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BENEFITS FROM INTERNATIONAL DIVERSIFICATION: INDIAN EXPERIENCES

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Abstract

Investing beyond border reduces risk compared to traditional domestic investment; this assertion is well founded by numerous researches in financial economics. The benefit virtually emerges from two sources. Increase in the number of investible countries that widen scope of international diversification and less than perfect correlation among world markets that essentially helps in risk reduction. Thus "widening scope" and nature of co movement among markets are the two main sources of benefit from international diversification. The study, however suggests that due to various restrictions coupled with "home bias", international investors still rely on domestic market that suggests diversification inefficiency.

*Key words: Portfolio investment, International financial markets, Diversification, Risk reduction, Co variance
JEL Classification G 15 G10 F31*

Introduction

There is a clear consensus among financial economists that return correlation among assets is the single most important factor to reduce risk for a given level of returns that make up the portfolio. Low as opposed to high correlation among international markets suggest, agenda of globalization yet to be completed and still any artful portfolio manager can enjoy the benefit of risk reduction by investing abroad. But this benefit is only achievable against higher transaction cost, tax, cost of collecting information and numerous other cost, finally it is truly a difficult task to asses "net benefit" of international diversification.

In many organizations, equity investing started as a domestic only affair with institutional investors investing in securities and companies that they "knew". Given the domestic focus of many investors' that is widely

known as "home- bias", fascination to invest in the local market is not surprising. Risk reduction even with inclination for local market is possible if most of the revenue of domestic companies flow from foreign countries [Oleg Ruban and D.Melas2009], or a number of foreign companies enlist shares in the local market. "Invest locally-enjoy benefit of global economy", this opportunity is truly achievable to an extent in developed markets. The benefits of course largely absent in the emerging markets those are in fact comparatively less integrated and ill developed. Poor 'quality' of functioning of emerging markets , unfavorable regulatory environment, informational inefficiency, high transaction cost discourage foreign investment and prevent investors of developing economy to enjoy benefits of international diversification. So financial economists those who adore internationalization of financial system suggest- "invest abroad", "allow foreign portfolio investment" and enjoy benefits of diversification instead of relying on domestic market alone.

Scope of the Study

Declaration "invest abroad" though appears sound and simple but a number of crucial problems to be addressed carefully before responding to the current slogan -"go beyond the boundaries". Goal of risk reduction by international diversification is undeniably important and rightly emphasized by financial economist. But neither it is possible to invest in all the available countries nor is it desirable too. It involves huge transaction cost, administrative expenditure or even it may be unmanageable. Instead of following any "careless policy", "quality of the market" along with pattern of co movement of earnings to be considered. Financial economists of course find more interest to study - Should we construct simply debt or equity portfolio? If it is a combination of two, what should be the optimal mix? Should we follow passive or active portfolio strategy? What are the implications of country restriction on portfolio mix and performance? Country or industry sector which one is important? How to select benchmark portfolio? "To hedge or not to hedge" what strategy to be followed? How to manage currency risk? Financial economists are grossly engaged to answer above problems that disturb asset managers while investing abroad. Obviously nature and extent of the problem varies across countries or region such as currency risk is nearly irrelevant in Euro countries, in developed economy investors enjoy more freedom to decide over asset mix, alternatively concept of optimal portfolio is nearly unachievable in many emerging economies due to enormous restrictions.

Present thesis mainly attempts to answer some contemporary issues of international portfolio diversification. In fact there are two main factors that influence risk reduction, first, extent of opportunity available for investment in foreign asset, second, nature of co movement among assets. Such as, if scope of foreign investment is restricted, exactly what happens in closed economy, study of co movement becomes irrelevant. While correlation and risk reduction is widely discussed in the literature of financial economics, widening of scope and it s impact on performance of international portfolio is mostly ignored. As the present movement for internationalization is predominantly restricted in some developed economy thus there is wide scope of investing in relatively unexplored and less integrated economy to enjoy benefit of diversification .Firstly we attempted to measure benefit of widening scope of investing in the new era. Secondly, we tried to show risk –return relationship in the changing economic environment to attest attractiveness of overseas investment. This will help investor to decide should we invest domestically, regionally or globally. Of course, if all the investors hold the world market portfolio then only theoretically it would be possible to achieve global equilibrium.

