

# **International integration without trading abroad: The case of the Chinese and Dutch Market returns**

Zhe Jin

0637548

## **Abstract**

We test whether it is possible to obtain the benefits from international diversification without holding foreign securities directly. Based on the research provided by Errunza, Hogan, and Hung (1999), we choose observations from 1976 to 2006 as the data sample to mimic market return indices of China and Netherlands in the perspective of U.S. investors. The original return correlations and Sharpe ratio performance measure provide convincing evidence that there are statistically and economically significant gains can be achieved through homemade diversification.

## **1. Introduction**

There is empirical evidence shows that international diversification can decrease the volatility of portfolios and increase valuations. The last few decades witnesses a tremendous economic development and remarkable reform in developed countries then emerging economies subsequently. As portfolio flows between markets have been less restricted, cost of capital in these countries is thus to be reduced which enables residents to share risks with foreign investors and enjoy great welfare gains made possible by international risk-sharing. These results the economic significance of investing in foreign indices gets much larger. With the recent trend of rising availability of shares of international multinational corporations, country funds, exchange-traded fund and depository receipts being listed in the U.S. market, they become key assets to form

international portfolios in the capital market gradually. Thus, the issue of whether it is possible to obtain the benefits from international diversification without holding foreign securities directly has attracted enormous attention from academic and investment communities all over the world.

The theoretical models of portfolio selection developed by Markowitz (1952) provide a positive explanation for holding diversified asset properly. According to the rules of Mean-variance framework, Grubel (1968) shows in an ex post study that the international diversification of portfolios is the source of an entirely new kind of world welfare gains. The studies of Levy and Sarnat (1970), Solnik (1974) and McDonald (1973) also clearly support the earlier findings that efficient risk reduction can be attained through diversifying portfolios internationally as well as purely domestically diversification.

However, those arguments are associated with the foreign assets only trade abroad virtually. For over 30 years, the trading of shares of multinational corporations, country funds, exchange-traded fund and depository receipts become more prevalent. Those assets provide great possibilities to invest portfolios in a foreign country when holding shares domestically. In the case of that, we can analyze the strategy to mimic foreign indices by domestically traded assets.

Our argument test acts consistently with the conclusion from empirical test. The diversification construction is improved by including MNCs, CFs, ETFs and ADRs. Relying on monthly returns data from January 1976 through July 2006, we consider the impact of substitute assets on risk reduction through domestically diversification. Result shows that the monthly return correlations of these homemade diversification portfolios with foreign market indices dominate the result with the S&P 500 index. Hence the index level correlation does not always need to be concerned as an important factor in the process. It is not necessary to obtain the benefits from international diversification by investing in assets that trade only abroad.

This study is built mainly upon the methodology of previous work done by Errunza, Hogan, and Hung (1999). The structure of the paper is as follows. In section 1, we go into the literature and theoretical background of international portfolio benefits. Then, the empirical approach to modeling international diversification by substituting foreign traded assets are reviewed in section 2. Section 3 presents the model and methodology. Section 4 describes the data and statistics summary consequently. Resulted is reported in section 5. In section 6, we apply mean-variance spanning and Sharpe ratio performance measure to find out the substitution ability and report the results. We end this paper with a brief conclusion.

## **2. Literature Review**

### **2.1 The Diversification Theory**

The loss diversification theory combines the security investment and the direct investment for the inspection. The stock market of the developing country is imperfect, which is regards as is a direct investment factor, and it should be correct at the same time. It has supplemented the beforehand investment theory insufficiency from another angle.

Along with the developing country stock market's gradual consummation, the securities investment has become the most main investment form gradually since 1980s. It proved that the direct investment and the securities investment have the supplementary function. At present, most countries are improving the foreign merchant investment environment vigorously, striving for the attraction of more foreign investments. But we should not neglect further developing and consummating the function of stock market in most countries, because it acts according to the loss diversification theory, the securities investment is the foreign enterprise the paramount consideration investment form. Along with most countries stock market's unceasing consummation, and it certainly will increase greatly through this way for absorbing the foreign capital.

In the mid-1970s s another kind of theory, which developed related investment condition, was called “the loss diversification theory”. Its preliminary representative

personage is Cave Si (R.E.Caves) and Stevens (G.V.Stevens). They embark from Makeweici equity portfolio theory, and thought that the foreign direct investment of diversification is the result of the loss diversification. Therefore, the equity portfolio theory's basis is also this theory foundation. Cave Si believed that “the level investment” in the direct investment reduced the market through the product diversification. But it is not to be indefinite, reduces the product mix sole risk; But “the vertical investment” is to avoid the upstream product and the raw material supply uncertainty risk. Stevens believed that the loss diversification's principle and is personally same, the general requirements under certain anticipated reward, making every effort for the minimum of the risk. But individual investment condition and the enterprise are dissimilar, and individual mainly invests in the monetary assets, and the manufacturer invests in the real estate, and invests in different national and the local factory and the equipment.

Later period representative personage of this theory are Mongolia (T.Agmon) and Li Shade (D.Lessard). They also believed that the Multinational corporation foreign direct investment represents its shareholder to take the loss diversification of the investment, and the relevance of different national and the local direct investment income has not provided in the very good way for individual loss diversification. The way of the securities investment is unable to provide, because the stock market, the capital movement cost is high, and the system is imperfect. Another scholar Arab League Deleur (M.Adler) believed that since the Multinational corporation makes the investment decision directly on behalf of the shareholder, individual securities investment's limit will not necessarily cause the foreign direct investment, only will then work as the foreign security market will be imperfect, cannot satisfy when individual investment will need. Multinational corporation according to the investment will only carry on straight then. In this case, the Multinational corporation played the loss diversification financial intermediary role.

