International Comparison of Stock Price Performance

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ABSTRACT

The purpose of this paper is to empirically investigate the international differences of performance of stock prices among markets. We utilize 4,916 company stock prices from twenty-two developed countries and fifteen developing countries and evaluate relative magnitude of performances of stock price among different developmental stages, various areas, and nations by using non-parametric Mann-Whitney tests. The results suggest the stock prices in emerging markets performed comparatively worse than the ones in developed countries. Our empirical findings also support the geographical variation of stock price performance. Specifically, the equity securities in North America, West, Central and North Europe outperform the rest of the world and stocks in East Asia perform worse. Although there are some exceptional results in the country-level tests, the relative size of stock price risks of most countries are similar to the ones of their developmental stage as well as the region. In addition, the analysis of time-series of relative risk-adjusted performance suggests the gaps among different groups tended to steadily diminish. This finding can be viewed as evidence of an enhancement of integration of international financial markets suggested by Bekaert and Harvey (2003).

Key Words: International Equity Price, Risk-adjusted Performance, Conditional Volatility, Global Beta.

JEL Classification: F21, F30, G11, G15.

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I Introduction

The purpose of this paper is to empirically examine the international differences of

performance of stock prices among markets. Specifically, the follow two questions will

be answered: How do stock price performance among different developmental stages,

geographic regions, and nations differ from each other? Whether the difference of

performance show specific time-series trend? To avoid the empirical problems caused by

the utilization of aggregate market indices and to make the finding more practicable to

investors, the current paper utilizes the data of individual stock prices from twenty-two

developed countries and fifteen developing countries. The result of comparison of

international stock price performance will not only facilitate decision regarding the asset

allocation, but also gain more understanding of integration of international financial

market via its time-series analysis.

Previous papers indicate distinct cross-country differences of market premium,

volatility, and correlation[1]. However, most of empirical examinations are by market

indices but seldom by the firm-level data. Suggested by Carrieri, Errunza and Sarkissian

(2004), empirical tests by utilizing national indices might generate problematic

conclusions since the same market information causes the different impacts to the values

of asset.   The aggregate market index may include opposite movements of stock prices.

The market indexes can be a proxy for analyzing overall market situation but cannot be

used to characterize the industries and firms between country and country appropriately.

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[1] Bekaert and Harvey (2003) and Beck, Demirgüç-Kunt, and Levine (2003) provide a complete lecture
review on the differences caused by geographic locations, developmental stages, legal traditions, and
natural endowments.

Another weakness using market-level data to employ empirical test is infeasibility of application by practitioners since national indices are not necessarily tradable. The first index funds were opened in the U.S. in 1971 and gradually spread to the other international markets. However, Frino and Gallagher (2001) and Jorion (2003) suggest the empirical result using indices are not completely applicable to index funds due to the existence of transaction fees and management costs. On the other hand, since stock performance is observable, investors can easily apply the finding of this paper and do not need to synthesize national funds.

Most previous empirical study on the characteristics of international asset pricing by using firm-level data focus on stocks in mature economies but it is not common to use data of equities in both emerging markets and developed countries. The papers involving markets of both developed and developing countries use indices but seldom employ data of individual stock price. The current research evaluating relative performances of equity securities in the groups of different developmental stages and geographical regions will make up this gap and enhance our understanding regarding the international difference of pricing kernels.

The cross-country disparity of performance of equity investment also associates with integration of global market. In segmented market, the risk premium is determined by the local market portfolio but not international pricing factor. The rewards of investment in individual country differ from each other due to the international variation of pricing kernel. Recent studies using international market-level data, such as Beck, Demirguc-Kunt, and Levin (2003) and La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) Rajan and Zingales (2003) show that the legal atmosphere, natural resources,

corporate environment, and business cycle cast different impacts to asset value in various countries. In addition, although emerging markets generated higher average return than the developed countries, Bekaert and Harvey (2000), De Santis and Gerard (1997), and Henry (2000) suggest the exceeding yield gradually decreased.

To remedy the violation of normality assumption, the U.S.-Dollar based stock price returns are assumed to follow GARCH (1,1) process and the international comparison of stock price performance is calculated by the Mann-Whitney test. On the whole, the stocks in developed countries, no matter being evaluated by raw U.S.-Dollar return or by risk-adjusted returns, such as Sharpe index and Treynor index, demonstrated better performance than emerging markets. There are two explanations regarding the phenomenon. First, our sample period in this study includes financial turmoil in emerging markets. Second, suggested by Bekaert and Harvey (2003), the enhancement of international integration of global financial market lowers the excess return of stocks in emerging markets.

The rest of this paper proceeds as follows. Section 2 describes the sources and summary statistics of the data of international stock prices. The overview of market performance is reported in Section 3. Section 4 presents the Mann-Whitney statistics as well as calculation of Sharpe index and Treynor index. The empirical finding of international comparison of performance of stock prices among different groups is reported in Section 5. In Section 6, we discuss some relevant issues and conclude.

II Data

The stock prices data of 4,916 companies that traded over 22 developed countries and 15 developing countries, which consist of 74 equity markets, during the period January 1992 to June 2003, are generated from the Global Issue of Compustat. To equate the basis of international comparison of performance and risk, the stock price return is then converted as the U.S. Dollar-denominated. The compounding monthly yield of each stock is:

$$r_{i,j,t} = \ln[(P_{i,j,t} \times e_{i,t})/(P_{i,j,t-1} \times e_{i,t-1})], \qquad (1)$$

where $P_{i,j,t}$ is the dividend-and-split-adjusted stock price of i company in j country at the end of month t and $e_{i,t}$ is the exchange rate of i local currency and the U.S. dollar at time t. The values of trading volume and market capitalization are obtained from the dataset provided by the World Federation of Exchanges. The Financial Times Actuaries World Index and the yield of thirty-year U.S. treasure bond are used to be the proxies of global market portfolio and riskless asset return, respectively. The data of exchange rate, FT Actuaries index and the local indices are obtained from the Global Financial Data.

Table 1 lists the countries, the number of sample companies, the exchange market, and the weights of trading value and capitalization in global market of each country. The distribution of sample companies is proportional to the scattering of whole data set of Global Issue, as well as the relative magnitude of trading value and global market capitalization.[2] The countries with the largest numbers of stocks in our sample are Japan (1,469) and the U.S. (1,103), which together are more than half of all sample stocks. The distribution of sample companies more or less agrees with the weights of

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[2] There are 19,524 stocks in the 37 sample countries in the dataset of Global Issue in June 2003. The numbers of stocks in the developed countries and emerging markets are 17,440 and 2,084, respectively.

trading volume and market capitalization. Our sample also includes 1,037 stocks traded

in European countries and mainly is from the major industrial countries in Europe

(France (112), Germany (142), Italy (112) and the United Kingdom (383)). The number

of sample stocks in the fifteen developing countries is smaller that of developed

countries. More than three-fourth of these 621 emerging-market stocks are from seven

East Asian emerging markets.

{Table 1}

The categorization of countries of different developmental stages and

geographical areas are presented in Table 2. Most of the sample countries and stocks are

from four major world economic crusts: East Asia, Europe, Latin America and North

America. Among them, East Asia and Europe contain more countries and tend to be

more culturally and politically heterogeneous within groups[3]. These two areas then are

split into two sub-groups (Southeast Asia and Northeast Asia) and three sub-groups

(South Europe, Central/West Europe, and North Europe), respectively. The more

detailed division of areas helps to analyze the geographical difference on stock price

returns thoroughly. Panel A demonstrates the groups of developed countries and

emerging markets and Panel B displays the countries of each of geographic areas. The

developed countries represent the territory of 87% sample stocks and 91% of world

equity market capitalization. In the Panel B, the market values of North American stock

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[3] The legal tradition, cultural background, religion, and language in North America are more homogeneous
than the rest of the world due to the economic integration of Canada and the USA. Beck, Demirgüç-Kunt,
and Levine (2003) and Stulz. and Williamson (2003) suggest the above social and political diversifications
within the same area may be able to explain the variation of the development of financial markets.

markets, mainly dominated by the U.S. equity markets, represent more than half of global market value. The equity markets value of European countries, primarily made up by Central/West European markets, is the second largest among all areas. Although the percentage of market value in East Asia is relatively small, the stocks represent more than 40% of whole sample since the corporation size in East Asia, on average, is smaller than the one in Europe and North America.

{Table 2}

III Overview of Equity Markets

The summary of U.S.-Dollar return of market indices in Table 3 provides a highlight to equity market of each country[4]. During the sample period, the annualized U.S.-Dollar-denominated returns in two developed countries, Australia and Japan, and in eight emerging markets, India, Indonesia, Korea, Malaysia, Philippians, South Africa, Taiwan, Thailand, and Turkey, were negative. There are two reasons to explain the phenomenon. First, the enhancement of integration of global financial market drives the excess return in international financial market decrease. Using the IFC data, Bekaerk and Harvey (2000, 2003) and Henry (2000) find stock price performance in emerging markets declined after global financial market gets more integrated. Second, our sample period also contains a number of financial crises. The well known instances during this period include "Tequila Crisis (in 1994)," "Asian Flu (in 1997)," and "Russian Virus (in 1998)."