Review of Literature

We reiterate, that the scope of this section is to measure the benefit of international diversification with no ambition to predict risk, to decompose sources of risk, to assign weight age to each source of variance and to measure risk premium objectively [Pollet and Wilson 2010]. There are outstanding research works showing correlation changes and its impact on risk-return relationship of portfolio and these can only be ignored at the cost of huge error. Study of regime-switching model developed by Ang and Chen [2005] along with

other notable researchers documented impact of asymmetric correlations [Butler and Joaquin 2002, Longin and Solnik 2001, Arouri2004] on equity portfolio. Between average correlation and average variance, it is the latter that dominantly influence portfolio risk. [See Pollet and Wilson 2010] .In our case we simply tried to show benefit of investing beyond national boundaries at a point of time relying on widely used mean variance concept first proposed by Markowitz[1952] followed by scores of researchers. Following earlier studies we followed passive instead of active strategy [Solnik 1994, Solnik et.al 1996, Bartram and Dufey 2001, Arun A. Kumar 2008, Ruban and Melas 2009] because it minimizes transaction cost and cost of rebalancing the portfolio.

For an international investor, the return on any foreign asset varies partly due to asset specific risk and the rest stems from fluctuations in exchange rates. Though the importance of each component of risk varies, grossly total risk of international investment may be defined as the summation of asset specific risk and currency risk while the latter constitutes only 10% of total risk [See Sohnke and Dufey 2001]. There are good number of research that has dealt with currency risk elaborately with robust econometric tools and no serious study can ignore these findings [Bhattacharya and Mukherjee 2003, Nath and Samanta 2003] Similarly, a wide group of researchers most probably due to fuzzy relationship between stock and exchange market, trivial contribution of exchange risk in the total risk, insurmountable problem of management and cost involved preferred to ignore this component of risk [See Odier and Solnik 1993 Froot 1993, Black1989]. We also ignored currency risk in the present writing.

There is a long standing debate –Is it country or industry effect that influences portfolio performance? Should portfolio manager follow "top down" or "bottom up" approach as it is conveniently known in modern finance? In emerging market, study suggests country effect is more prominent than industry [A. Kumar, 2008, Griffin and Stulz 2001].Thus we considered country level diversification ignoring industry effect in the present study.

Diversification Ratio and Risk Reduction: Methodology, Data Sources and Time Period

Investors who prefer to invest only in domestic market virtually restrict themselves to a smaller number of securities to choose from. Since they exclude the large set of foreign stocks, bonds and other securities, they limit the power of diversification a priori and forgo the possibility of further reducing portfolio risk by picking some foreign stocks that show low correlation with domestic portfolio.

One of the most popular findings in financial economics is sequential addition of stocks decrease in portfolio risk. Initially, the portfolio variance decreases rapidly as the number of investible country increases thereafter it reduces marginally. Statman [1987] concludes that most of the variance reduction can be achieved when the number of stocks in a portfolio reaches 30. Underlying assumption is, while individual security variance matters for portfolio with few stocks, portfolio variance is primarily driven by the average covariance when the number of securities becomes large. The lower the covariance between securities, the smaller the variance of a diversified portfolio becomes, relative to the variance of the securities that make up the portfolio. The primary motive for international diversification has been to take advantage of the low correlation between stocks in different national markets. Grubel [1968], Levy and Sarnat[1970] Solnik [1996] ,Goetzmann et.al. [2005] and others conclude that an internationally diversified portfolio enjoy a substantially reduced risk compared to the portfolio invested domestically. This is the point that we attempt to elaborate in this section with due attention to Indian investors.

A number of researchers considered individual stock return data to study the benefits of international diversification at the company level. But given that these benefits are largely driven by the correlation across markets, a simple analogue can be constructed by comparing the variance of a portfolio of country indices relative to the variance of portfolios that invest only in a single country. This will help to understand incremental benefits of diversifying internationally rather than investing in a single domestic market.

Benefits of international diversification mainly stem from two main sources. The first is the average covariance – or correlation –between markets. A lower covariance rotates the diversification curve downwards.

