approach during the study period from 2010 to 2014.

Sara Henderson, Isabel Garza Rodriguez: This study explained inflation in 31 countries, they classified that 31 countries as 15 countries they are considered as developing and remaining countries they considered as developed they studied inflation for 31 countries whereas my study deals with inflation for all the countries during the study period.

Kris Rasmussen; Daniel Tetteh: This study deals with relationship between only two countries they are Canada and Ghana for inflation, interest rate, exchange rate and GDP whereas my study deals with relationship between all the countries for inflation impact on select global asset classes.

Hugo Gerard: This study deals with inflation for G7 countries and Australia by using a panel vector auto regression whereas my study deals inflation for all the countries and global select asset classes by using Markowitz approach.

Denise Cote, Carlos De Resende: In This study deals with inflation for only one country i.e, China during the study period 1984-2006 whereas my study deals with inflation for all the countries and also studies how inflation is impacting on global select asset classes during the study period 2010-2014.

Ajit R. Joshi and Debashis Acharya: In this study they deal with relationship between international prices of primary commodities and domestic inflation in India during the study period 1994 to 2007 whereas my study deals with inflation for all countries and also explain the relationship between inflation and asset classes during the study period.

Prasanna V Salian, Gopakumar. K: This study deals with the relationship between inflation and GDP growth in India whereas my study deals with inflation for all the countries during the study period 2000-2014 and also examined the relationship between the relationship between the global inflation and asset classes

Quamrul Ashraf, Boris Gershman, Peter Howitt: This study deals with how inflation is effecting on macroeconomic performance by disrupting the mechanism of exchange in a decentralized market economy, whereas my study deals with how inflation is effecting on select asset classes using Markowitz approach and also explained the relationship between inflation and asset classes

DATA ANALYSIS:

1) To know the relationship of inflation on global select asset classes

		Globalmsci	Globalbond	Globalrealty	Globalgold
GlobalInflation	Pearson Correlation	-0.687	0.292	-0.273	0.787
	Sig. (2-tailed)	0.2	0.634	0.657	0.114
	N	5	5	5	5

Interpretation:

The above analysis of correlation has been applied for the select asset global classes such as MSCI, gold, bond and realty with global inflation. The bivariate correlation depicts that gold is the only asset class which is strongly correlated during the analysis period and bond is slightly positive correlate msci and realty asset classes were strongly to slightly negative correlated with the global inflation

2. To measure the inflation impact on select asset classes returns.

Null Hypothesis:	Obs	F-Statistic	Prob.
INFLATION does not Granger Cause BOND		1.59119	0.2919
INFLATION does not Granger Cause MSCI		23.1462	0.003
INFLATION does not Granger Cause GOLD		3.08408	0.1341
INFLATION does not Granger Cause REALTY		3.00999	0.1387

Interpretation:

The above analysis of granger causality test has been applied to global asset classes with inflation the null hypothesis is accepted because the probability value of all asset classes is observed significant and reject alternative hypothesis to asset classes with inflation. the granger capacity test result unviels that with the global inflation did not affect the global asset class returns during the study period.

3. To measure the risk, returns of asset classes and compare with inflation risk

risk

	pimco	msci	realty	Gold
2010	0.274891165	0.106342475	0.14143763	0.002204434
2011	0.17671259	0.071239268	0.07570851	9.43523E-06
2012	-	-	0.13655851	0.002889256
2013	0.166045021	0.076987237	-0.0230315	-0.0018594
2014	0.490880665	0.076258731	0.00921368	0.003908116
	0.140904834	0.030717045	0.06797736	0.001430368