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[4] Previous researches by Harvey (1991) and Harvey, Solnik, and Zhou (2002) suggest the MSCI national index is of high correlation coefficient with local market in developed countries. However, it does not necessarily apply to developing countries because of the selection criteria of the MSCI. Furthermore, the MSCI local indices eliminate investment companies and foreign domiciled companies, which are included in the data set of Global Issue.

The financial turmoil tends to instigate a greater value loss of capital assets in developing countries due to the vulnerability of their financial markets.

{Table 3}

Similar to previous researches, stock returns of most market indices are not Gaussian. According to coefficients of skewness, kurtosis and Jarque-Bera statistics, the distribution of stock market return in most countries demonstrate leptokurtic property and volatility clustering. The statistics of Augmented Dickey-Fuller (ADF) test of all countries indicate the rejection of unit-root null hypothesis and conclude the stationary of all time-series.

The equity markets in less developed countries are more volatile than rich countries. Like the result of former study, the standard deviations of annualized market return in developing countries are greater than the ones in developed countries. We also present global beta of individual country i following the international capital asset pricing mode (I-CAPM) suggested by Solnik (1974). The relationship of global beta between emerging markets and developed countries are not as straightforward as the one of stock price volatility because correlation of individual stock market with world market also influences the global beta. The global betas in the group of mature economies are from 0.85 to 1.49 while among emerging markets are from 0.49 to 2.03. The global market systematic risk in emerging markets, in general, is greater than the one in developed countries.

The stock markets in developed countries, overall, are more associated with the movement of world market than the ones in emerging markets[5]. The average and median of coefficients of correlation of developed countries is 0.64 and 0.65, respectively, while developing countries are 0.43 and 0.41, correspondingly. The lower coefficients of correlation between emerging markets and world market indicate the developed countries are more globally integrated.

IV Methodologies

4.1 Mann-Whitney Test

One of difficulty in empirical testing international asset performance and risk is the dearth of prior information regarding parameters over each country. The non-parametric Mann-Whitney test allows simultaneous examination of the magnitude of gap and its statistical significance without prior assumption of Gaussian distribution of parameters. The null hypothesis is

H₀ : the risk of stock prices in the tested group are not different from the risk of stock

prices in the rest of the world.

The tested groups are listed in the first row of each panel. The asymptotically Gaussian distributed statistics are

$$z_{EM} = \frac{(TR - \mu_{TR}) \pm 0.5}{\sigma_{TR}}, \qquad \begin{array}{l} \text{when } TR > \mu_{TR}, \text{ then } -0.5, \\ \text{when } TR < \mu_{TR}, \text{ then } +0.5, \end{array} \qquad (2)$$

where TR is the sum of the ranks of U.S. Dollar-based stock returns of the analyzed group; μ_{TR} is the expected value of the sum of the ranks under the hypothesis:

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[5]   Australia, Austria, and Belgium are the exceptions in the group of developed countries since their global coefficients of correlation and global betas are extraordinarily lower than the other developed countries. One may find a similar phenomenon in the analysis of individual stock price.

$$\mu_{TR} = \frac{n_T(n_T + n_N + 1)}{2},$$ (3)

where n_T and n_N are numbers of stocks in the tested group and stocks in the rest of the world, respectively. The standard deviation of this asymptotic normal distribution is

$$\sigma_{TR} = \sqrt{\frac{n_1 n_2 (n_1 + n_2 + 1)}{12}}.$$ (4)

The results of the Mann-Whitney test not only indicate the magnitude of the gap of the parameter among the groups but also provide the statistical significance of this difference. A Mann-Whitney statistic less than -1.96 denotes the equity prices in the examined group are, generally, less risky than the stocks in the rest of the world. On the other hand, a Mann-Whitney statistics greater than 1.96 indicates the stock prices in the tested group are, in general, more volatile than the equities in the rest of the world.

4.2 Risk-Adjusted Performance

The current paper presents the international comparison of raw return, Sharpe index, and Treynor index of individual stock price return. The comprehension of gap of stock risk-adjusted return among countries facilitates investors making decision on global portfolio allocation. In addition, the variation of relative volume of unit market price of risk can be used to identify the integration of international financial market. The benefit from international diversification decreases if risky assets are compensated by the same pricing kernel and the gap of the unit-risk performance among countries shrinks.

The excess return of stock price return and its conditional volatility are utilized to compute Sharpe index. The generalized autoregressive conditional heterosedasticity, GARCH, model is use to calculate variance of stock price return. To adjust for issues of

leptokurtosis and volatility clustering, the GARCH (1,1) model introduced by Bollerslev (1986) is applied to characterize the process of stock price returns. The volatility and innovations of error of stock price return is defined as:

$$r_{i,j,t} = \mu_{i,j} + \varepsilon_{i,j,t},$$

$$\varepsilon_{i,j,t}\big|I_{t-1} \sim GED(0, \sigma^2_{i,j,t}),$$

$$\sigma^2_{i,j,t} = \varpi_{i,j} + \upsilon\varepsilon^2_{i,j,t-1} + \varsigma\sigma^2_{i,j,t-1}, \tag{5}$$

where I_t is the set of information available at the beginning of time t with the conditional density function modeled as a Generalized Error Distribution (*GED*); $\sigma_{i,j,t}$ is the conditional standard error of asset i, and ε is white noise. Our algorithm used to generate the optimal solution is the methodology suggested by Berndt, Hall, Hall, and Hausman (BHHH) for maximum likelihood problems. The Sharpe index (SI), specifically, is:

$$SI_{i,j,t} = \frac{r_{i,j,t} - r_{f,t}}{\sigma_{i,j,t}}, \tag{6}$$

where $r_{i,j,t}$ is monthly logarithmic U.S. dollar based return of stock j in country i at time t, and $r_{f,t}$ is the yield of thirty-year U.S. treasure bond.

International investors also may concern investment reward per unit global systematic risk. The global beta Treynor index is defined as the unconditional covariance between U.S. dollar based yields of a stock with the return of the global portfolio divided by the variance of return of the world market portfolio. Specifically, the global Treynor index is:

$$TI = \frac{r_{i,j,t} - r_{f,t}}{b_{i,j,t}}, \tag{7}$$

where $r_{i,j,t}$ is five-year moving average monthly return of stock j in country i at time t,

$b_{i,j,t}$ is the global systematic risk of asset j by using previous sixty monthly U.S.-dollar

returns. The global beta of any asset j in market i is $b_{i,j} = \sigma_{i,j,W} / \sigma_W^2$, where $\sigma_{i,j,W}$ is the

covariance of the U.S. Dollar-based return with global market portfolio and σ_W^2 is the

variance of the global market portfolio. The global beta of each asset is generated by the

monthly data of the previous five years.

V Individual Stock Price Performance

The stock price performance plays a critical role on investment decision of international

portfolio. A rational international investor will focus on both raw yield of stocks and

risk-adjusted performance such as the Sharpe Index and Treynor Index. Previous study

by Harvey (1995) and Bekaert and Harvey (2003) report that the returns and volatilities

in emerging markets are high while their correlations with international market are lower

than the developed economy. This fact implies the pricing risk factor used to determine

equilibrium equity prices might vary from country to country. Karolyi and Stulz (2003)

propose the pricing risk of financial asset in a market that is less integrated with the

global market is the domestic market systematic risk. The pricing error by the domestic

asset pricing model is negatively associated with the correlation between the domestic

market and global market. The international comparisons of risk-adjusted performance

of individual stock prices and their distribution will be presented in this section. To

facilitate understanding whether the chronological variation, the proportions of sample

months that the stocks in developing countries significantly outperform the ones in

developed countries (>1.96) and significantly perform worse than the ones in developed

countries (<-1.96) are listed.

5.1 Stock Price Returns

The summary of the time-series of Man-Whitney (M-W) statistics of the U.S.

Dollar-denominated stock returns over the different developmental stages, regions, and

countries are presented in Table 4. The statistics in Panel A show that stocks in emerging

markets, in general, performed worse than the stocks in developed countries during the

sample period. One may find the ratios of months that stocks in developing countries

become winners and losers do not substantially differ. In Figure 1 the sequential

variation of M-W statistics indicate the existence of random pattern of relative

winner/loser of stocks between developed countries and developing countries. This

graph also reflects the time-series of relative performance in the global financial market

from 1992 to 2003. One may find, for instance, that in the periods from early 1994 to

late 1995 and from 1997 to 1998, the emerging economies kept two long continuous

negative M-W values.

The statistics in Panel A of Table 4 suggest that the variation of stock returns

among continents is statistically significant. The stock prices in East Asia, Central/West

Europe, and South Europe generated lower return than the stocks of other areas. On the

other hand, the stocks in North America and North Europe tend to outperform the rest of

the world significantly. The M-W statistics of Latin America indicates the stock

performance in this area is not significantly better or worse, statistically, than the rest of

the world. The performance of stock prices between developed countries and emerging

economies is distinguishing, as well as the regional diversity and variety among the region is transparent.