This is widely discussed, need little elaboration and we describe it as "qualitative aspect" of risk reduction. Stock market variance may be defined as a product of correlation among markets ρ_t and individual market variance σ^2_t. The stock market portfolio is the weighted portfolio of all stocks where w_j^t is the weight age defined as the fund invested in each country. The variance of the portfolio return is given by

$$\sigma^2_{s,t} = \sum_{j=1}^{N} \sum_{k=1}^{N} w_{j,t} w_{k,t} \rho_{jk,t} \sigma_{j,t} \sigma_{k,t}$$

We defined σ^2_t to be equal weighted cross sectional average variance for the N stocks,

$$\dot{\sigma}^2_t = \frac{1}{N} \sum_{j=1}^{N} \sigma^2_{j,t}$$

We let ϵ_{jkt} the pair wise stock specific deviations from the cross sectional variance average for variance

$$\xi_{jk,t} = \sigma_{j,t} \sigma_{k,t} -- \dot{\sigma}^2_t$$

and rewrite the expression from stock market variance

$$\sigma^2_{s,t} = \sum_{j=1}^{N} \sum_{k=1}^{N} w_{j,t} w_{k,t} \rho_{jk,t} (\dot{\sigma}^2_t + \xi_{jk,t})$$

$$= \dot{\sigma}^2_t \sum_{j=1}^{N} \sum_{k=1}^{N} w_{j,t} w_{k,t} \rho_{jk,t} + \sum_{j=1}^{N} \sum_{k=1}^{N} w_{j,t} w_{k,t} \rho_{jk,t} \xi_{jk,t}$$

Thus stock market variance is the sum of two terms. The first term is the product of the equal weighted average of individual stock return variances and the value weighted average of return correlations across all pairs of stocks in the portfolio. The second term depends on the cross sectional relationship weights, pair wise correlations, and cross product of standard deviations. When all assets have the same individual variance, the second term is equal to Zero and the expression can be simplified accordingly.

$$\sigma^2_{s,t} = \dot{\sigma}^2_t \sum_{j=1}^{N} \sum_{k=1}^{N} w_{j,t} w_{k,t} \rho_{jk,t} = \dot{\sigma}^2_t \dot{\rho}^2_t$$

This expression has two components: average variance and average correlation. We approximated stock market variance with the right hand side of the equation. For a detailed discussion and derivations see Pollet and Wilson [2010]

The second important factor is the implication of increase in the number of investible markets available to investors on portfolio risk. An increase in the number of available market allow investors to move down along a given diversification curve. Earlier studies unduly emphasized on how increased correlation among markets in the new regime limits benefit of diversification ignoring the offsetting impact of increasing investment opportunity that was not available earlier. We refer this aspect often ignored by economists as "quantitative" aspect of risk reduction. [See Goetzmann et.al. 2005]

We developed the following model to measure independent and joint impact of correlation with increase in international investment opportunity .Algebraically, the ratio of the variance of an equally – weighted portfolio to average variance of a single market is given by:

$$Var\frac{\left(\sum_{i=1}^{n} X_i \big/ n\right)}{\frac{1}{n} \sum_{i=1}^{n} Var(X_i)} = \frac{\frac{1}{n^2} \sum_{i=1}^{n} Var(X_i)}{\frac{1}{n} \sum_{i=1}^{n} Var(X_i)} + \frac{\frac{1}{n^2} \sum_{i \neq 1}^{n} Cov(X_i, X_j)}{\frac{1}{n} \sum_{i=1}^{n} Var(X_i)}$$

using upper bars to indicate averages, this can be written as:

$$\frac{1}{n} + \left(\frac{n-1}{n}\right) \times \frac{\overline{Cov(X_i, X_j)}}{\overline{Var(X_i)}}$$