Makeweici, Sharp and Merton the Mill, these three US economists simultaneously had the honor to receive the Nobel economic prize in 1990. That was because “they contributed to the modern finance economic theory’s development. For the investor, the shareholder and the experts of finance have provided the weight, different monetary

assets, investment risk and the income tool. They are estimated negotiable securities forecast stock and so on, bond prices. These three prize-winner's theory has explained the following question: In assigning in the securities investment total quantity, how to cause each kind of property to reduce the risk and the income achieves balanced; How to balance decides the negotiable securities by this kind of risk and the income the price; As well as how factors do the change of tax rate or business failure affect the negotiable securities price. Makeweci contribution was he has developed the property choice theory. His works have been published in 1952 "Property Choice" an article, formerly will be individual the property analysis to advance a new stage, and he took the asset portfolio as the foundation, coordinated the investor to the risk the manner, and thus carried on the property choice the analysis, and from this he has then had the modern contact lens theory. Makeweci's property choice theory analysis method--The modern asset portfolio theory, is helpful for the investor to choose the most advantageous investment, to obtain the best asset portfolio, and to cause the investment reward to be highest, but its risk is smallest. His main contribution is to develop a concept explicitly to be possible to operate choices on the investment profolio theory under the definite condition. His research in today was considered that was the finance economic theory forerunner work, was honored as "the Wall Street's first revolution". Because he has made the groundbreaking work in the financial economic aspect, thus he obtained in 1990 the Nobel economic prize.

## **2.2 The Researches on Uncertainty and Risk**

Here Savage (1954) proposed "the person and nature gambling" under the system and introduced the SEU theory briefly the basic content. What the policy-maker chooses is the motion (or motion process), and how to describe moves (acts)? In fact uses two basic concept - - event (events) and result (Consequences) in the Savage theory describes the motion. The event is the world condition (state of the world) the set, the world in fact is the exterior thing which the policy-maker faces, a condition is to a world description. The result in fact is described by Savage to have to the policy-maker value anything. A motion is defined from the world state space to result space mapping (function). Different motion quite in different mapping. All possible motions to constitute the motion space. We may record S are the state space, C are the result space, A are the motion spaces. Thus, a motion may define is  $C=a(s)$ . Or uses the person and

the natural gambling way, the indication is  $C=f(a, S)$ . The angle which relates from the condition and the result says, the policy-maker chooses the motion to be equal to, in each kind of possibility occurs at the event detains bets the result, therefore, a motion is equal to one kind of lottery ticket.

The economic analysis's basic content is the person and the natural survival relations as well as the person who and person's relations forms in this kind of relations. These two kind of relations may choose a person for a job and natural gambling (game with nature) as well as the person and person's gambling describe. If on to motion description also quite Yu Ren and natural gambling. The policy-maker chooses the motion (to detain gambling), but the natural selection condition, the human and the natural choice had decided finally the policy-maker obtains result. The subjective expected utility theory's main conclusion (morals expected utility existence theorem) is: in certain supposition (axiom) under the condition, has the only probability distribution in the state space (to satisfy probability axiom), has a real value in the result space the utility function (to have linear transformation nature). If  $a>b$ , and when only  $u(a)>u(b)$ . And,  $U(a)$  is the motion a expected utility,  $U(b)$  is the motion b expected utility.

In brief, the subjective expected utility theory indicated policy-maker's rational (Rational) decision-making principle (to have expected utility form) and person's cognitive capacity (1e bon sens), between the subjective and objective world mutual independence as well as the policy-maker expresses the one's subjective world, the objective world as well as the choice object idea (space) between the nature relation, this kind of relation constituted the objective world (state space), the one's subjective world (result space), as well as between the motion space one kind complete, not the contradiction, and was the optimized logical system. We said that the life has the complete rationality in such logical system's policy-maker (Complete Rational). What must point out that we said that the policy-maker has the complete rationality is not refers to the policy-maker to have makes in any significance the most superior decision-making complete information, this is to a complete rational very usual misunderstanding. In fact, under definite condition's decision-making is under the complete information condition decision-making in a sense, said from the information angle, said that the policy-maker had the complete rationality is refers to policy-maker's decision-making had in certain level surmounts any concrete experience information (knowledge) “the generality” or “multi-purpose” (Onmipotence). The understanding complete rational

this nature to understand that the indefinite economic the modern development is very important.

First, we from strategy choice explanation complete rational time nature. The policy-maker not only chooses the motion, in fact needs to choose about the motion strategy, is also in each kind of possibility about the world status messages condition under motion complete plan. In the natural dynamic gambling process, the policy-maker may use the reversion induction the most superior strategy which later all stages may carry out in the policy-making first stage choice. Policy-maker's this kind of ability may also be called the strategy rationality (Strategic Rationality). Therefore, observes afterward the experience information (knowledge) to the motion choice is valuable, but to strategy choice and insignificant. Thus, saying from the motion stratification plane, the human has the time characteristic to the motion choice, and can the choice which will make in tomorrow not be unnecessary to make today. But, says from the strategy stratification plane, the human does not have the time characteristic to the strategy choice, the complete rational policy-maker may make in the present until the future a series of according to the status messages decision planning for action, and with the lapse of time, the plan does not need to change. The independent supposition in fact also means that the world state procedure's order of occurrence does not matter.

Next, we explained that the complete rational spatial nature, which policy-makers can use SEU , which question in what kind of situation the policy-making principle? In any situation, policy-maker may use the theory of expected utility in any policy-making principle. Therefore, the policy-making principle of SEU does not exist when it is ubiquitous. It surmounts all time and the spatial nature, or it surmounts all experience's nature. This policy-making principle may indicate that it is absolute, the ultimate principle. The policy-maker moves perfectly under this principle according to the fullest reason. Therefore it has also achieved the highest freedom sacredly, which is said by Leibniz. SEU decision-making principle may be one kind of absolute generality, may also be one kind of multi-purpose. What should be pointed out that this kind of complete rational policy-making nature is precise. The neoclassic and economic behavior analysis is rational, and also attempts to explain what they construct the principle, which economics has surmounted individual, the nationality, the history and a national boundary general basic cause.

Generally expected utility theory

Obviously, in real life person is not the complete rational person who describes. Simon pointed out that person's cognitive capacity is limited. This proposed the limited concept of rationality (bounded rationality). The uncertainty of economic modern development is concrete and expanding and comprehensively limited understanding of SEU theory

First, the indefinite economy stems from two aspects, which approximately limited understanding of SEU theory. One aspect is paradoxly initiation, proposed by the Alai paradox and Ellsberg. And each kind of experiment showed that it exists the utility function (risk by chance) and the nature of probability (uncertainty), which departs from as well as many kinds of new theory establishments to the SEU theory. For example prospect theory (Kahneman & Tversky, 1979), which is regrettable theory (Loomes & Sugden, 1982) and so on. Another aspect is according to the effectiveness by chance with the moral hazard question, and it is initiation to the SEU theory question as well as the new theory establishment. This aspect's work takes the work as representative. These theories mainly have the weighting utility theory (for example Allais, 1979; Chew & McCrimmon, 1979; Fishburn, 1983), the misalignment expected utility theory (for example Machina, 1982), the introduction of Dreze(1987) contains the moral hazard and it depends on the condition by chance when the expected utility theory. In order to get the expected utility theory (Rank-dependent Expected Utility, Quiggin, 1982; Yaari, 1987), non-coca expected utility theory to be obtained (Non-additive Expected Utility, Shackle, 1949).

