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"Risk-Return Benefits of International Diversification to Indian Investors"

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ABSTRACT: *This paper deals with international diversification and how it can be beneficial for an Indian investor. The data from an Indian stock index has been analysed and compared with data from the indices of six other countries around the world, namely Japan, UK, USA, Canada, China and Australia. The main focus is on the Healthcare & Pharmaceutical industry. This comparison has been done using portfolios comprised 50% of the Indian healthcare index Nifty Pharma and 50% of one other national healthcare index. The data from the indices of the six countries has been currency-adjusted in order to show the real gain that an Indian investor might make in terms of Indian National Rupees (INR), as there is a possibility of gains that are made in the foreign currency being nullified after accounting for currency adjustments. This analysis has been done with the aim of finding the advantages and disadvantages of international diversification, keeping in mind the risk and returns that it might bring to the investor.*

KEYWORDS: *International diversification, portfolio diversification, investment decisions, risk management, healthcare sector, India*

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I. INTRODUCTION

Portfolio diversification, according to NASDAQ, is the act of investing in varied asset classes and securities, so as to avoid poor portfolio performance even the event that a single security, industry, or asset class underperforms. In this sense, it serves as a risk management tool. Harry Markowitz's Modern Portfolio Theory suggests the possibility of creating a set of efficient portfolios, which maximize returns at a given level of risk. The lower the correlation between the returns of the constituent securities, the higher the diversification benefit will be. Thus, it is not simply about choosing a number of stocks, but about choosing an appropriate combination of them. It is generally accepted that diversification has an impact on risk reduction more than it does on increasing returns. It stands to reason that comparable investments in different countries would be expected to have a lower degree of correlation as compared to those that are in the same country, due to differences in factors such as the economic cycles. Investing in assets across different nations, could, then, reduce an investor's variability of returns and protect against one-off events and shocks. This is the basic rationale behind international diversification, which involves building a portfolio of securities originating in more than a single country.

The broad objective of this paper is to identify evidence of the risk-return benefits derived from the international diversification of equity holdings, through the statistical analysis and comparison of the past performance of Indian sector-specific indices with those of other nations. For the purpose of this study, the sector we have chosen to analyze is the healthcare and pharmaceutical sector. This analysis would seek to identify any trends that have occurred over the past 10 years, that is from 2008 to 2018. This study has been undertaken from the viewpoint of an Indian investor and seeks to identify countries whose investments would allow Indians to reap significant diversification benefits, along with an attempt to quantify the likely range of these benefits.

II. REVIEW OF LITERATURE

1. (Levy &Sarnat, 1970)

This article attempts to identify any benefits arising out of the international diversification of investments by studying the returns and standard deviations of stocks from 28 different countries over the time period 1951-67. A high degree of variance was observed among the risk-return metrics of the various countries under study. It was concluded that combining the investments of countries whose economic performances were negatively correlated with each other led to the formation of efficient portfolios, offering higher return at a lower risk.

2. (Biger, 1979)

This article aims at assessing foreign exchange risk by using different sets of efficient portfolios. It shows that the effect of exchange risk in the international scenario is much lesser than a normal investor would expect. The article states that the common propositions that investing in foreign securities reduces the risk of the portfolio, and that international diversification is more efficient than holding the country's own portfolio instead, are indeed proven to be true according to the analysis done keeping risk and return in mind.

3. (Levy &Lerman, 1988)

The authors of this article assert that internationally diversified bond portfolios yield returns substantially higher than those that are not, at a comparable level of risk. These conclusions were derived from observations made in bond markets from the perspective of a United States-based investor over the period spanning 1960 to 1980, and were attributed to the fact that international bond markets typically have a low level of correlation. Efficient portfolios were created based on these correlation metrics, and it was ultimately found that U.S. investors could increase their returns by approximately 3-5% per year, just through international bond diversification. These gains were high enough to warrant incurring the extra cost of holding foreign securities.

4. (Pfau, 2011)

This paper addresses the scope for pension funds having internationally diversified holdings. Despite the evident risk and return benefits, many countries have regulations which prohibit retirement funds from investing globally. This is due to the faulty perception that international assets are riskier, which is compounded by the possibility of exchange rate fluctuations. Another reason is the need to have savings flow into local investments, in order to facilitate growth and improve the efficiency of financial markets within the country. However, the authors assert that besides the risk-return benefits, international diversification is also a viable strategy when the pension fund's asset requirements exceed that which is available in the local market, which is often the case with emerging economies.