As the number of countries [n] becomes large, this simply converges to the ratio of the average covariance among markets to the average variance. If the correlations among individual markets were zero, virtually all risks would be diversifiable by holding a portfolio that combined a large number of countries. By contrasts, in times of high correlations, even a large portfolio of country indices would experience considerable volatility. With a limited number of international markets in which to invest, however, n may be small. Indian experience is satisfying in the sense; correlation of Indian market with the rest of the world is still encouraging from diversification perspective so possibility of risk reduction and scope of increasing the number of investable countries are wide. Our sample includes India, Japan, Singapore, Malaysia, Hong-Kong, South Korea, Thailand, Taiwan, along with two leading markets of the world U.S and U.K. Time period has been mentioned in the appropriate section. While constructing domestic portfolio we used Bombay Stock Exchange 200 (annualized daily log normal return) and long term Government Bond yield as reported in Reserve Bank of India Bulletin . We relied on mainly two international indices as sources of passive global investment opportunity and these are MSCI All Country World Investable Market Index[ACWI IMI] and MSCI Emerging Market Index [EM]

Empirical Findings

To calculate the separate impact of change in the correlations and secular increase of the investment opportunity set, we compute the above equations that gradually include

1] First, we consider two developed countries namely US and UK that are included in the sample.

2] Then we consider eight Asian countries that satisfy hypothesis of "proximity".

3] In a sense we gradually increased the number and finally considered substantially large number of countries that is all ten counties that in a restricted sense represent world index [n = maximum available].

The Figuer-1 shows the ratio of variance of the equally weighted portfolio of country indices scaled by the average variance of the country indices, as a function of the number of countries in the portfolio. The ratio is computed as

$$Var \frac{\left(\sum_{i=1}^{n} X_i / n\right)}{\frac{1}{n}\sum_{i=1}^{n} Var(X_i)} = \frac{1}{n} + \left(\frac{n-1}{n}\right) \times \frac{\overline{Cov(X_i, X_j)}}{\overline{Var(X_i)}}$$
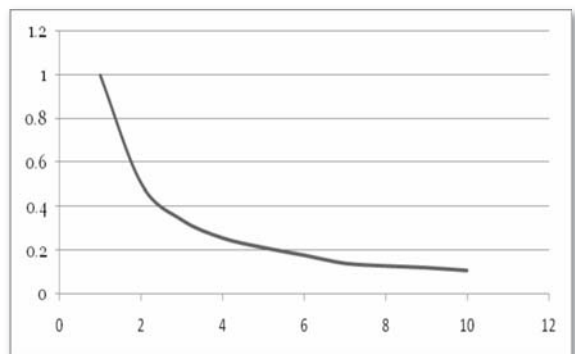
All returns are measured by capital appreciation and exclude dividends, converted to US dollars.

Figure: 1

REDUCTION OF EQUITY RISK: Country Effect

Number of Countries

Countries included are: India, Japan, Singapore, Hong Kong, Malaysia, South Korea, Thailand, Taiwan, U.S.A, U.K

Graph shows impact of change in the risk measured by correlation when investment opportunity set gradually increases. The final scenario gives the benefits of diversification for the full set of sample countries. In consonance with earlier studies ,findings of present work suggest " optimal portfolios are not necessarily well diversified"[Leavy and Sarnat 1970,Jorion 1985].Seven to eight countries are sufficient for maximum risk reduction as it is in our case there after it virtually remains constant. Seven countries portfolio reduces risk to the extent of more than 80 %.

Figure 2

RISK REDUCTION: RATIO OF PORTFOLIO
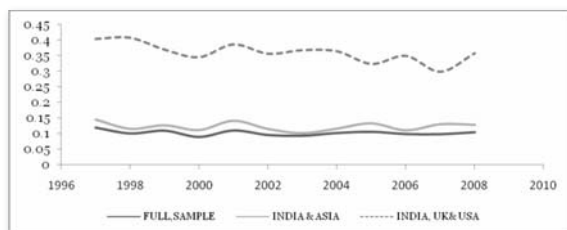VARIANCE AND VARIANCE OF INDIVIDUAL
COUNTRY

Figure 2 alternatively shows impact of diversification ratio on the portfolio variance and the average variance of the countries in the portfolio. Addition of new markets changes the variance structure; the influence can either be positive or negative depending on whether the additional markets increase or decrease average among markets. First, we consider two major economies [U.S, U.K] assuming Indian investors were allowed to invest only in these countries. Secondly we assume investment opportunity set was limited to only Asian countries and lastly all countries were considered. It is evident that the risk declines with increase in investment opportunity set but the benefit achievable is marginal when the opportunity set expands.