Next, the subjective utility theory establishes a vital significance no longer. It will be different in the multi-stage's dynamic decision-making's nature with the SEU theory, having possibly even more the limited rational characteristic. For example, reversion induction way is not necessarily suitable, the decision-making way is not necessarily. And it will be suitable and so on. The decision-making will become more empirical and timeliness. Once more, in the dynamic decision-making, the SEU decision-making principle can maintain consistent everywhere. And it is not necessarily. Dreze (1972) founded that the dynamic decision-making is effective to derive the analysis method. Kreps & Porteus(1979) demonstrated that the policy-maker in the

expense of decision-making might be SEU, but it caused by the expense of decision-making , which the wealth decision-making is not necessarily.

Finally, the economy studies the person's choice to analyze and trace the economic phenomena. The indefinite economy will choose the object description from the condition of the payment lottery ticket, which describes the choice essence to have the significance to a certain extent. But, what should be pointed out that human's choice has the hierarchical nature. For example, motion, strategy, gambling as well as decision. It rules choice. Many social phenomena need to be explained in the different level and the different period and it is a game theory of thinking mode of basic content. Although the different level as well as the stage decision-making is in a different spatial time's variability, and it had reflected the experience knowledge. It patrols the knowledge which is different in levels as well as the stage choice of function. But, it does not have any level and the stage of decision-making, which is eternally unchanged. Because people's logical knowledge does not have infinite time space ability, it is also the needed adjustment unceasingly through the new experience. The objective world itself does not have any traversing time and space of the rule. The subjective expected the utility theory of complete rationality (multi-purpose), which is not suitable for the realistic society. The subjective expectancy theory's critique is an economic modern development of great importance for the direction. It demonstrated precisely the subjective expected utility theory's value in this kind of development. And it has provided a very good starting point for the economic development.

The standard theory departs from the reality, which was driving from the economists. And they are constructed by the massive new theories. These new theories attempt to the standard theory for carrying on the expansion. And it is established that the analysis and the explanation of strength theory to the reality. Therefore, it is also called generalization which is expected as utility theory (but, it is not necessary that the policy-making principle which has expected the utility form inevitably). The economist for constructing these new theories involve inevitably to the subjective expected utility theory. Three kind of supposition are further understanding. These three kind of suppositions not only involve the economic fundamental question, but also involve the science in more profound, it is also a more general question. Just like Hey (1997) said that it was the uncertainty analysis, which is not only technical, but also the philosophy.

Condition - by chance with risk loathing

Excepting the probability and the expected utility theory of discussion under the uncertainty, the decision-making's important method also includes “the condition - by chance” method (State-Preference) as well as the risk loathing theory (Risk-Aversion). These three methods have certain similarities in a sense. Under the uncertainty condition method (1953), it is proposed by chance by Luo. Debulu (1959) has carried on the further elaboration. Because Hirsh-leifer(1965, 1966) applies it in the investment theory. Radner et al. utilize it in the financial theory and the general isostatic theory, but the reputation rises up. The condition method's main principle changes the commodity spatial structure appropriately by chance, but it transforms the uncertainty under policy-making question as the conventional choice question. This is different from the expected utility principle. And it does not need any probability (subjectively), but by chance it will be established in above the condition interdependence of commodity combination. A condition method is believed by chance that the commodity difference not only lies in its physical feature and the time, the space etc. Moreover it lies in “the condition”. For example, raining time of the condition, ice cream and the clear sky ice cream is different. And it can request the different price of the consumer. Therefore, 13 kinds of commodities, the kind of natural state, and then the commodity has not planted the price, and the commodity space is the subset. It is opposite saying in the subjective which is expected as utility theory, in such optimized question which the economical policy-maker is facing:

$$\max U = \sum_s \in s \pi_s u(x_s)$$

S . t .

$$\sum_s \in SP_s X_s \leq \sum_s \in SP_s e_s$$

And,  $X_s$  represents under the condition which the commodity could be combined ( $x_1s, x_2s, \dots, Xns$ ),  $e_s$  can be represented the initial talent vector. It may obtain the optimized condition and the fundamental theory with risk exposure through the Lagrange method.

The risk loathing theory (Friedman & Savage, 1948) proposed by Friedmann and Savage that Markowitz (1952) has carried on the analysis which regarded it. Pratt(1964)

and Luo (1965) discussed the risk measure by chance. Ross(1981) has made the improvement through it. Friedmann and Savage (1948) attempt the risk loathing concept which explains that the people carry on the small probability of great income gambling (buying the lottery) .At the same time, they also will purchase certain insurance. They use the expected utility function for shaping the change which explains this paradox. Pratt (1964) and the Luo (1965) have made such measure of theory to the risk loathing:  $U \succ V$  has the stronger risk loathing, if regarding all. And  $U:R \rightarrow R$  and  $V:R \rightarrow R$  is by chance on the  $M$  two basic utility function. They have also carried on the proof for such way.

### **2.3 International Portfolios**

The enterprise's internationalization is the process that the enterprise integrates itself into the world economy, and allocates the elements of production, capital, technology etc. into the international scope, in order to realize the sustainable development of the economic activities (Watson, Peter, 2005). It plays an important role in an enterprise's production and marketing. With the development of today's economic globalization development's today, there are very a few enterprises to be able if to be separated from the international market to survive. Its development cannot leave the international market. The enterprise's internationalization has become an inevitable trend in the process of economic globalization, and it is also an inevitable choice for the enterprise's development has arrived at a certain stage. Generally speaking, when an enterprise's operative activity starts contacting with the international economy, in fact this means a start of the enterprise's internationalization. Although it not necessarily can become a multinational corporation in the true sense, or this process may be very long, yet the fact that the enterprise will move toward the internationalization is undeniable.