One may gain more understanding about the distribution of Mann-Whitney statistics of each area by observing the time-variations from Figure 2 to 10. It is noticeable that the tendency for all areas to be significant "winner" or "loser" during a certain period. Like what is indicated by the M-W values of the whole period and their means, the time-series of relative magnitude of stock price return significantly greater (less) than the rest of world for each region is random. Although the winner/loser probability of each area varies, the M-W statistics demonstrate permanence of statistical significance tend to be mean-reverse in the long run of all areas. The winner in the previous period likely becomes the loser in the next period. This finding supports the profitability of contrarian trading strategy suggested by Balvers, Wu, and Gilliland (2000) in international equity markets.

One also can find the occurrence of disturbance in global financial markets in certain regions. The clusterings of consistently better performance in Central/West Europe and North America and worse performance in East Asia and Latin America during certain periods corresponds to the financial turmoil in developing countries. From mid 1997 to early 1998, stocks in East Asia performed significantly worse than the rest of the world due to the Asian financial crisis. In this period equity markets in Europe and North America relatively generated higher yield and became international hedging paradises. This condition inverted since the "Russian Flu" in 1998 cast more substantial impact to financial markets in European countries and United States, and East Asian stocks tend to be less influenced negatively. In general, North America and Europe are of

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higher proportions of better performance than the rest of the world, while East Asia has the largest percentage of worse performance than the other areas.

We further investigate the cross-country difference of stock performance and report the results in Panel B and C of Table 4. The values of M-W statistics of the whole period represent the practicability to generate profit by engaging buy-and-hold strategy among countries. The relative profitability of stocks in the same groups of developmental stages and geographic areas are not essentially similar. The stocks in two developing countries, Brazil and Greece, outperformed the rest of the world although generally the stocks in emerging markets tended to generate lower return. On the other hand, stocks in some developed countries, Austria, Belgium, Finland, France, Germany, Japan, Luxemburg, the Netherlands, and Spain, significantly performed worse than the rest of the world. It is worthy noticing that all of them except Japan and Finland are from Central/West Europe.

The outcomes of M-W tests allow us more closely examine the stock price performance of individual country. The stocks in the United States, the United Kingdom, and Canada during this period, generally, were of highest profitability among all markets. On the other hand, the greatest minus M-W value, Japan, reflects its sloppy economic growth and the depreciation of Japanese Yen in the past decade. There are two regions of numerous countries with significantly negative values: Central/West Europe (i.e., Austria, Belgium, France, Germany, Luxemburg, The Netherlands, and Spain) and East Asia (Indonesia, Malaysia, Philippines, Taiwan, and Thailand). One explanation is the U.S. Dollar appreciated against most currencies in the world. Moreover, economic growth in Europe was sluggish in the 1990's and some Eastern Asian countries suffered

from the financial crisis from 1997 and lasted three to four years. To avoid political and economic exposures, international investors tend to allocate portfolios in the countries of relative stable capital markets so that the global capital flows trigger the variation of relative performance among countries.

One will find the tendency of mean-reversion of relative performance in international stock market. Observing the figures of time-series of M-W statistics of each group of developmental stage, area, and country, there is no market in which its stocks keep apparently performing better or worse than the rest of the world in more than one year. Conversely, a series of significantly better raw stock returns follows an opposite change in global relative stock performance. The magnitude of upbeat of an M-W value, generally speaking, is similar to the amount of downbeat of its international comparative performance which happened later, and *vice versa*. .

5.2 Sharpe Index

The summary of statistics of time-series of Mann-Whitney test of the U.S. Dollar-based Sharpe index over the different developmental stages, regions, and countries are presented in Table 5. Taking into account volatility of equity price return, the stocks in emerging markets performed significantly worse than the stocks in developed countries. The distinctions of unit-risk yield of stocks among continents are considerable. The statistics of the whole period indicate that the Sharpe ratios of stocks in Eastern Asian nations, in general, were below the level of the world and the unit-risk return of stocks in Latin America, North America and North Europe were significantly better than the other regions. These results implies investors will make profit by implementing short-sale

position of the stocks of areas with significant negative M-W statistics and longing position of the stocks with significant positive M-W statistics. The variation of total-risk-adjusted performance of stocks caused by the developmental stages and geographic regions are obvious.

Figure 11 presents the time-series of M-W statistics on the test of U.S. Dollar-based Sharpe ratios between the developed countries and emerging markets. Similar to raw return, there is no constant drift with time-varying volatility on the relationship on risk-adjusted performance between emerging markets and developed countries. In the period from mid 1997 to mid 1998, the volatility-adjusted returns of stocks in the emerging economies were relatively lower than the ones in developed countries and this circumstance reversed after the recovery of stock prices and currencies in some of emerging economies after mid 1998.

In Table 5, one can find the existence of the high frequencies of statistically significant M-W values. Similar to the results of the international tests on raw U.S. Dollar-based return, the percentages of the M-W values significantly greater than upper critical level and significantly less than the button critical level varies from region to region. Particularly, North America and Central/West Europe and North Europe are of higher proportions of better total risk adjusted performance than the rest of the world, while East Asia has the biggest percentage of worse performance than the other areas.

The graphs from Figure 12 to 20 demonstrate the monthly M-W statistics of Sharpe ratio in different regions. The relative winner/loser tests show the permanence of statistically significant M-W statistics in certain areas and suggest the mean-reversion of M-W statistics in the long term. From mid 1996 to mid 1998, stocks in East Asia

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continuously performed significantly worse than the rest of the world due to the economic recession in Japan and Asian financial turmoil. Equity securities in Europe and North America then relatively were more mean-variance efficient. On the other hand, the Sharpe ratios of stocks in North America were lower than the other areas from mid 2001 to mid 2002.

The results of tests of individual country are demonstrated in Panel B and C of Table 5. The relative variance-adjusted performance of stocks in the group of different developmental stages is diverse. Specifically, the whole period Sharpe ratios of stocks in developing countries are not significant higher than the ones in developed countries even though the raw returns of some of stocks in developing countries were higher than the ones in developed countries. The stock prices in developing countries are so volatile that the variance-adjusted performances are lower than the ones in developed economies even though the raw returns of stock prices in some developing countries are relatively high.

One may find the relative mean-variance efficiency of stock price in each country is not completely consistent with the result of the developmental stage and area. The test on the mean of monthly Sharpe ratio indicates that stocks eight developed countries, Belgium, Finland, France, Germany, Japan, Luxemburg, the Netherlands, and Spain, were significantly worse mean-variance efficient than the rest of the world. Stock prices in seven among all developed countries, Australia, Canada, Denmark, Ireland, Sweden, United Kingdoms, and United States, outperformed the rest of the world. On the other hand, stock prices in four emerging markets, India, Indonesia, Taiwan, and Thailand, have significantly lower Sharpe ratio.

We then turn to the extent of the differentiation from the tested group to the rest of the world. Similar to the result of international comparison on raw return, the stocks in the United States, the United Kingdoms, and Canada represent the group of stocks of the best variance-adjusted performance. On the other hand, Japanese stocks were of the least mean-variance efficiency in this period. In addition, the stocks in the countries of Central/West Europe that relatively performed worse in terms of raw return, such as Austria, Belgium, France, Germany, Luxemburg, the Netherlands, and Spain, also be less mean-variance than the other countries.

5.3 Treynor Index

In Table 6, the summary of Mann-Whitney (M-W) statistics of the U.S. Dollar-denominated Treynor index over the different developmental stages, regions, and countries are demonstrated. In Panel A, one can find the beta-adjusted returns of the stocks in emerging markets were significantly worse than the stocks in developed countries, which is similar to the result of the tests on raw return and Sharpe Index. Figure 21 presents the historical change of M-W statistics on the test of Treynor index of stock prices between the developed countries and emerging markets. Unlike the patterns shown in raw return and Sharpe ratios, the emerging markets' bad relative Treynor index is substantial in the most of sample period except in the first half of 1997 and from late 2002 to 2003.

The distinctions of unit yield per global systematic risk of stocks among continents are considerable. The statistics of the whole period, which is the result of buy-

and-hold strategy, indicate that the Treynor ratios of stocks in East Asia and Europe, in general, were below the level of the world. According to unit-global-beta performance, stocks in North American countries significantly outperformed. The variation of beta-adjusted performance of stocks caused by the developmental stages and geographic regions are significant. Particularly, North America and North Europe are the areas of greater proportions of periods with relatively high Treynor ratios than the rest of the world, whereas East Asia had the biggest percentage of comparatively low performance than the other areas. The discrepancies of Treynor index in Latin America, Central/West Europe and south Europe did not consistently perform worse or better than the rest of the world.

The graphs from Figure 22 to 30 demonstrate the monthly M-W statistics of beta-adjusted yield in different regions. The stocks in East Asia, especially Northeast Asia, where is dominated by Japanese equity markets, tend to be substantially less efficient than the other areas in the most of the sample period. On the other hand, North American stocks are the most profitable measured by Treynor ratio in the most of the period. However, the gap of Treynor index between East Asia and in North America was decreasing due to their opposite change directions. The global systematic risk efficiency of European equity securities was mixed. The stocks in South Europe performed better beta-efficiency than the world average after mid 1997, while the Treynor ratios of Central/West European and North European stocks were diminishing and were below the world average after 2000. The stocks in Latin America did not show any obvious trend and performance relativity in terms of global beta-adjusted yield.