International bond investment strategy involves some unique features that widely differ from equity. Generally bond markets are more likely to be disintegrated and comparatively more susceptible to currency risk. Importance of bond market is gradually gaining importance in international investment as most of the pension funds in developed economy are primarily invested in bonds and those lessons may benefit us to manage pension fund in future. For bonds, can we observe identical trend of risk reduction or it deviates from equity. Earlier studies suggest low or even negative correlation among international bond market [See Bruno Solnik1994, Sohnke and Dufey 2001]. The reason emphasized is the national monetary policies are not fully synchronized among countries thus co movement of long term Government bond yield is surprisingly low. However, the correlation among bond markets is higher among countries with strong economic and monetary ties such as European Union countries [E.U]. The following graph suggests benefits of bond diversification among the sample countries which is closely similar to cross border equity investing.

Interestingly Fig. 3 shown below may provoke us to quesiotn - does bond diversification gives us slightly lower benefit than equity. Marginal difference in findings is partly due to variation in correlation of bond yield, variance of foreign currency and most importantly dissimilarities in sample countries for equity and debt portfolio. Latter includes all developed economy excepting India, countries that have incredible impact on world economy , that are closely integrated and scope of diversification benefit is minimum.In absence of reliable information on bond yield of Asian countries ,we were compelled to select some developed economy.

Figure 3

REDUCTION OF BOND RISK: COUNTRY EFFECT

Number of Countries

Countries included: India, Hong Kong, Japan,Germany, France, U.K,
USA, Australia
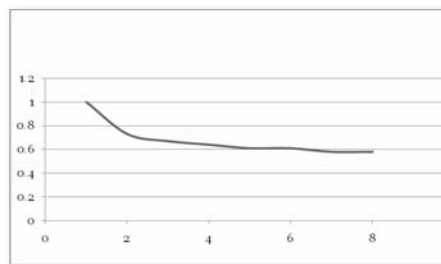
The graph further shows only four contries are sufficient to enjoy bond diversification benefit to the extent of nearly 40%, though portfolio is not well diversified. Though initially it declines sharply thereafter risk reduction benefit is marginal.

INTERNATIONAL INVESTMENT: THE DOMESTIC-INTERNAITONAL APPROACH

Reduction of risk is undneiably important that would help to optimize risk-return profile of investment. Costruction of such a portfolio is however not an easy task and we relied on a more practical and operaitonally manageble "passive approach".

Figure 4:

INDIAN INVESTOR: DOMESTIC DIVERSIFICATION -STOCK AND BOND [Rupee terms]

1997-2008
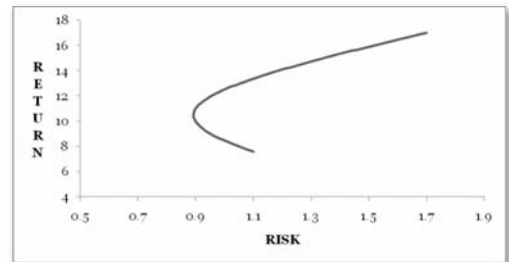
Efficient frontier for domestic diversification has been prepared that considered incremental allocation of 10% between the extremes: debt and equity. It may be reasonably argued "why stock –bond" instead of "large and mid cap" stock combine. There are studies suggesting implicaitons of large and mid cap stock combinations on efficient frontier [Ruban and Melas2009]. We relied on the popular belief supported by strong empirical evidences that portfolio should normally consist of atleast one importatant class of nonstock asset whose return covariance with the stock market is negatively related to the average variance of stocks. And this is mostly satisfied by long term government bond.We use local currency to calculate risk and return that represent hedged return. Alike many other emerging markets average return and risk of Indian market is too high-it is roughly 16% for equity and 7% for 10 year Government bond thus risk premium is about 9%. Whereas average world stock risk premium slightly exceeds 3 percent. Risk [α] return [r]relationship for an equally weihgted portfolio Is roughly 12.55 for India. Minimum risk portfolio (σ= .9) can fetch a return of 11% and risk return relatioship is 12.22 approximately. Allmost in each country there are restrictsions on asset mix,optimal equity investment is restricted for some funds, foreign investment for some fund is not allowedso domestic diversification is only means for risk reduction.