The concept that holding international portfolios enhances diversification benefits has its roots in the literature. Eun and Resnick (1984) evaluated models to measure the correlation structure of international share prices. Among the eight developed markets, the stock returns correlated between countries are tested to be much less than those within a country. Solnik (1974) examined the risk of the portfolio when diversification increase by the number of stocks, he found that the risk decrease but not proportionally, however, it will eventually go nondiversifiable, that is to say stay even. Then he continued the study in an international view, he concluded the sustainability of risk

decreasing can be enhanced by international diversification. When both fully diversified, an international portfolio is less than half as risky as U.S. portfolio.

Data from emerging markets tells the same story. A well documented measure is from the paper by DeSantis and Gerard (1997). They point out that, in 1994, a diversified internationally portfolio among 10 major developed markets shares the same volatility with a well-diversified portfolio of American equities whose annual expected return is higher by about 2.5 percent. Adding emerging economies into the portfolio is beneficial in promoting the further gain from international diversification. Since it is proved that the amount of the securities capitalization in each country should possess the same proportion in well-versified international portfolio. For emerging markets account for about 12 percent in world market capitalization, 12 percent of emerging investment should also be held in a well-diversified portfolio.

Besides shares of international multinational corporations, country fund, exchange-traded fund and Depository Receipts are other assets represent claims on foreign traded assets. It means we can hold a diversified portfolio of assets rather than a diversified stock portfolio to reduce this exposure to market risk or the systemic risk of any one asset class. We describe the closed-end country fund as an investment company that issues fixed number of shares domestically and uses the proceeds to invest in the shares of other companies in a foreign country. Normally the fund shares and the underlying assets are traded in two typically different markets with different microstructures. Closed-end mutual funds were first introduced and still an important component for foreign investment in emerging financial economies whose capital markets are not accessible to outside investors. Errunza, Senbet, and Hogan (1998) claims that that country funds traded in the developed capital markets can help to improve the efficiency of pricing and capital mobilization of local companies. Investors can save extra transaction and information costs, circumvent investment barriers and potentially benefit from the expertise.

Exchange-traded fund originated in 1993 for the applications in the portfolio management. Most ETFs are index funds monitoring their underlying index.

Comparable with the mutual fund, which only can be traded at the end of the trading day for its net price, Exchange-traded fund is more like stock. It can be purchased or redeemed throughout the trading day for prices of its net asset value with a premium or discount. The stock-like features provide liquidity and flexibility. Much more, ETFs is structured for more cost effectiveness by not maintaining a cash reserve in case of redemptions and saves on brokerage expenses. Also it can be more tax efficient by means of lightening the tax burden on investments in corporate stocks. Zigler (2000) proved Exchange-traded fund is appropriate for the investors who demand the diversification.

American Depositary Receipts represents ownership in the shares of a foreign company trading on US financial markets in dollars. ADRs enable US investors to overcome the restrictions, cost and other problem associated with cross-border transaction. Though ADRs from a specific country (i.e. ADR index) should provide similar returns to an indexed country fund, the fewer costs associated with ownership of ADRs provide advantage over country funds for the small domestic investor. For instance, they have lower correlation with the S&P 500 Index than country fund and require no management fee. Urias (1994) describes ADRs have a “spill over” effects. He argued that as the expected return of a cross-listed ADRs illustrate the performance of global risk sharing, the ability of U.S. investors can increase their abilities to mimic returns on this other foreign, even though they are not themselves cross-listed, by the extent another foreign security correlated with the ADR issuing firm. So the expected returns for the foreign market can be reduced through the integrating effects of the ADR spill over to other securities. The study is examined and confirmed by Errunza and Miller (2000), they pointed out the present trend of world capital markets integrated can decrease the expected returns for the foreign market effectively.

Errunza, Hogan and Hung (1999) look at the issue of whether investors can mimic foreign indices by holding domestically trading assets. The paper investigates the issue from the standpoint of U.S. investors using monthly data from 1976 – 1993 for 7 developed and 9 emerging markets. 11 out of 16 displays statistically and economically insignificant of extra gains can be attained beyond the gains achieved with home-made diversification. This leads to the convenience that, through the increasing availability of

the assets, the investors can enjoy the benefit from diversification by purchasing shares in MNCs shares, US market indices, and industry portfolios, closed-end country funds and American Depository Receipts traded in the US instead of buying shares abroad.

### **3. Methodology**

#### **3.1 Research Design**

The dissertation will do case studies on the investment portfolio through three countries, China, US, Netherland. To construct a diversification portfolio which is highly correlated with a foreign market index, we substitute the domestically trading assets into diversification subsequently to implement the test. The regression models derived by Errunza, Hogan and Hung (1999) are used here to capture the impact of duplicate returns on unavailable foreign assets. The coefficient or proportionality is calculated to measure the return correlation. Finally the diversification portfolio can be obtained.

We analyze a set of data for the use of the proposed test. I construct similar portfolios with the work of Errunza, Hogan and Hung (1999) using monthly data to confirm their findings. The eligible set consists of the MSCI (Morgan Stanley Capital International) World Index, 29 US-DS global industry portfolios, a sample of 24 multinational firms, 4 closed-end funds (CFs), 3 Exchange-traded funds (ETFs) and 24 American Depository Receipts (ADRs) to form the eligible set. All the securities are listed on New York Stock Exchange (NYSE). The data are collected each month for all assets depending on availability from Datastream, for the January 1976-December 2006 period. The multinational firms (MNCs) sample selection procedure begins with the list of the 50 largest U.S. multinational corporations as ranked by 1976 sales report by Fortune magazine. We deleted the stocks that are no longer traded as of December 31, 2006, or for which data can not be accessed from Datastream during the sample period from the eligible set. This left us with a sample of 24 MNCs. I decided to utilize US-DS global industry portfolios because the information on MSCI global industry portfolios can not be obtained by Datastream. The Table 1 reports a complete list of the set of eligible securities.