The results of tests on individual country are demonstrated in Panel B and C of Table 6. The relative global beta-adjusted performance of stocks in group of different developmental stages was essentially diverse. Similar to the results of Sharpe index, the whole period Treynor index, which represents the performance of buy-and-hold strategy in the sample period, of stocks in emerging economies are not significantly higher than the world average level. The test on the cumulative mean of monthly Treynor index indicates that stocks in four emerging markets (India, Indonesia, Taiwan, and Thailand) and eight developed countries (Belgium, Finland, France, Germany, Japan, Luxemburg, the Netherlands, and Spain) were below the global security market line than the rest of the world. On the other hand, seven developed countries, Australia, Canada, New Zealand, Singapore, Sweden, United Kingdoms, and United States, outperformed the rest of the world. In general, the stocks in mature economies are more likely global beta efficient than the ones in developing countries.

The conclusion of comparison of performance of equity securities among those countries does not significantly differ by using different indices. Since the correlations between the stocks in emerging markets and global market were lower than the ones in mature economies, the level of significance of deviation between developing countries and developed countries is smaller than by utilizing standard error adjusted performance.

The comparison of systematic risk adjusted return among the countries is similar to the international assessment to the standard error adjusted return and crude U.S dollar return. The stocks in the United States, the United Kingdoms, and Canada represent the group of stocks with the highest Treynor index, while Japanese stocks were of the least

beta-adjusted efficiency in this period. In addition, the stocks in the countries of

Central/West Europe that relatively performed less mean-variance efficient, such as

Belgium, France, Germany, Luxemburg, the Netherlands, and Spain, also were of less

Treynor index than the other countries.

VI Conclusion and Discussion

In this paper, we provide the empirical evidence of cross-national difference of

performance of stock prices by utilizing both firm-level data. The analysis of relative

return among 4,916 individual company stock prices from 37 countries is presented. To

avoid the common problem of violation of Gaussian assumption, non-parametric Mann-

Whitney test is used. We also apply GARCH(1,1) model to characterize stock return

process and to calculate the conditional volatility. To investigate the mean-variance

efficiency and integration of international financial market, the current paper also

examines the significance of international variation of indices of risk-adjusted

performance.

The cross-national comparison of return, Sharpe index and Treynor index

suggests the stocks in developed countries outperformed the equities in emerging markets

during the sample period. The relatively bad stock price performance in developing

countries may be caused by lower liquidity and poorer protection of property right in

emerging markets. On the other hand, the differences of unit-risk yield between the

group of developing countries and developed countries gradually minimized. The

shrinkage of stock return in emerging market and the decline of disparity of pricing

kernel are consistent with the finding of Baekert and Harvey (2003) regarding the integration of global financial markets.

The comparison of stock price performance of individual country provides a closer look on the investment strategy. Specifically, the M-W statistics of raw return, Sharpe index, and Treynor index suggest the performance of stocks in the U.S., U.K., Canada, Sweden, Australia, Denmark, and New Zealand were better than the ones in the rest of the world. The conclusion of individual country is similar to the result of the test on group of nations that none of developing countries demonstrates better performance.

Our research is confined by the length of period of stock price data. The stock prices data in the Global Issue of COMPUSTAT is available after 1992, in which the period of high growth of financial market in developing countries is expelled. Furthermore, the sample period incorporate the period of market crashes in developing countries. We claim that the focus of the current paper is to investigate the international difference of equity performance but not to compare the changes of their time-series. Future study should take into account the dynamics of relative stock performance so that the robustness of M-W test can be enhanced.

The classification of countries for the international comparison can be extended and refined. The possible scopes can be the legal tradition suggested by Beck, Demirgüç-Kunt, and Levine (2003), the cultural and religious background proposed by Stulz and Williamson (2003), and the financing sources of enterprises put forward by Rajan and Zingales (1998). The result of the analysis of the above categorizations will provide global fund managers information on capital allocation. In addition, the future research should take the interrelation of classification into account. For instance, most European

and all North American countries in this study are categorized as the developed countries while all Latin American and most East Asian countries are classified as emerging markets. The more detailed analysis of individual country might help us distinguish the interrelationship among different classification.

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Table 1 The Distribution of Sample Stocks in Each Country

The distribution of number of stocks in each sample country, exchange market, currency, and weight of market value over the world value are presented. The weights of trading value and capitalization are calculated by the data provided by the World Federation of Exchanges as of the end of 2002.

Country	Number of Companies	Market (Number)	Currency	Weight of Capitalization	**Local Market Index**
ARGENTINA	15	Buenos Aires (1)	Argentina Peso	0.07%	Buenos Aires SE General Index (IVBNG)
AUSTRALIA	119	Australian Stock Exchange National Market, Brisbane, Hobart, Melbourne, Perth, Sydney (6)	Australia Dollar *	1.67%	Australia ASX All-Ordinaries
AUSTRIA	40	Vienna (1)	Austria Schilling	0.15%	Composites - Austria Trading Index (ATX)
BELGIUM	24	Brussels (1)	Belgium Franc	0.11%	Belgium CBB Spot Price Index
BRAZIL	40	Rio de Janeiro, Sao Paulo (2)	Brazil Real	0.56%	Brazil Bolsa de Valores de Sao Paulo (Bovespa)
CANADA	200	Montreal, Toronto, Vancouver (3)	Canada Dollar	2.50%	Canada S&P/TSX 300 Composite Index
CHILE	26	Santiago (1)	Chile Peso	0.22%	Santiago SE Indice General de Precios de Acciones
DENMARK	22	Copenhagen (1)	Denmark Krona	0.34%	Copenhagen KAX All-Share Index
FINLAND	21	Helsinki (1)	Finland Markka	0.61%	Finland HEX All-Share Composite
FRANCE	112	Bordeaux, Lyon, Marseille, Paris (4)	France Franc	6.75%	France SBF-250 Index
GERMANY	142	Bremen, Dusseldorf, Frankfurt, Hamburg, Hanover, Munich (6)	Germany Deutschemark	3.01%	Germany Frankfuter Allgemeine Aktien Index
GREECE	11	Athens (1)	Greece Drachma	0.29%	Athens SE General Index
HONG KONG	117	Hong Kong (1)	Hong Kong Dollar	2.03%	Hong Kong Hang Seng Composite Index

Country	Number of Companies	Market (Number)	Currency	Weight of Capitalization	Local Market Index
INDIA	59	Bombay, Calcutta, Delhi (3)	India Rupee	1.07%	Mumbai (Bombay) SE Sensitive Index
INDONESIA	63	Jakarta (1)	Indonesia Rupiah	0.13%	Jakarta SE Composite Index
IRELAND	20	Irish (1)	Ireland Pound*	0.26%	Ireland ISEQ Overall Price Index
ITALY	112	Bologna, Florence, Genoa, Naples, Rome, Turin, Venice (7)	India Rupee	2.09%	Banca Commerciale Italiana General Index
JAPAN	1,469	Fukuoka, Hiroshima, Kyoto, Nagoya, Niigata, Osaka, Sapporo, Tokyo (8)	Italy Lira	9.08%	Japan Nikkei 225 Stock Average
KOREA	43	Souel (1)	Japan Yen	0.95%	Korea SE Stock Price Index (KOSPI)
LUXEMBOURG	8	Luxembourg (1)	Korea Won	0.11%	Luxembourg SE LUXX Index
MEXICO	11	Mexico City (1)	Luxembourg Franc	0.46%	Mexico SE Indice de Precios y Cotizaciones (IPC)
MALAYSIA	142	Kuala Lumpur (1)	Mexico New Peso	0.54%	Malaysia KLSE Composite
NEW ZEALAND	20	Auckland (1)	Malaysia Ringgit	0.10%	Mumbai (Bombay) SE Sensitive Index
NORWAY	30	Oslo (1)	New Zealand Dollar	0.30%	Oslo SE All-Share Index
NETHERLANDS	82	Amsterdam-AEX Aptiebeurs (1)	Norway Krone	0.35%	Netherlands All-Share Price Index
PHILIPPINES	11	Manila (1)	Netherlands Guilder	0.08%	Manila SE Composite Index
PORTUGAL	17	Lisbon (1)	Philippines Peso	0.02%	Portugal Banca Torres & Acores General Index
SINGAPORE	61	Singapore (1)	Portugal Escudo	0.45%	Singapore Straits-Times Index
SOUTH AFRICA	57	Seoul (1)	Singapore Dollar	0.51%	FTSE/JSE All-Share Index
SPAIN	56	Barcelona, Bilbao, Madrid, Valencia (4)	South Africa Rand	2.03%	Madrid SE General Index

Country	Number of Companies	Market (Number)	Currency	Weight of Capitalization	Local Market Index
SWEDEN	35	Stockholm (1)	Sweden Kronor	0.79%	Sweden Affarsvarlden General Index
SWITZERLAND	34	Zurich (1)	Switzerland Franc	2.40%	Switzerland Price Index
THAILAND	119	Bangkok (1)	Thailand Baht	0.20%	Thailand SET General Index
TAIWAN	77	Taipei (1)	New Taiwan Dollar	1.15%	Taiwan SE Capitalization Weighted Index
TURKEY	15	Istanbul (1)	Turkey Lira	0.15%	Istanbul SE IMKB-100 Price Index
UNITED KINGDOM	383	Granville, London (2)	UK British Pound *	7.90%	UK Financial Times-SE 100 Index
UNITED STATES	1,103	AMEX, NASDAQ, NYSE (3)	US Dollar	48.52%	S&P 501 Composite
Total	4,916			97.94%	World - FT-Actuaries World Index