Following earlier discussions we attempt to show how risk-return profile changes while investing abroad and the strtegy to be followed to accomodate currency risk. For an international investor, the return on any foreign asset varies not only because of asset specific risk, but also because of unpredictable fluctuations in exchange rates. Currency risk is relevant not only for optimal portfolio construction but also for determination of international assets equilibrium returns. In euro region an investor is aware of high likelihood of disappearance of the currency risk component of the total risk of his investment and concentrate on "fully hedged" asset risk. To make the argument slightly more formal, we denote with r the continuously compounded [or log] exchange rate change. Then,

$$r_k^c = r_k^k + x_k^c = r_k^k + X_k^c + X_s^c$$

While rkc is the return on country k portfolio denominated in currency c, and X_k^c the log of the changes in the exchange rate between currency k and currency c. The first part of the equation is the well known decomposition of foreign investment returns in local asset returns and currency returns. The second equality reflects the no-triangular arbitrage condition for exchange rate.

We ignored currency risk as it is comparatively insignificant compared with market risk. A diversified European portfolio, such as the MSCI Europe index has a very small currency risk component. The curren-

cy risk contribution of non-EU countries is larger than those EU currencies, but it is still small compared with market risk. In a global portfolio [the MSCI world index], market risk is ten times larger than currency risk [Solnik 1994]. While importance of currency risk is negligible, hedging is very costly in the long run because of the transaction costs and administrative burden of constantly monitoring and rebalancing the forward currency position. Often it is beyond the capacity of sophisticated investment manager to deal with the complex financial instruments that hedging involve.

Investing in global index in true sense provide the benefit of world diversification of fund.This section presents risk-return tradeoffs of internaitonal diversification, the opportunity that are widely available now. We followed passive portfolio strategy and considered MSCI ACWI index that is considered as a most comprehensive index. We assumed no constrain in investing abroad, though this assumpiton may be conveniently relaxed. India –World efficient frontier includes 16 portfolio along with two extremes.

Figure 5:

INDIA- WORLD , INDIA –PACIFIC STOCK ALLOCATION
[in $ terms, 1997-08]
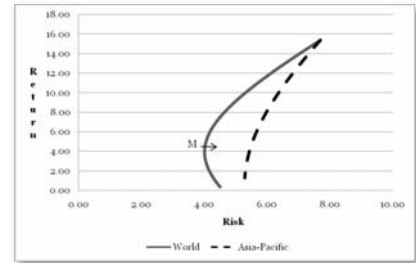
In the equally weighted portfolio, risk/return ratio of globally diversified investment is 1.7, while minimum variance portfolio [M] would consist of 20% India and 80 % invested in global index. Though time period varies study of Robeco Group [1997] also suggests optimal portfolio allocation must rely more on international and less on local market and the ratio varies from as high as 90% for Germany to 50% for US. It may be questioned while correlation is time varying is there any possibility that expected gain from world portfolio diversification to decrease over time. Since the degree of market segmentation is constantly changing over time through a dynamic integration process, there exist conceptual problems that are based on static assumptions of completely segmented or partially integrated market. The argument is equally applicable to India and the possibility of shift in the efficient frontier with change in the covariance cannot be ignored.

Following theoretical assumptions both return and risk of world index is much lower in comparison with Indian index. Virtually ten year annualized return from world index was negative as reported by MSCI Barra, for the period understudy it was slightly positive. Interpretation is the variation of Indian stock index return which is not explained by the world index is diversifiable in the context of a world market portfolio. Hence, in an aggregate perspective, expected return from global investment can be stated as follows:

$$R_{mt+1} \_r_{f.t+1} = \beta_0 + \beta_1 Var_t[r_{mt+1}] + \lambda x_t + \epsilon_{t+1}$$

Where β_1 is positive $Var_t[r_{mt+1}]$ is the conditional variance of world market returns, x_t represents other potential sources of variation in expected return $\epsilon_{t+1 = 0}$. Campbell [1993] derives this relationship for a representative agent with Epestein- Zin preferences under fairly general conditions. It is often assumed that the market portfolio satisfies a variance in mean relationship for excess log market return where λ is 0 in equation.