We choose two countries China and Netherlands which never been researched in previous works as the data samples for emerging and developed markets respectively. They are been selected for the reasons follows: China, famous for its rapid economic development in the late 20th century, has 3 country funds and nearly one hundred ADRs traded on the US market, which is more than most of the emerging markets selected in previous researches. Netherlands, an important player in world trading, is the earliest few countries benefits from the ADR introduction in U.S. market and it has also listed its country fund in the 1990s market. They employ similar method for calculating the country index. The monthly observations are value weighted and all the calculations are conducted in terms of U.S. dollar returns using the effective rate on the last trading day of the month. All the return data are collected from Datastream and cover the period from January 1976 to December 2006. Then we compute the returns of indices. Considering the risk-free rate we choose the one-month rate then subtract it from the monthly returns of all asset classes.

### 3. 2 Research Model

Property price definite model which (for example stock) exists by the forms of capital. Take the Stock market as the example. Supposes the investor through the fund investment in the entire Stock market, therefore his investment decentralization (diversification), he will not have undertaken completely any may the spread loss. But, as a result of the economical and the Stock market change's uniformity, the investor will undertake may not the spread loss. Therefore investor's anticipated repayment is higher than the non-risk interest rate. supposes Stock market's anticipated rate of return is  $E_{(rm)}$ , the non-risk interest rate is  $r_f$ , that the market risk premium is  $E_{(rm)}r_f$ , this was the investor as a result of undertakes related with the Stock market has not been possible the spread loss, but anticipated obtained repayment. Considered that some property (for instance some company share), supposes its anticipated rate of return is  $R_i$ , because the market non-risk interest rate is  $R_f$ , therefore this property's risk premium is  $E_{(ri)} - r_f$ . The capital asset fixed price model described this property risk premium and between market risk premium relational  $E_{(ri)} - r_f = \beta(E_{(rm)}r_f)$  in the formula, Beta the coefficient is a constant, is called the property Beta (asset beta). The Beta coefficient

expressed the property rate of return to market change's sensitive degree (sensitivity), may weigh this property not to be possible the spread loss. If assigns Beta, we can determine some property current value (present value) the correct discount rate (discount rate), this discount rate was this property or another same risk asset anticipated returns ratio discount rate =  $R_f + \beta(R_m - R_f)$ .

Here United States is defined as the home market. Firstly, industry portfolios are introduced. Roll (1992) claimed that significant factor on co-movements of national indices can be explained by to industry impacts rather than country. The industry compositions of the national stock market indices play a major role influencing the international structure of country correlations. Countries with similar industries tend to be more correlated regardless of region. But latter papers are against this viewpoint. Griffin and Karolyi (1998) reported that the positive response is limited. Diversification across countries within an industry still shows better effects in for risk reduction than industry diversification within a country.

In this case, equation can be written in a simpler form with the returns of 29 global industries along with MSCI World index or IFC Global Index:

$$R_{I,t} = \beta_1 R_{e1,t} + \dots + \beta_{29} R_{e29,t} + \varepsilon_{I,t} \quad (1)$$

Where  $R_{I,t}$  is the return on the Ith foreign market index during period t and  $R_{e1}, \dots, R_{E29}$  are returns on US-DS global industry portfolios.

Then the stepwise regression procedure and forward and backward threshold criteria as in EHH are followed to determine a new portfolio. We now consider the including U.S. market index and U.S. MNCs. To form a more inclusive portfolio, it is useful to follow the stepwise regression and forward and backward threshold criteria as in Errunza, Hogan and Hung (1999) to estimate the weights of the new augmented diversification (D2). Under the procedure the return on S&P 500 index and the return on a value-weighted portfolio of 24 U.S. traded multinational firms are taken to decide the portfolio.

Nowadays, country funds play a more and more important role in modern international trading. The number of these assets floated in U.S. is much larger than before. For instance, China listed 3 country funds in the middle 1990s while only one is held at the most by one country in EHH's paper. In contrast with EHH who select the CFs and ADRs with the longest history, we include all the CFs and ADRs listed on U.S. markets according to the new empirical analysis of Patro (2005). Using a panel of 34 country funds, he indicates that listing of new country funds has a significant impact to decrease the country fund premiums due to its ability to span current funds using new funds. We add the country fund and ADRs subsequently to observe weights allotted to the previous securities varying upon the availability of new country funds and overseas listings in line with Chaieb and Errunza (2006).

Equation 2 is stated in terms of the return correlation after country funds is added:

$$R_{I,t} = \varphi_1 R_{D2,t} + \varphi_2 R_{CF,t} + \varphi_3 R_{ETF,t} + \varepsilon_{I,t} \quad (2)$$

where  $R_{D2,t}$  is the return on portfolio (D2),  $R_{CF,t}$  and  $R_{ETF,t}$  is the return on the relevant country fund and exchange-traded fund. The portfolio weights of an augmented diversification portfolio are estimated by regressing the  $I$ th market return on the return of the previous diversification portfolio ( $R_D$ ) and the return on the CF ( $R_C$ ) from the corresponding  $I_{th}$  market,

In the end when all the ADRs are included, formally the regression formula can be written as:

$$R_{I,t} = \varphi_1 R_{D2,t} + \varphi_2 R_{CF,t} + \varphi_3 R_{ETF,t} + \varphi_4 R_{adr,t} + \varepsilon_{I,t} \quad (3)$$

where  $R_{ADR,t}$  is the return on the relevant ADR.

Finally diversification portfolio is formed as the fitted values of the following regression.

### 3.3 Data Collection

The data used in this dissertation was mainly from some software, such as DataStream, bankscope; and formal websites such as Finance .yahoo.com. Now the following panels are going to explain some special data collection in detail.

**Table 1**

#### **The Set of Eligible Securities**

The list of Eligible set consists of 24 multinational corporations as ranked by 1976 sales report by Fortune magazine, 29 US-DS global industry portfolios, 4 Closed-End country funds(CFs) and 24 American Depository Receipts (ADRs). The Bank of New York is the information source for the CFs and ADRs sample and their listing dates. All data are compiled from Datastream.