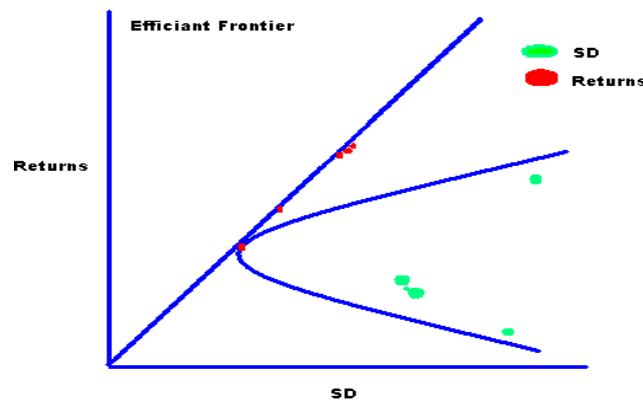
returns

pimco	12.81174	-6.39931	-12.7232	-2.50739	0.355105	-1.69261
inflation	7.180064	9.911227	9.621918	9.302585	5.883752	8.379909
p-i	5.631676	-16.3105	-22.3451	-11.81	-5.52865	-10.0725
msci	18.71088	-10.4526	-7.50826	33.32213	9.672406	8.748915
inflation	7.180064	9.911227	9.621918	9.302585	5.883752	8.379909
m-i	11.53081	-20.3638	-17.1302	24.01955	3.788654	0.369006
reality	14.97013	-11.1421	18.15909	-2.62162	12.05554	6.284204
inflation	7.180064	9.911227	9.621918	9.302585	5.883752	8.379909
r-i	7.790061	-21.0533	8.537174	-11.9242	6.171785	-2.09571
gold	24.66775	16.81831	1.176459	-26.9142	-3.79304	2.391063
inflation	7.180064	9.911227	9.621918	9.302585	5.883752	8.379909
g-i	17.48768	6.907085	-8.44546	-36.2167	-9.67679	-5.98885
asset	5.604263	-0.07481	7.768495	8.589146	-2.83693	3.810032
inflation	7.180064	9.911227	9.621918	9.302585	5.883752	8.379909
a-i	-1.5758	-9.98604	-1.85342	-0.71344	-8.72068	-4.56988

Interpretation:

The above analysis shows that all the asset classes were not having the risk because the beta value is less than 1 with the bench mark risk.returns of equity asset class i.e msci has beaten inflation during the study period where as the rest of the asset classes such as gold and reality has given positive returns but failed to beat inflation.bonds had given negative returns during the study period.

To measure the asset class performance with efficient frontier of Markowitz approach.



Interpretation:

The above analysis of all the asset classes has been considered in markowitz approach portfolio,total returns of portfolio had beaten inflation inspite of unequal performance among the asset classes during the study period the standard deviation of portfolio is observed more than the slot value i.e inspired high deviation of the portfolio the returns had beaten the inflation.

Findings:

1. Inflation is not effected the returns of the global asset classes but it had influenced on the asset classes to get fluctuate.
2. This analysis had observed that gold and bond were positively correlated butwhereasMSCIand reality were negatively co-related during the study period.
3. Equity asset classes had given higher returns than the inflation, but gold and reality asset classes were failed to beat the inflation inspite of positive returns.
4. Bond asset class had continously given negative returns year on year except 2010.
5. The global asset classes such as gold ,bond, msci and reality were considered based on inflation for the construction of portfolio in markowitz approach.the overall returns of the portfolio had beaten the inflation.hence the approach has performed well inspite of higher standard deviation.

Conclusion:

i conclude the analysis of “an empirical study of inflation impact on select asset classes by using Markowitz approach “in this study global asset classes has been considered from the year 2010 to 2014 and designed the portfolio based on the Markowitz approach to MSCI, bond, gold, reality with inflation. All the assets were considered based on the correlation with the lower risk and observed that global portfolio had beaten to the global inflation.in this study for global equity asset class msci has been considered for bond, pimco, to gold asset classes international gold price is traded in london stock exchange and reality has been considered as global reality index which traded in us stock exchange, hence further study is recommended in designing the markowitz approach by considering unconventional global asset classes with various other macro economic factors.

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