But our finding of investing in world index is incomparable with the result of domestic diversification that includes both stock and bond. For a comparative study of efficient frontier line and to analyze few theoretical underpinning it would be wise to consider India and Asia Pacific combination along with the case of Indian investors investing globally. Both are all equity portfolio simply scope of diversification is restricted to Asia –Pacific region in the second case. Ten years average annualized return from Emerging Market was positive but far less than Indian market.

Return of Indian market is more correlated with the market of Asian region represented by MSCI Emerging Market indices, thus the benefit of investing in neighboring Asian market is comparatively lesser. The efficient frontier line clearly explains the situation. Generally bondage among stock markets of the country that are geographically close to each other remains high that reduces scope of achieving diversification benefit [See Bartram and Dufey 2001]. Any solution in dashed line is suboptimal which is eminent from the above graph drawn from experiences of Indian investor investing in Asia pacific index. Same return can be earned with lower risk if funds were internationally diversified. In an equally weighted portfolio: when fund invested in global market risk –return relationship is 1.7 where as in case of Asia it is 1.38 that shows nearly 19% improvement in the performance of the global fund.

For a detailed analysis to study the impact of level of unification among markets, portfolio risk and efficient frontier we further consider two cases: Indian investors investing in Asian market namely Japan and Singapore, alternatively in U.S and U.K market. Both are three stock portfolios.
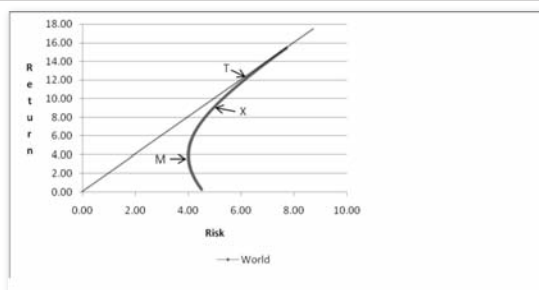
Figure 6:

INDIA –ASIA & INDIA, USA, UK ALLOCATION
(local currency, 1997-2008)
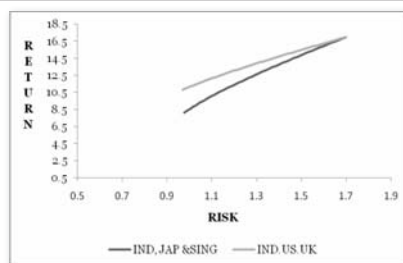
It is clearly visible that investment in USA and UK is a better option than Japan and Singapore. Strikingly India maintains insignificant correlation of return with other four countries of our sample; the relationship varies in different time period but never reaches at a point that may be treated as statistically significant. But variance of return of say Japan is at least 21% higher than both U.S. and U.K, the countries that have nearly same variance that are 1.174 and 1.162 respectively. Similarly variance of Singapore is approximately 10% more than two leading markets of the world. Implication of this analysis is, average correlation and average variance together account for almost all variation in stock market variance and that average variance is the dominant component which affects stock market return. Dynamism of correlation and its impact on risk is a widely discussed issue and the researchers may be benefitted from the brilliant writings of Pollet and Wilson 2010.

Conjecture

GEOMETRY OF EFFICIENT SET

Above figure illustrates a classical minimum variance frontier derived from the data used to construct efficient frontier while Indian investor investing in world index. The minimum variance portfolio M and the tangent portfolio T with highest ratio of μ/α. Minimum variance portfolio includes 20% and 80% funds invested in Indian and world equity index respectively. If short sales are allowed, any portfolio X on the efficient set can be written as weighted average of two fixed portfolios: the minimum variance portfolio M and the tangent portfolio T with the highest ratio μ/α. With risk –free lending at zero rate of interest, this tangent portfolio is

the optimal choice for all investors. For N assets under consideration, the vector of portfolio weights q can be written as [Jorion 1985]:

$$q = x \frac{\sum^{-1} I}{I' \sum^{-1} I} + (1-x) \frac{\sum^{-1} u}{I' \sum^{-1} u} = xqm + (1-\bar{x})qr$$