Table 2 The Classifications of Countries

Panel A: Developmental Stages and Symbols

<u>Developed Countries</u> Australia (AUS), Austria (AUT), Belgium (BEL), Canada (CAN), Denmark (DNK), Finland (FIN), France (FRA), Germany (DUE), Hong Kong (HKG), Ireland (IRE), Italy (ITL), Japan (JPN), Luxembourg (LUX), New Zealand (NZL), Netherlands (NLD), Norway (NOR), Singapore (SGP), Spain (ESP), Sweden (SWE), Switzerland (CHE), UK (GBR), USA (USA)
<u>Emerging Markets</u> Argentina (ARG), Brazil (BRZ), Chile (CHL), Greece (GRC), India (IND), Indonesia (IDN), South Korea (KOR), Malaysia (MYS), Mexico (MEX), Philippines (PHL), Portugal (PRT), South Africa (ZAF), Taiwan (TWN), Thailand (THA), Turkey (TUR)

Panel B: Regions

Region	Number of Sample Stocks	Countries (Number)
East Asia *		
Southeast Asia	513	Hong Kong, Indonesia, Malaysia, Philippines, Singapore, Thailand (6)
Northeast Asia	1,706	Hong Kong, Japan, Korea, Taiwan (4)
Europe		
South Europe	211	Greece, Italy, Portugal, Spain, Turkey (5)
Central/West Europe	867	Austria, Belgium, Denmark, France, Germany, Ireland, Luxembourg, Netherlands, Switzerland, UK (10)
North Europe	86	Finland, Norway, Sweden (3)
Latin America	92	Argentina, Brazil, Chile, Mexico (4)
North America	1,303	Canada, USA (2)
Total	4,916	(37)

* Due to the geographic allocation, Hong Kong is classified in both groups of Southeast and Northeast Asia.

Table 3 The Statistical Summary of Markets

In this table, the annualized mean, standard deviation of return, skewness coefficient, kurtosis coefficient, the international systematic risk and correlation coefficient between local market and international index $\rho(R_d, R_W)$ are reported. To test the assumption of normality, the Jarque-Bera statistics of each index return series is demonstrated. The result of Augmented Dickey-Fuller (ADF) test indicates the stationarity of time-series of return.

Panel A: Developed Countries

Country Index	Mean	Std. Dev.	Skewness	Kurtosis	International beta	$\rho(R_d, R_W)$	Jarque-Bera	ADF Test
AUS	-0.002	0.438	-0.035	7.813	0.493	0.185	3.393	-1.122 **
AUT	0.018	0.193	-0.406	0.083	0.626	0.459	3.696	-1.077 **
BEL	0.050	0.212	-0.399	-0.079	0.719	0.481	3.633	-0.789 **
CAN	0.045	0.182	-1.037	3.882	0.959	0.744	102.079 **	-0.833 **
DNK	0.051	0.168	-0.334	0.055	0.729	0.615	2.496	-1.005 **
FIN	0.146	0.325	-0.143	1.087	1.491	0.654	6.216 *	-0.851 **
FRA	0.045	0.188	-0.427	0.967	1.039	0.783	8.585 *	-0.993 **
DUE	0.031	0.212	-0.408	2.805	1.093	0.730	44.120 **	-1.039 **
HKG	0.064	0.298	-0.027	1.964	1.272	0.608	19.538 **	-0.996 **
IRE	0.083	0.182	-0.565	1.387	0.879	0.687	16.669 **	-1.032 **
ITA	0.038	0.252	0.140	0.298	0.947	0.536	0.781	-1.134 **
JPN	-0.073	0.247	0.168	-0.204	1.129	0.646	0.956	-0.939 **
LUX	0.078	0.225	-0.679	3.288	0.869	0.551	66.069 **	-0.861 **
NLD	0.061	0.190	-1.004	2.414	1.068	0.794	52.280 **	-1.102 **
NZL	0.041	0.206	-0.481	0.500	0.867	0.600	6.259 *	-1.108 **
NOR	0.061	0.218	-0.816	2.707	0.993	0.646	52.463 **	-0.990 **
SPG	0.007	0.289	-0.009	1.818	1.239	0.606	16.679 **	-0.977 **
ESP	0.060	0.216	-0.105	0.525	1.056	0.692	1.464	-1.043 **
SWE	0.062	0.246	-0.249	0.274	0.895	0.714	1.658	-0.999 **
CHE	0.087	0.168	-0.598	1.181	0.783	0.659	14.826 **	-0.938 **
GBR	0.033	0.148	-0.241	-0.094	0.844	0.808	1.401	-1.005 **
USA	0.076	0.150	-0.722	0.977	0.942	0.888	16.251 **	-1.023 **

Panel B: Emerging Markets

Country Index	Mean	Std. Dev.	Skewness	Kurtosis	International beta	$\rho(R_d, R_W)$	Jarque-Bera	ADF Test
ARG	0.048	0.364	0.218	5.613	1.152	0.236	40.058 **	-0.913 **
BRZ	0.059	0.506	-0.699	1.442	2.033	0.569	21.248 **	-0.961 **
CHL	0.021	0.217	-0.045	1.615	0.491	0.321	13.111 *	-0.798 **
GRC	0.017	0.303	0.332	1.355	0.757	0.356	11.561 **	-0.944 **
IDN	-0.073	0.476	-0.500	2.648	1.224	0.367	41.507 **	-0.772 **
IND	-0.012	0.312	0.076	0.460	0.273	0.125	1.040	-0.952 **
KOR	-0.041	0.430	0.161	3.330	1.314	0.712	57.791 **	-0.913 **
MYS	-0.015	0.349	0.135	2.945	0.835	0.338	45.018 **	-0.812 **
MEX	0.021	0.388	-1.326	3.748	1.356	0.495	111.995 **	-0.925 **
PHL	-0.067	0.355	0.426	3.146	1.164	0.605	55.057 **	-0.816 **
PRT	0.041	0.200	0.000	1.833	0.666	0.474	16.958 **	-0.832 **
ZAF	-0.003	0.265	-1.415	6.288	0.977	0.526	251.397 **	-1.030 **
TWN	-0.037	0.329	0.530	1.073	0.972	0.484	11.884 **	-0.934 **
THA	-0.088	0.404	-0.003	0.950	1.156	0.405	4.344	-0.920 **
TUR	-0.013	0.623	-0.126	0.666	1.629	0.373	2.401	-0.985 **

* indicates the significance at 97.5% level and ** indicates the significance at 99% level.

Table 4. The Mann-Whitney Test of Stock Return

The summary of the time-series of Mann-Whitney statistics on monthly return on developmental stages, geographic regions, and each of 37 countries from 1992:01 to 2003:06 is presented. The null hypothesis of test is the U.S. Dollar-based stock return of the tested group (e.g., emerging markets) is not different from the one in the rest of sample (i.e., developed countries). The number of Whole period is the Mann-Whitney statistics of the return of the whole sample period. The average is the mean from the time-series of Mann-Whitney statistics during the sample period. The groups that MW>1.96 and MW<-1.96 indicate the parameter of stock price in the tested group is statistically greater/smaller than the one in the rest of the sample at 2.5% level.

Return

Panel A: Tests Between the Developmental Stages and Geographic Region

	Whole Period	Average	>1.96	< -1.96
Emerging Market	-7.366	-1.239	0.380	0.453
Regions				
East Asia	-22.779	-3.551	0.401	0.533
Southeast Asia	-6.918	-1.570	0.372	0.504
Northeast Asia	-19.860	-3.080	0.416	0.518
Europe	-2.000	3.785	0.555	0.314
South Europe	-3.756	-0.051	0.372	0.358
West Europe	-3.543	1.175	0.460	0.350
North Europe	3.562	0.731	0.350	0.255
Latin America	1.737	0.024	0.358	0.343
North America	27.356	2.536	0.540	0.372

Panel B: Tests Among Countries - Emerging Markets

Country	Whole Period	Average	>1.96	< -1.96
ARG	-0.580	0.086	0.219	0.255
BRZ	1.335	-0.024	0.299	0.321
CHL	2.044	-0.029	0.212	0.212
GRC	1.981	-0.067	0.204	0.248
IND	-1.212	-0.371	0.336	0.401
IDN	-4.977	-0.529	0.336	0.401
KOR	-1.160	-0.415	0.314	0.416
MYS	-2.829	-0.594	0.394	0.453
MEX	-0.016	-0.023	0.175	0.190
PHL	-2.411	-0.466	0.109	0.241
PRT	1.276	-0.009	0.153	0.161
ZAF	-0.938	0.091	0.321	0.285
TWN	-6.250	-0.857	0.350	0.460
THA	-5.355	-0.805	0.307	0.460
TUR	1.810	-0.038	0.314	0.321