#### **Panel A**

<b>Multinational Corporations</b>	
1. Ashland Oil Inc.	13. Goodyear Tire and Rubber Co.
2. Bethlehem Steel Corp.	14. International Business Machines
3. Boeing Co.	15. ITT Corporation
4. Caterpillar Inc.	16. Navistar International Corp.
5. ChevronTexaco	17. Occidental Petroleum Corp.
6. ConocoPhillips	18. Procter & Gamble Co.
7. Dow Chemical Co.	19. Rockwell International Corp.
8. Eastman Kodak Co.	20. Sealed Air Corp.
9. Exxon Mobil	21. Sunoco, Inc.
10. Ford Motor Co.	22. Tenneco Autv.
11. General Electric Co.	23. United Technologies

12. General Motors Corp.	24. Xerox Corp.
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Source: [http://money.cnn.com/magazines/fortune/fortune500\\_archive/full/1976/](http://money.cnn.com/magazines/fortune/fortune500_archive/full/1976/)

**Panel B**

<b>global industry portfolios</b>	
1. Aero/Defence	16. Industrial Machinery
2. Airlines	17. Insurance
3. Automobiles	18. Leisure Goods
4. Banks	19. Mining
5. Broadcast and Entertainment	20. Nonferrous Metals
6. Build Material and Components	21. Publishing
7. Chemicals	22. Real Estate
8. Clothing and Accessories	23. Recreational Products
9. Construction and Material	24. Retail
10. Electronic Component and Equipment	25. Steel
11. Financials	26. Telecom, Media and IT
12. Food and Beverages	27. Tobacco
13. Forestry and Paper	28. Transportation
14. Health Care	29. Utilities
15. Industrial engineering	

**Panel C**

<b>Closed-End Country Fund</b>	
	Start Date
China	

1. China Fund	8/1992
2. Greater China Fund	8/1992
3. Templeton Dragon Fund	10/1994
Netherlands	
1. Netherlands Fund	4/1996

**Panel D**

<b>Exchange-traded fund</b>	
	Start Date
China	
1. PowerShares Gld Drg Haltr USX China	12/2004
Netherlands	
1. iShares MSCI Netherlands Investable	3/1996

**Panel E**

<b>American Depository Receipts</b>	
	Start Date
China	

1. Sinopec Shanghai Petrochemical Co Ltd.	8/1993
2. Guangshen Railway Co. Ltd.	6/1996
3. China Eastern Airlines Corp Ltd.	3/1997
4. China Southern Airlines Corp Ltd.	8/1997
5. China Mobile Ltd.	11/1997
6. Yanzhou Coal Mining Co Ltd.	4/1998
7. PetroChina Co Ltd.	5/2000
8. China Unicom	7/2000
9. China Petroleum & Chemical Corp.	11/2000
10. China Telecom Corp Ltd.	12/2002
11. China Life Insurance Corp Ltd.	1/2004
12. Suntech Power Holdings Co Ltd.	1/2006
Netherlands	
1. Unilever	12/1961
2. Royal Philips Electronics	2/1973
3. Aegon	7/1985
4. Royal Ahold	5/1991
5. ABN AMRO Holding	8/1993
6. Reed Elsevier NV	12/1994
7. ING Groep	1/1995
8. Corporate Express	2/1995
9. Royal KPN	11/1995
10. CNH Global	11/1996
11. Head	10/2000
12. Van der Moolen Holding	11/2001

## 4. Data Analysis and Findings

### 4.1 Data Description Statistics

For the returns data, we examine the IFC China index and MSCI Netherlands index, which are compiled from International Finance Corporation (IFC) and Morgan Stanley Capital International (MSCI) respectively, as the monthly return indices for these two countries. For the use of comparison, we select the S&P 500, a proxy for the U.S. equity

#### Table 2: Summary Statistics for Assets Returns

Statistics for asset returns. Returns of IFC China equity index and MSCI Netherlands and world equity indices are monthly percentage, denominated in USD and in excess of the one-month Eurodollar deposit rate. The sample period is from January 1977 to December 2006.  $\rho_i$  denotes autocorrelation of lag I. The test for the kurtosis coefficient has been normalized to zero, B-J is the Bera-Jarque test for normality based on excess skewness and kurtosis, Q is the Ljung-Box test statistics for autocorrelation of order 12 for the returns and for the returns squared.

#### Panel A: Summary Statistics

	China	Netherlands	World
Mean	0.019	0.012	0.011
Standard Deviation	0.107	0.047	0.040
Maximum	0.427	0.144	0.147
Minimum	-0.223	-0.236	-0.132
$\rho_1$	0.132	0.027	0.066
$\rho_2$	0.105	0.078	-0.038
$\rho_3$	-0.120	-0.032	-0.011
Skewness	0.580	-0.732	-0.308

Kurtosis	0.104	2.960	0.974
B-J	21.561**	167.614**	20.722**
$Q(12)$	29.686**	20.913*	13.331
$Q^2(12)$	36.236**	18.525	35.770**

\* significant at the 5% level

\*\* significant at the 1% level

### Panel B: Correlations for Assets Return

	China	Netherlands	United States	World
China	1	0.082	0.066	0.120
Netherlands		1	0.667	0.635
United States			1	0.795
World				1

## 4.2 Data Analysis

Table 2 provides some basic statistics regarding the composition of the indices. The table reveals that China, as an emerging market, its return displays higher average and larger volatility than its developed market counterpart Netherlands. This sharply contrasts with what the emerging markets return are characterized. The cross section of serial correlation is reported to describe the persistence of the market returns based on past returns. In contrast to the Dutch market, the first-order serial correlation coefficient is higher for the Chinese's market. Therefore the evidence suggests that the market return of China is more predictable. The Bera-Jarque statistic indicates that the hypothesis of normality is rejected in both instances at the 5 percent level. The indices of skewness and kurtosis show that the returns are lack of symmetry has heavier tails, thus, display infrequent extreme deviation from normality for both countries in our sample. The last two rows of the table give the Ljung-box test statistics of  $Q(12)$  and its

squared series, from this information it seems the evidence that is China shows much higher autocorrelation than Netherlands.

**Table 3: Composition of Diversification Portfolios**

**Panel A**

Panel A reports the composition of diversification portfolios for China and Netherlands respectively. Using the stepwise regression procedure, the diversification portfolio is constructed by regression Standard and Poor’s 500 return index, 29 US-DS global industry portfolios, a ,24 multinational firms along with closed-end funds (CFs) and American Depository Receipts (ADRs).The numbers in each column correspond to the identification in Table I.