Where μ is the vector of expected returns, 1 is a vector of ones, and ∑ is the variance –covariance matrix of asset returns. We have derived portfolio M from our own estimation. The weights of the minimum variance portfolio depend only on the sample covariance matrix; alternatively classical tangent portfolio relies on sample mean. Minimum variance portfolio at present is virtually unachievable due to various restrictions in all countries around the globe and "home bias" that induce investors to invest a fairly small proportion of their assets in foreign markets. Any discussion on minimum variance portfolio is relevant in Indian context particularly in the backdrop of current debate over privatization of pension fund. Aggregate ceiling for overseas investment by Indian mutual fund, registered with S.E.B.I, was enhanced from US 4 billion dollar to U.S $7 billion in April 2008. Gradual relaxation of current restrictions would help to minimize the differences between actual shares of foreign investment and the share of foreign assets that would be held in a "borderless" global portfolio. If asset managers are allowed to follow this principle, portfolio investments might be less prone to "boom and bust" cycles relative to other assets, being driven by long-term economic fundamentals.

Conclusions

Most serious defect of the classical approach is the poor out –of- sample performance of the optimal portfolios. Performance measure always deteriorates substantially outside the sample period, and the supposedly optimal choice is sometimes dominated by a crude approach. Furthermore, if the impact of time varying variances and co variances is not adequately accounted for both optimal choice and risk premium will be subject to miscalculation. The problem can be avoided to an extent if average correlation is considered to measure risk, the approach which has been followed in the present writing.

Another problem is the instability of the optimal portfolio: the proportions allocated to each asset are extremely sensitive to variations in expected returns, and adding a few observations may change the portfolio distribution completely. Also optimal portfolios are not necessarily well diversified. Often a corner solution appears where most of the investments are zero and large proportions are assigned to countries with relatively small capital markets and high average returns. Indian market is a classic example where both return and risk is comparatively too high in comparison to other markets of the sample. It's a major problem of practical application of mean variance analysis that warrants a closer examination.

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Appendix

All earlier struggles for unification started with enthusiasm, ended up with frustration and culminated at protectionism; hence concept of "flat world" finally delivered some unpleasant experiences. But this time, advocacies of this precept suggest –"we learned from our experiences", "we are cautious, careful and determined to persuade this policy to create a new and prosperous world order". Among all factors of production, it is probably freewheeling and fast moving funds that have truly proved that the concept of "borderless economy" has some relevance. India with some initial hesitation finally joined in the saga of globalization. Virtually our policy makers at present are victim of the dogma that the change process is "irreversible" and "irresistible" that ushered in a mammoth increase in flow of fund to and from India. Central theme of the present study is to analyze 1] Impact of the volt –faced change in the policy on activities of capital market 2] much needed newer outlook of asset management to successfully navigate in the rough terrain of international finance.

Informational efficiency allow "invisible hand" to operate, control and discipline market, thus, minimize the scope of market failure and government intervention which is essentially counterproductive. Old institutional structure with a set of well defined rules, regulations within which individuals and firms operate may not be appropriate to achieve objective of the new regime. While change is essential, the mode, extent and speed may vary across the countries. Brilliant research in institutional economics point that informational efficiency and relevance of the concept of "equilibrium price" largely depends on "level of corruption," "state of rules and regulations", "property rights", "reporting practices," " corporate governance", "level of disclosure" etc. that ensures free flow of relevant and comparable information. No investor who cares about "market failure", be it domestic or international, can ignore above characteristics of market while deciding destination of investible fund. Of course it would be a wild thinking that market failure simply results from "poor institutional" structure. Instead present thesis emphasizes even with robust structure "break" is possible but in its absence failure is likely to be more frequent, pronounced and devastating. The concept was thrusted upon us by frequent massacre in international finance that we witnessed in the recent past resulting enormous suffering of investors. In the backdrop of above theoretical framework, a comparative analysis of the merits of the sample countries is given below.

A] Higher the opportunity of international investments more is the possibility of asset market development. By definition, emerging markets are comparatively less attractive destination of foreign funds, hence less attractive and mostly immature. Frontier markets for obvious reasons are virtually neglected by world community hence look haggard. But as a whole, growth of financial integration for developing economy is encouraging.

B] Institutional structure and "quality" of functioning of developed markets are superior to emerging market