Panel C: Tests Among Countries - Developed Countries

Country	Whole Period	Average	>1.96	< -1.96
AUS	4.298	0.228	0.285	0.226
AUT	-9.121	-0.216	0.255	0.314
BEL	-7.706	0.227	0.292	0.226
CAN	8.702	0.489	0.387	0.263
DNK	2.654	0.234	0.212	0.161
FIN	-0.884	0.471	0.263	0.102
FRA	-9.857	0.444	0.314	0.219
DUE	-4.345	-0.016	0.314	0.314
HKG	-1.270	-0.532	0.343	0.380
IRE	2.250	0.207	0.124	0.117
ITL	1.924	-0.354	0.336	0.372
JPN	-18.299	-2.729	0.431	0.504
LUX	-4.285	0.158	0.109	0.044
NZL	2.774	0.263	0.212	0.109
NLD	-2.762	0.276	0.292	0.234
NOR	1.630	0.222	0.248	0.175
SGP	1.403	-0.071	0.336	0.343
ESP	-12.407	0.395	0.321	0.212
SWE	4.730	0.538	0.328	0.212
CHE	0.324	0.410	0.219	0.161
GBR	8.895	0.961	0.409	0.328
USA	24.821	2.445	0.540	0.365

Table 5 The Mann-Whitney Test of Sharpe Index

The summary of time-series of Mann-Whitney statistics on Sharpe Index on developmental stages, geographic regions, and each of 37 countries from 1992:01 to 2003:06 is reported. The null hypothesis of test is the U.S. Dollar-based stock return Sharpe Index of the tested group (e.g., emerging markets) equals the one in the rest of sample (e.g., developed countries). The standard deviation of the whole sample period is unconditional while the monthly standard deviation of each period is estimated by GARCH (1,1) model. The number of Whole period is the Mann-Whitney statistics of the Sharpe Index of the whole sample periodThe groups that MW>1.96 and MW<-1.96 indicate the parameter of stock price in the tested group is statistically significant greater/smaller than the one in the rest of the sample at 2.5% level.

Panel A: Tests Between the Developmental Stages and Geographic Region

	Whole Period	Average	>1.96	< -1.96
Emerging Market	-5.101	-0.915	0.401	0.460
Region				
East Asia	-26.313	-3.662	0.394	0.533
Southeast Asia	-3.670	-1.098	0.394	0.504
Northeast Asia	-25.121	-3.414	0.401	0.540
Europe	3.987	3.753	0.569	0.336
South Europe	-1.432	-0.082	0.380	0.358
West Europe	1.659	1.221	0.460	0.350
North Europe	4.072	0.657	0.350	0.255
Latin America	2.034	-0.015	0.350	0.372
North America	28.083	2.773	0.569	0.365

Panel B: Tests Among Countries – Emerging Markets

	Whole Period	Average	>1.96	< -1.96
ARG	0.274	0.076	0.270	0.255
BRZ	1.411	-0.001	0.343	0.336
CHL	1.870	-0.077	0.241	0.270
GRC	1.719	-0.027	0.241	0.219
IND	-0.852	-0.268	0.328	0.380
IDN	-3.030	-0.282	0.277	0.365
KOR	-0.437	-0.298	0.299	0.365
MYS	-1.374	-0.274	0.423	0.438
MEX	-0.040	-0.013	0.219	0.212
PHL	-1.812	-0.319	0.139	0.248
PRT	1.098	0.012	0.212	0.204
ZAF	-1.301	0.078	0.321	0.307
TWN	-6.505	-0.740	0.365	0.423
THA	-3.717	-0.571	0.321	0.423
TUR	1.778	0.050	0.328	0.314

Panel C: Tests Among Countries – Developed Countries

	Whole Period	Average	>1.96	< -1.96
AUS	5.108	0.460	0.380	0.248
AUT	-7.196	-0.013	0.277	0.299
BEL	-5.045	0.206	0.226	0.234
CAN	8.938	0.631	0.372	0.307
DNK	2.435	0.238	0.314	0.212
FIN	-0.026	0.409	0.263	0.161
FRA	-6.967	0.426	0.343	0.292
DUE	-5.866	0.010	0.350	0.350
HKG	-1.031	-0.324	0.365	0.358
IRE	2.207	0.258	0.204	0.139
ITL	1.633	-0.364	0.343	0.394
JPN	-23.928	-3.182	0.431	0.526
LUX	-2.498	0.128	0.066	0.051
NZL	2.882	0.296	0.277	0.190
NLD	-3.316	0.306	0.321	0.263
NOR	1.666	0.213	0.263	0.234
SGP	1.518	-0.054	0.350	0.365
ESP	-7.329	0.335	0.336	0.248
SWE	4.827	0.510	0.350	0.255
CHE	1.173	0.376	0.263	0.204
GBR	9.376	1.042	0.431	0.336
USA	25.479	2.635	0.526	0.336

Table 6 The Mann-Whitney Test of International Beta Treynor Index
The summary of time-series of Mann-Whitney statistics on international beta Treynor
Index on developmental stages, geographic regions, and each of 37 countries from
1992:01 to 2003:06 is reported. The null hypothesis of test is the U.S. Dollar-based stock
return international beta Treynor Index of the tested group (e.g., emerging markets)
equals to the one in the rest of sample (e.g., developed countries). The whole period is
the Mann-Whitney statistics of the Treynor Index during the sample period. The groups
that MW>1.96 and MW<-1.96 indicate the parameter of stock price in the tested group is
statistically significant greater/smaller than the one in the rest of the sample at 2.5% level.

Panel A: Tests Between the Developmental Stages and Geographic Region

	Whole Period	Average	>1.96	< -1.96
Emerging Market	-4.233	-3.851	0.190	0.747
Region				
East Asia	-21.168	-22.044	0.051	0.911
Southeast Asia	-2.393	-2.320	0.228	0.519
Northeast Asia	-20.627	-21.491	0.000	0.911
Europe	-6.547	2.923	0.405	0.215
South Europe	-2.644	4.263	0.759	0.089
West Europe	-3.191	3.413	0.620	0.203
North Europe	2.261	2.426	0.544	0.101
Latin America	1.895	0.147	0.025	0.076
North America	25.527	18.781	0.975	0.000

Panel B: Tests Among Countries – Emerging Markets

Country	Whole Period	Average	>1.96	< -1.96
ARG	0.052	0.224	0.000	0.063
BRZ	1.446	-0.233	0.013	0.152
CHL	1.487	0.124	0.051	0.000
GRC	1.727	2.100	0.620	0.000
IND	-2.916	-2.003	0.025	0.595
IDN	-2.753	-2.246	0.038	0.519
KOR	0.151	-0.551	0.228	0.228
MYS	0.132	-0.931	0.152	0.392
MEX	0.342	0.479	0.025	0.013
PHL	-1.828	-1.675	0.000	0.253
PRT	1.790	-0.242	0.114	0.025
ZAF	-1.142	-0.969	0.000	0.241
TWN	-5.615	-2.961	0.038	0.570
THA	-3.314	-2.110	0.228	0.595
TUR	1.419	1.707	0.430	0.000

Panel C: Tests Among Countries - Developed Countries

Country	Whole Period	Average	>1.96	< -1.96
AUS	4.506	2.825	0.823	0.000
AUT	-1.807	2.328	0.089	0.696
BEL	-2.416	0.409	0.316	0.165
CAN	8.440	5.421	0.987	0.000
DNK	1.580	2.174	0.557	0.000
FIN	-2.084	-1.424	0.291	0.684
FRA	-10.234	-3.741	0.190	0.709
DUE	-5.705	-2.609	0.114	0.709
HKG	-1.146	-0.859	0.051	0.291
IRE	1.331	1.694	0.405	0.000
ITL	1.360	4.603	0.785	0.076
JPN	-19.577	-21.137	0.013	0.911
LUX	-2.240	2.834	0.975	0.013
NZL	2.386	0.080	0.076	0.000
NLD	-4.051	-2.321	0.291	0.646
NOR	1.233	1.320	0.418	0.025
SGP	2.078	1.238	0.291	0.025
ESP	-9.459	-0.187	0.316	0.329
SWE	3.999	3.662	0.797	0.000
CHE	-0.147	2.456	0.671	0.063
GBR	7.567	6.538	0.848	0.051
USA	23.010	17.394	0.962	0.000