	U.S. market index	Global Industry Portfolios	Multinational Corporations	CF	ETF	ADR
China	no	1,2,6-8,15,18-20,22,24,25,28	4,9,12,15,17,23,24	1,2	no	1,5
Netherlands	yes	1,2,5-10,16,19,20,24,28,29	4,7,9,12,14,15,21,23	no	1	2,3

yes (no) means that the asset is included by the stepwise regression

**Panel B**

**Fitted Value of the Diversification Portfolios**

Panel B reports the fitted value of equation 2 and 3. AD1 correspond to the regression values from the regression  $R_{l,t} = \varphi_1 R_{D2,t} + \varphi_2 R_{c,t} + \varepsilon_{l,t}$  , and AD2

represents  $R_{I,t} = \varphi_1 R_{D2,t} + \varphi_2 R_{c,t} + \varphi_3 R_{adr,t} + \varepsilon_{I,t}$ .  $\varphi_1, \varphi_2$  and  $\varphi_3$  reports the parameter estimates and t-statistics for the regressions.

Country					
China	$\varphi_1$	$\varphi_{2CF1}$	$\varphi_{2CF2}$	$\varphi_{4ADR1}$	$\varphi_{4ADR2}$
AD1	0.7469	0.4114	0.2539		
	(4.3431)	(1.9832)	(1.0847)		
AD2	0.7171	0.3728	0.2273	0.1844	0.0588
	(4.1607)	(1.3061)	(0.8875)	(1.2823)	(0,5229)
Netherlands	$\varphi_1$	$\varphi_3$	$\varphi_{4ADR1}$	$\varphi_{4ADR2}$	
AD1	0.9216	0.2918			
	(10.6002)	(5.8357)			
AD2	0.8877	0.2744	0.3025	0.0962	
	(9.7215)	(4.8937)	(7.7160)	(4.5209)	

Panel B contains the matrix of national correlations for the indices. It reveals that China has extreme low correlations with other indices. For Netherlands and United States, the mean correlations are ranging from 0.635 to 0.795, still lower than the correlations between portfolios of U.S. assets with the result shown in the study of De Santis and Gerard (1997).

## 4.3 Findings

### 4.3.1 Composition of diversification portfolios

Table 3 presents the composition of diversification portfolios for China and Netherlands in the perspective of U.S. investors. It is noted from Panel A that both diversification portfolios for the two countries are including country funds and ADRs. However, there are a few minor differences. For instance, the removal of U.S. market index during the

process of stepwise regression and inclusion of two country funds from the three floated in U.S. are easily observed in the case of China. It seems all these assets can be used to take advantage of providing international diversification benefits.

Figures of parameter estimate show the effect the assets newly introduced on the home-made diversification enhancement of spanning their indices. Country funds, exchange-traded fund and ADR both contribute significant improvement in the domestically diversification. As an emerging market, China experiences distinct benefits which are different from previous studies. In EHH's paper, none of the nine emerging markets show significant enhancement of spanning of the indices by the introduction of ADRs. This mainly due to China's 13 years of ADRs' listing while there was no such asset from emerging markets available to investors in the early period until 1990. It also implies that the augmented portfolio D2 still play the major role in the performance of enhancing the home-made diversification as the weights of D2 exceed the others two for all the four portfolios. Compare with ADRs, Country fund introductions have a more significant effect than the ADR introductions in the case of China. The result is consistent with those of Bekaert and Harvey (2000). However, this condition does not hold for Netherlands, but it is explainable if we take into account the fact that Netherlands has ADRs listed in U.S. throughout our sample period. Both China and Netherlands have two ADRs included in the portfolio, they all have relatively longer history. Take Netherlands for instance, two of the three ADRs are earliest issued are selected by the stepwise regression. One explanation is providing by Sarkissian and Schill (2004) as they observe an even stronger decreasing in the post-listed return by the first listing.

## **Table 4 Pairwise Correlations**

### **Panel A Unconditional Return Correlations**

I is Standard and Poor's 500 return index. D1 is diversification portfolios based on 29 US-DS global industry indices. D2 is the diversification portfolio constructed by

S&P 500 return index, 29 industrial portfolios, and 24 multinational corporations by the stepwise procedure. AD1 are augmented diversification portfolios in which D2 is augmented using each country's country funds and exchange-traded fund. AD2 are augmented portfolios in which AD1 is augmented by the country's representative ADRs.

	I	D1	D2	AD1	AD2
China	0.066	0.169	0.302	0.466	0.512
Netherlands	0.667	0.694	0.703	0.726	0.759

**Panel B: Pairwise Correlations for Assets Returns**

Country	China	Netherlands
Country index and world index	0.120	0.635
Country index and diversification portfolio	0.512	0.759
diversification portfolio and world	0.293	0.684

**4.3.2 Pairwise Correlations**

The Unconditional return correlations are listed in Panel A of Table 4. I represents the S&P 500 return index. As the index correlation between the U.S. market index and a target foreign market index is suggested as an indicator for diversification benefits As is made clear, the effect of market integration become more pronounced as the correlation between the two market indices decreases. Since the correlation coefficient between

China market index and S&P 500 return index is remarkable low as 0.066, which nearly allows the portfolio to performance a random correlation. It is observable that China holds the better position in international diversification than Netherlands.

To examine the degree of correlation change through new assets added into the augmented portfolios, we observe four portfolios in each market. Results are also reported in Panel A of Table 4. These results indicate that the correlation between U.S. index and the diversification portfolios are, on average, higher than those with target market index. And there is clear evidence that changes in the composition of investors can have a direct impact on benefit of diversification. With the availability of substitute assets on the home market, investors are allowed to domestically diversify to duplicate the returns on foreign assets. The most striking feature of results is the consistency of correlation increasing between the homemade diversification and foreign market index when the portfolio is sequentially augmented with U.S. listed foreign assets. Intuitively as the results suggest the correlation is increasing, return on target market index can be perfectly mimicked by a portfolio of domestically international diversification, which would thus seem effective to result in the higher benefits. Individually, all the assets provide significant contribution in mimicking portfolios. It is also included that ADRs statistically significantly enhance the integration in comparison with ADRs' virtually no effect for EMs or marginally effect for DMs in EHH's paper. Viewing China in comparison with Netherlands, the difference between correlation coefficient of U.S. index with the most augmented portfolio and those with China index return is 0.446, notably exceeds the difference of 0.092 for Netherlands. The result is not different from theoretical expectations that EMs normally outperformance DMs in the domestically international integration gains.