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5. (Lekovic, 2018)

This article aims to compare simple diversification and efficient diversification of investments, and the different aspects that they relate to. It also looks into the issue regarding the selection of the optimal size for a portfolio. It states that the number of securities in a market should be increased, given that the marginal benefits are more than the marginal costs. It explains why correlation is important when it comes to portfolio diversification. Another comparison in this article is the comparison between national diversification and international diversification, which makes it easier to understand how risk reduces in different cases. In conclusion, the correlation between the individual securities is an important factor in deciding the number of securities, which in turn gives us the returns due to diversification.

III. RESEARCH DESIGN

Statement of Problem:

Many investors may shy away from investing overseas due to perceived risks, and as such may be losing out on the potential benefits of globally diversified holdings. Thus, through this paper we attempt to estimate the average risks and returns that can be made through diversifying across six different countries from the point of view of Indian investors, in order to determine whether or not international diversification is a worthwhile strategy for them.

Objectives:

1. To identify and quantify the benefits of international portfolio diversification through an analysis of the historical risk and returns of Nifty Pharma with six other national healthcare sector indices.
2. To identify countries with which diversification yields significant benefits for Indian investors.

Data Sources

Secondary data was used in conducting this study. Historical index prices and currency conversion rates were sourced from the following websites respectively:

1. https://in.investing.com/indices/
2. https://www.ofx.com/en-au/forex-news/historical-exchange-rates/

Yearly index prices have been taken to be the closing prices as on 31st January of the respective year. Similarly, yearly exchange rates are as on 31st January of the respective year.

IV. METHODOLOGY

For the purpose of this study, historical price data was sourced for the following healthcare indices from 7 different countries.

COUNTRY	INDEX
India	Nifty Pharma
Japan	Nikkei 500 Pharma
UK	FTSE 350 Pharma & Biotech
USA	NASDAQ Health Care
Canada	S&P TSX Health Care
China	SSE Health Care
Australia	S&P/ASX 300 Pharma & Biotech

Yearly price data was used, and it was assumed that this would be sufficient to adequately capture all the broad trends over the period of the study. The foreign index prices were then adjusted for currency differences, by multiplying them with the exchange rate of their respective home currencies with the Indian National Rupee (INR).

Using this information, currency-adjusted index returns were then calculating using the following formula.

Return = $\frac{P1-P0}{P0}$

Where P0 = Currency-adjusted closing price at the end of the first year

P1= Currency-adjusted closing price at the end of the next year

These return values arrived at were further used in the calculation of the average currency-adjusted returns for each index, which were then compared against each other.

In order to gauge the price volatility experienced by each index, variance was calculated on the yearly currency-adjusted return data using the following formula.

Variance = $\frac{\sum(x-\bar{x})^2}{(n-1)}$

Where x = Returns

$\bar{x}$= Average return

N = Number of observations

Subsequently, correlation analysis was conducted between the indices, to determine whether there were any notable connections or trends that could be exploited to make investment gains.

Finally, variance and average returns were calculated for a series of portfolios having an equal weighting of Nifty Pharma and one other national pharmaceutical index. The Markowitz model was employed to do so, and the formulas used were as follows:

Portfolio return = $\sum$ xiRi

Where Ri = Expected return on security

Xi = Weighting of security in portfolio

Portfolio variance = $X_1^2\sigma_1^2 + X_2^2\sigma_2^2 + 2X_1X_2.r_{12.}\sigma_1\sigma_2$

Where X_1 &X_2 = Weight of securities 1 & 2

σ_1&σ_2 = Standard deviation of securities 1 & 2

r_{12} = Correlation between securities 1 & 2

Data Analysis Tools

Throughout the study, Microsoft Excel was the primary data analysis tool used for calculation purposes.

Expected Outcome

We expect to observe diversification benefits that result in each of the portfolios comprising of equal proportions of Nifty Pharma and another national healthcare index displaying an average yearly return that exceeds Nifty Pharma and a standard deviation less than that of Nifty Pharma.

Limitations

1. Only 6 countries have been selected for analysis, and these may not be completely representative of the benefits and shortfalls of international diversification as a whole.
2. Indices specific to the healthcare sector were used, and it may not be accurate to generalize these results to encompass all investments in the countries under study.
3. Since index returns were used for analysis, if an investor attempts to follow such a strategy by investing in Exchange-Traded Funds (ETFs), his returns would, on an average, be 1-2% lower than indicated by this study, as they would be net of the fees that would be charged by the fund managers.