Figure 1   The Time-series of Mann-Whitney Statistics on Return: Emerging Markets vs. Developed Countries
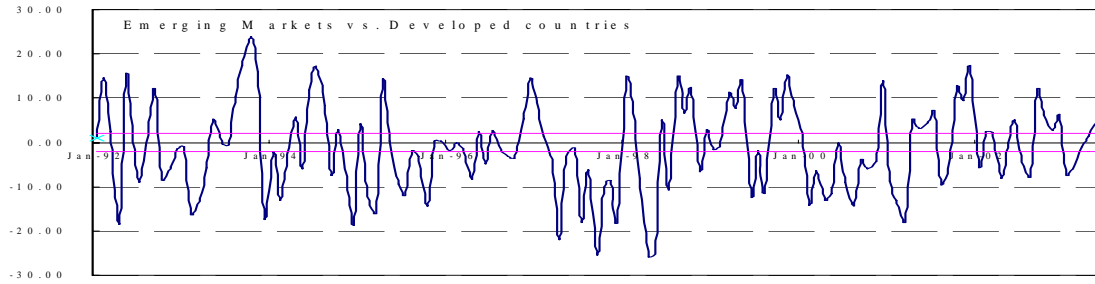
Figure 2   The Time-series of Mann-Whitney Statistics on Return: East Asia vs. Other Areas
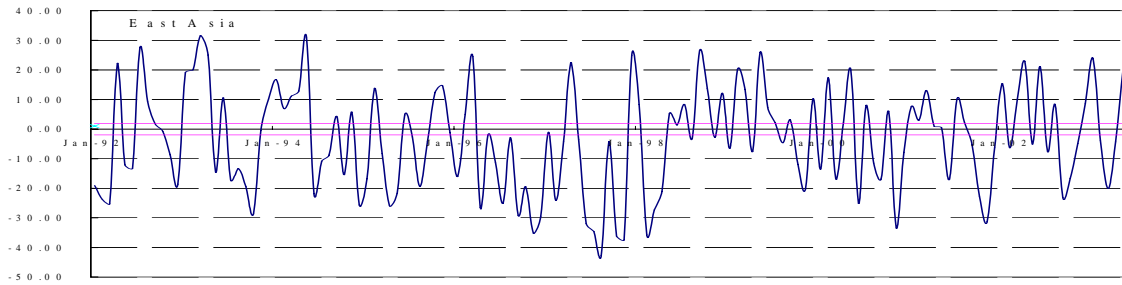
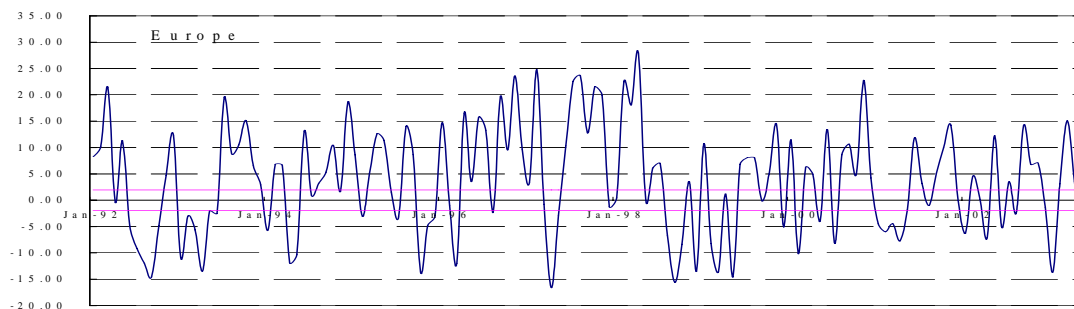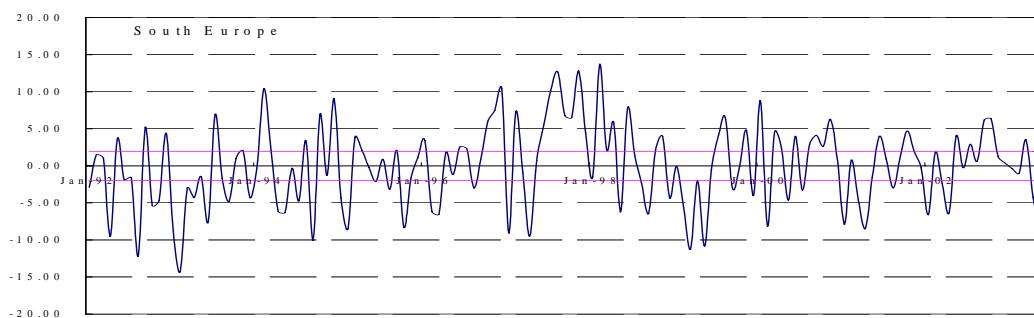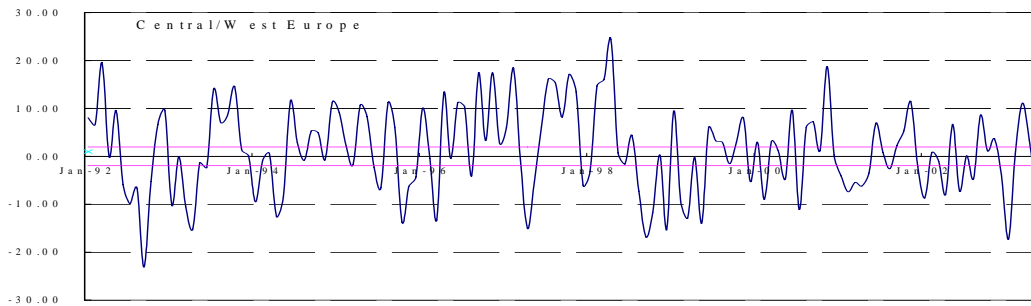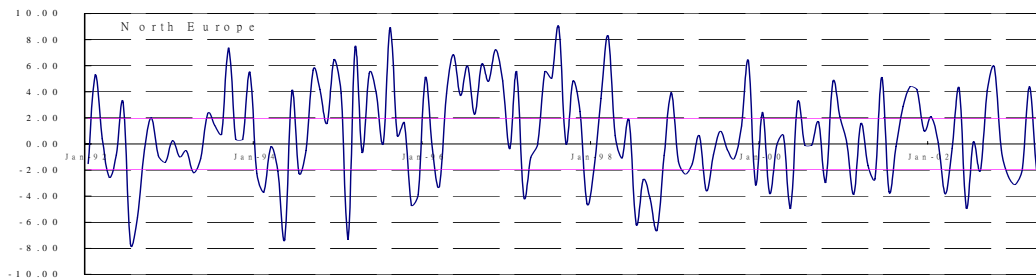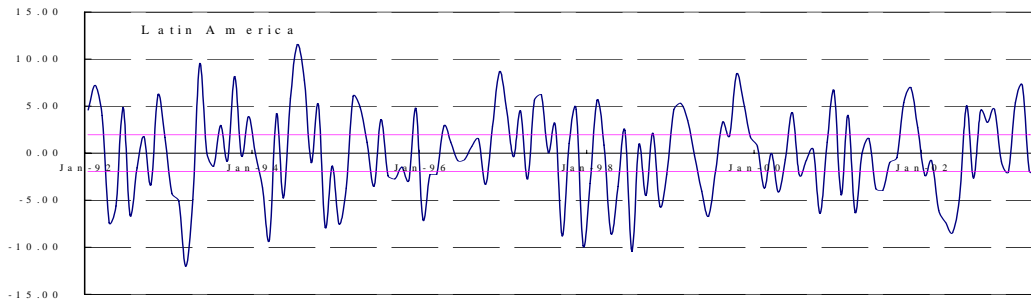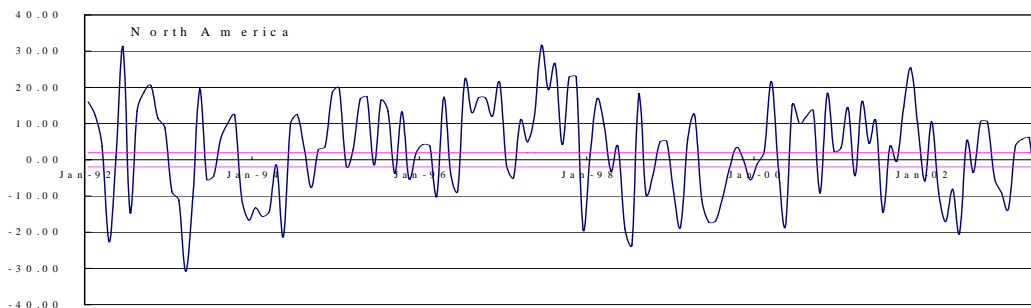Figure 3   The Time-series of Mann-Whitney Statistics on Return: Southeast Asia vs. Other Areas
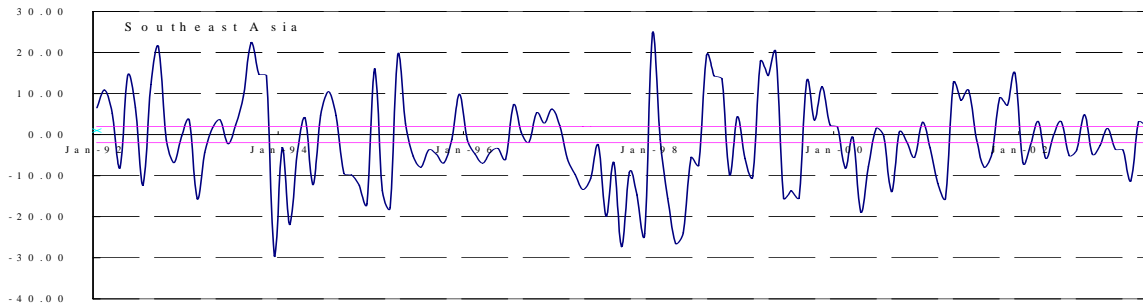
Figure 4   The Time-series of Mann-Whitney Statistics on Return: Northeast Asia vs. Other Areas
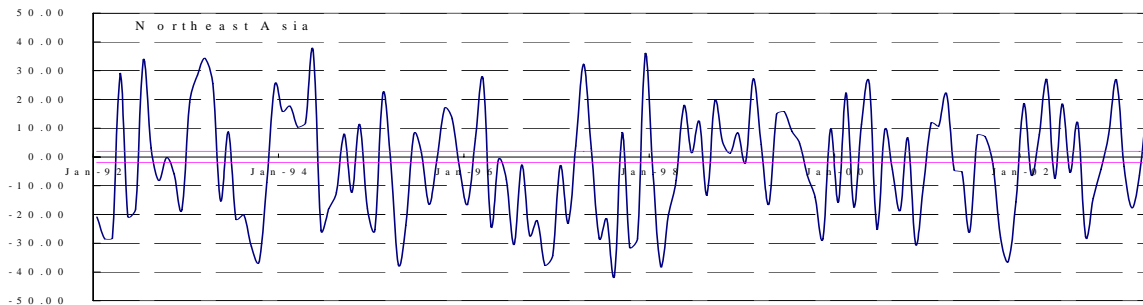
Figure 5   The Time-series of Mann-Whitney Statistics on Return: Europe vs. Other
Areas
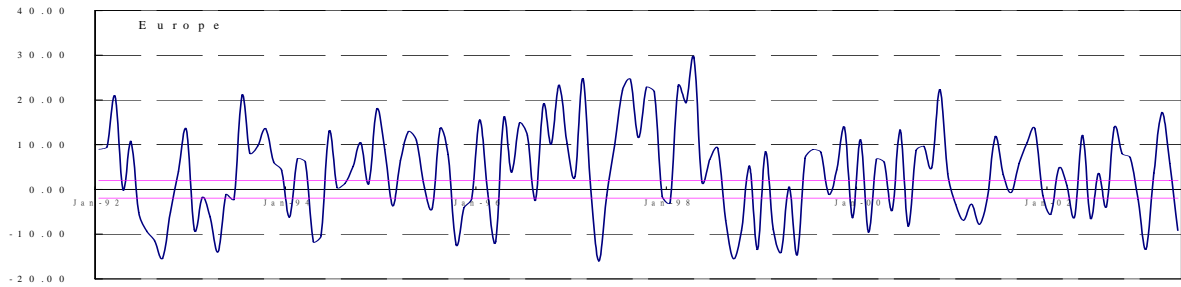