We also present the pairwise correlations in Panel B of Table 2 for Country index, world index and diversification portfolio. With expected, we observe that the return correlations between target market index and world index are 0.120 and 0.635 for China and Netherlands respectively. While the correlations between country index and diversification portfolios are 0.512 and 0.759. The difference is significant by both Horizontal and Longitudinal comparison. There may be a few explanations can be found in previous sections.

**Table 6: Correlations over Sub-periods**

Table 6 reports means and standard deviations of market return of China and Netherlands and the correlation between their market indices and the most augmented portfolio over four nonoverlapping sub-periods. The Construction of the most augmented portfolios is explained in previous Chapters.

	China	Netherlands
1976.01-1987.11		
Mean	0.013	0.013
Standard Deviation	0.137	0.047
Correlation	0.424	0.653
1987.12-1992.12		
Mean	0.025	0.010
Standard Deviation	0.068	0.036
Correlation	0.560	0.398
1993.01-1997.08		
Mean	0.028	0.025
Standard Deviation	0.155	0.035
Correlation	0.794	0.746
1997.09-2006.12		
Mean	0.015	0.005
Standard Deviation	0.110	0.056
Correlation	0.871	0.824

Overall		
Mean	0.019	0.012
Standard Deviation	0.107	0.047
Correlation	0.512	0.759

### 4.3.3 Sub-period correlation

The key objective of this section is to analyze the performance of integration to change through time. The empirical evidence provided by Bekaert and Harvey (1995) generally indicates that the degree to which many countries are integrated into world capital markets has changed over time but world capital markets do not always become more integrated. We examine the correlation between the most augmented portfolios and foreign market indices over nonoverlapping sub-periods to illustrate the degree of integration.

First, the lengths of sub-periods should be decided. The sample period is not equally divided. We select some dates suggested by previous works as separation point. Our data sample is from January 1976 to December 2006. We divide the entire sample period into four sub-periods: the first is from January 1976 to November 1987, and then we test the influence of 1987 crisis in the post crash period from December 1987 to December 1992. The separate point is suggested in Bekaert and Harvey (1995). The left period is divided into two sub-periods around March 1997. The former is from January 1993 to August 1997 and the latter from September 1997 to June 2002. August 1997 is chosen as the separation point because it is the beginning of Asian Crisis and close to the ending month used by Bekaert, Harvey and Viskanta (1998).

In Table 6, we have the mean, volatility and correlations of Chinese and Dutch returns for the thirty one year sample period and for the four nonoverlapping sub-periods of these thirty one years. As we observe, the correlations always have changed somewhat and show consecutive increasing in sub-periods over time. However, in EHH,

there are some notable exceptions with a drop correlation for some DMs in December 1981 to November 1987, but only one developed country in our sample does not provide sufficient information to indicate a bias against their result. Another interesting notice is that in the period of January 1993 - August 1997, many countries experiences significant liberalization, the integration increasing far outperformed other sub-periods.

## **5. Conclusion and Recommendations**

### **5.1 Conclusion**

In this case, we study the expansion of domestic investment in real estate market to the international market in US and Hong Kong for an insurance company. The available data sets do not provide strong support to this strategy. Possible explanations are the limitation of the diversification and high correlation among the three real estate markets. We suggest including the emerging market in its portfolio. In addition, we investigate the stability of the international portfolio frontier in the three markets using sub-periods data. We find portfolio frontiers shift dramatically in different period. This increases the difficulty in portfolio decision. In all, we suggest to provide guides to portfolio decision by using the latest data sets and considering future market development and exchange rate risk.

### **5.2 Recommendations**

In most investment activities, profit and risk are two things which are always dependent with each other. Profit takes risk as a cost, and risk will be compensated by profit (Mehrling, Perry, 2005: 36). So the basic relation between profit and risk is that profit and risk are corresponding with each other. Anticipated returns ratio = non-risk interest rate + compensation for risk. That is to say, the investment item with a high risk requests a high return ratio; Otherwise, the investment item with a low risk requests a low return ratio. But, it can not be regarded that the higher the risk is, the more the profit will be.

Many economists have told us through a good risk controlling the Unsystematic Risk can be disputed or reduced at a same level of profits.

As the investment diversification can provide the investors many benefits, we recommend some ways of investment diversification as follows (Stone, Bernell K.,1970: 165):

First, we may carry on the investment on the different type of asset which mainly includes the stock, the bond and the investment in the money market or a portfolio of these. The proportion of the different type's asset occupying in the investment portfolio needs to act according to the conditions of the different investors.

Next, we may carry on the investment portfolio inside the same type asset but in different fields. The different professions have the different performance to the different period in the economic cycle and their stock price will also have the corresponding change. E.g., financial service industry usually develops rapidly in the initial period of the economic cycle's recovery stage so the trade stock usually displays a good performance at this time while the stock with mining industry usually grows quickly in the end period of the economic cycle's recovery stage.

Third, the trades may carry on the investment in different companies but in the same field because even in the same industry, not everybody does the same thing. Sometimes this company will have good performance and sometimes that company develops quickly in the same period.

Fourth, risk may be dispersed through the global investment. An important advantage of global investment is that the trades may further enhance the yielding stability of our investment through dispersion investment of a global scale (Rubinstein, Mark, 2006: 39). For Trade of China, If it only invest in China, even if it buy all the stocks in Shanghai and Shenzhen stock market, the trade must face the systematic risk in Chinese Stock market. This systematic risk had no way to avoid through the domestic dispersion investment. But it may be reduced through the dispersion investment of a global scale. Therefore it can be found that China has started QDII gradually, later Trade of China will also have more and more opportunities to disperse the investment risks in the global scale.

Fifth, the trades may carry on the dispersion in the different investment management styles. There are two kinds of relative investment management styles. One is called

initiative style, the other is passive style. The goal of initiative management is to obtain the repayment which surpasses a specific index or the standard repayment through the choice on the stock and on the investment time. But the passive investment does not expect the repayment surpassing the market repayment through the positive investment portfolio management. Two kinds of typical passive investment strategies are the index investment and long-term holding after purchase.

It is not easy to take on an appropriate dispersion investment but an appropriate dispersion investment to our long-term investment income is very important. Many researches indicated that 80-90% long-term investment income of an investment is determined by the type of the investment portfolio (Stone, Bernell K.,1970: 79)

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