V. ANALYSIS AND INTERPRETATION

The results of the study were as follows.

	INDIA	**JAPAN**	**UK**	**USA**	**CANADA**	**CHINA**	**AUSTRALIA**
	Nifty Pharma	**Nikkei 500 Pharma**	**FTSE 350 Pharma& Biotech**	**NASDAQ Health Care**	**S&P TSX Health Care**	**SSE Health Care**	**S&P/ASX 300 Pharma& Biotech**
Average Return	16.54	11.18	7.47	20.59	16.52	19.76	19.28
Variance	743.69	166.70	218.28	518.85	817.69	613.39	435.82
Standard Deviation	27.27	12.91	14.77	22.78	28.60	24.77	20.88
Correlation with Nifty	-	-0.39	0.28	0.31	0.43	0.67	0.11
Portfolio Return	-	13.86	12.01	18.57	16.53	18.15	17.91
Portfolio Variance	-	158.81	296.35	410.50	556.56	566.11	325.47
Portfolio Standard Deviation	-	12.60	17.21	20.26	23.59	23.79	18.04
%Difference in Return from Nifty	-	**-16.20**	**-27.41**	**12.25**	**-0.05**	**9.71**	**8.28**
%Difference in Risk from Nifty	-	**-53.79**	**-36.87**	**-25.70**	**-13.49**	**-12.75**	**-33.85**

Our analysis revealed that every single portfolio that was weighted with 50% of the Nifty Pharma index and 50% of another national healthcare index had a lower standard deviation than that of the Nifty Pharma index, indicating lower risk. The portfolios weighted with American, Chinese and Australian indices offered average returns higher than that of Nifty Pharma as well as lower risk, indicating that these would be favorable countries for Indian investors to park their funds.

On the other hand, the portfolio weighted with UK's FTSE 350 Pharma gave returns that were 27.41% lower than Nifty Pharma. However, this may be in light of the fact that the British markets have experienced a notable amount of turbulence over the last few years, as an aftermath of the Brexit. The return characteristics of the Canadian portfolio were more or less comparable with that of Nifty Pharma, while the risk was reduced by about 13.5%. Particularly interesting is the case of Japan, whose Nikkei 500 Pharma index had the lowest correlation with Nifty Pharma, at -0.39. Despite this, the portfolio of Nikkei and Nifty had a return that was lower than that of Nifty Pharma alone by 16.2%. However, this portfolio also had the lowest risk of all the combinations studied, with a standard deviation of 12.6, making it less than half as risky as Nifty Pharma. Thus, we believe that the Japanese index would afford diversification benefits to an Indian investor, even though the reduced average returns may suggest otherwise.

VI. SUGGESTIONS

This study has been largely limited to determining whether or not international diversification is a worthy strategy for an Indian investor, and we have concluded that it is. Though we have identified countries whose investments are well-suited to be paired with Indian investments, we have not zeroed in on concrete reasons as to why this is so. Determining the characteristics which make these countries suitable for diversification purposes may help identify other countries whose investments would be similarly beneficial. Moreover, tracking these characteristics would allow an investor to determine when a given country's investments would cease to be appropriate for his strategy, allowing him to exit the market before making huge losses. Thus, we feel that this is a worthwhile area for other researchers to look into.

VII. CONCLUSIONS

Our data analysis and interpretation support our expectation that international portfolio diversification results in lowered risks for the investor. Contrary to our expectations, it does not always increase the returns. Some part of this is because different countries may be in different stages of the economic cycle, and some

markets may be uniquely affected by conditions that are peculiar to them, such as political factors. As a result, a particular country may not always be a good fit for an Indian investor's diversification strategy. However, it is pertinent to note that there exists a tradeoff between risk and return, and it is natural for a reduction in risk to bring with it a lower return. In fact, for all the portfolios under study where the return has reduced compared to Nifty Pharma, risk has reduced by an even greater percentage.

Ultimately, international diversification results in the creation of more efficient portfolios, and we thus conclude that it is an appropriate strategy for an Indian investor to pursue. Thatsaid, some countries may be better investment targets than others, and like any investment, these must be chosen with care.

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