Figure 6   The Time-series of Mann-Whitney Statistics on Return: South Europe vs.
Other Areas
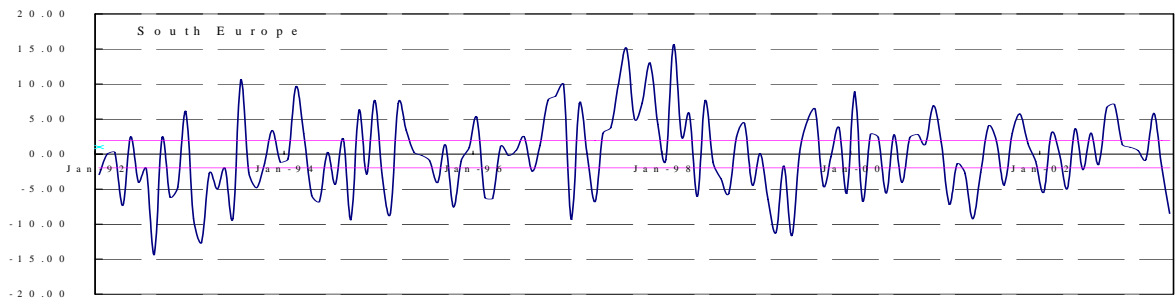
Figure 7   The Time-series of Mann-Whitney Statistics on Return:: Central/West Europe
vs. Other Areas
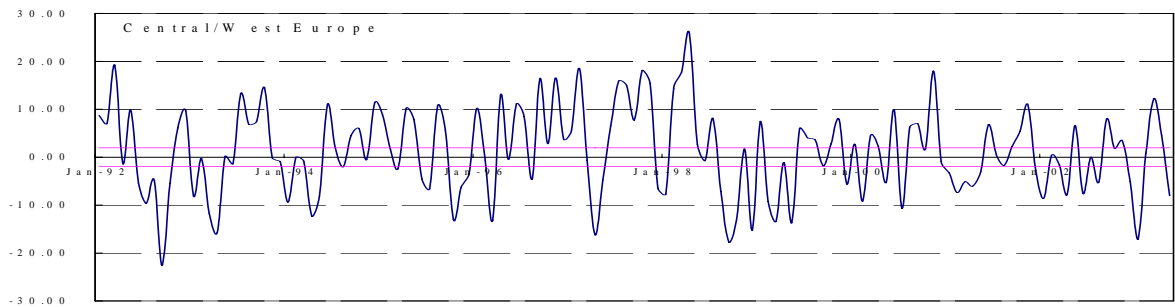
Figure 8   The Time-series of Mann-Whitney Statistics on Return:: North Europe vs.
Other Areas
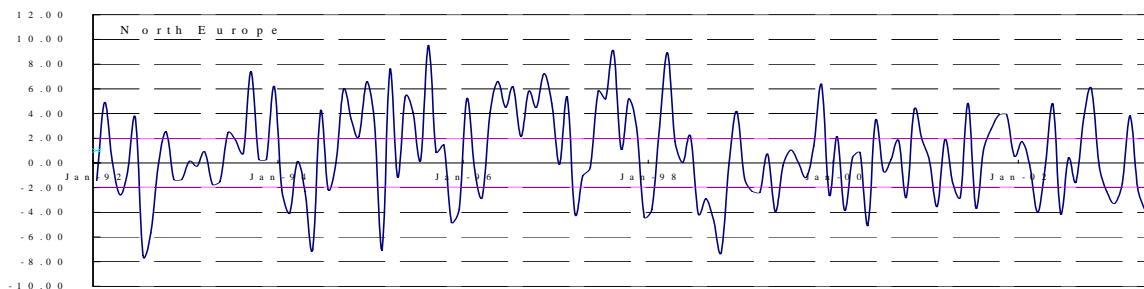
Figure 9   The Time-series of Mann-Whitney Statistics on Return:: Latin America vs.
Other Areas
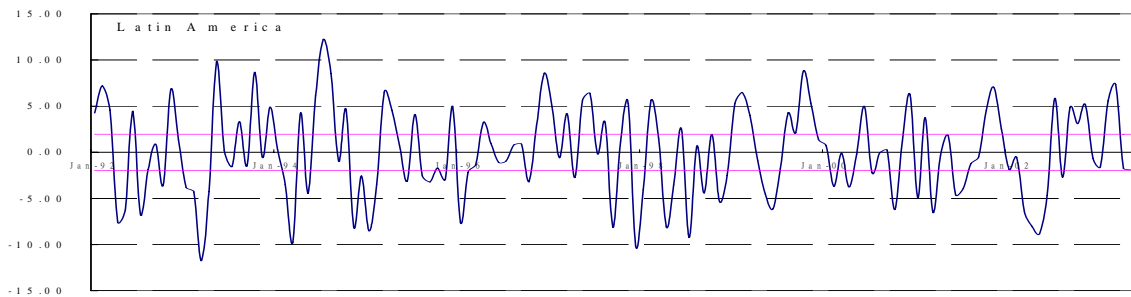
Figure 10   The Time-series of Mann-Whitney Statistics on Return:: North America vs.
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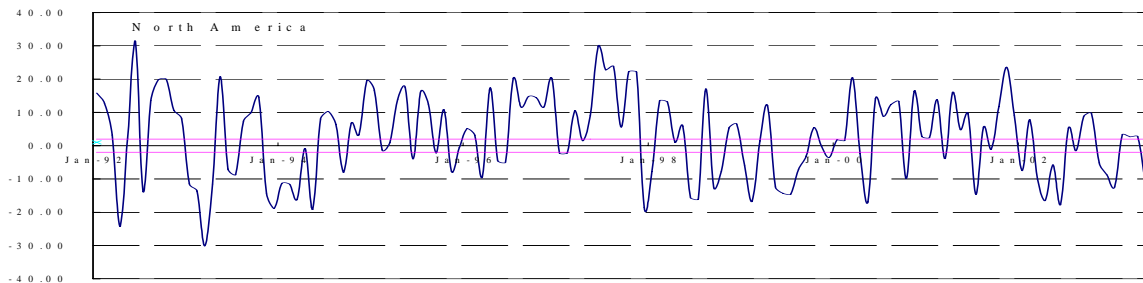
Figure 11   The Time-series of Mann-Whitney Statistics on Sharpe Index: Emerging
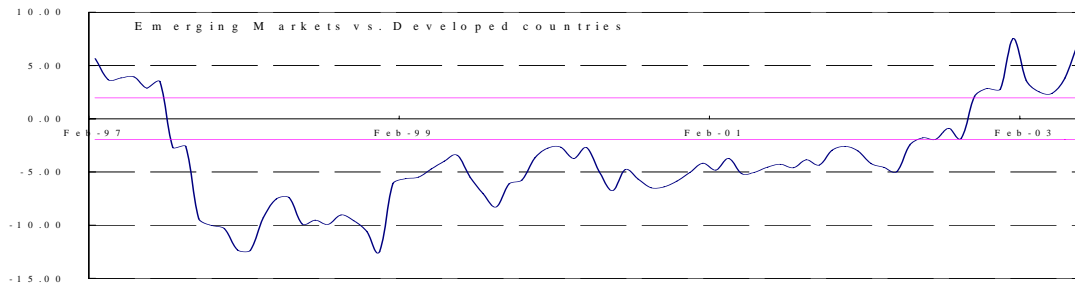Markets vs. Developed Countries
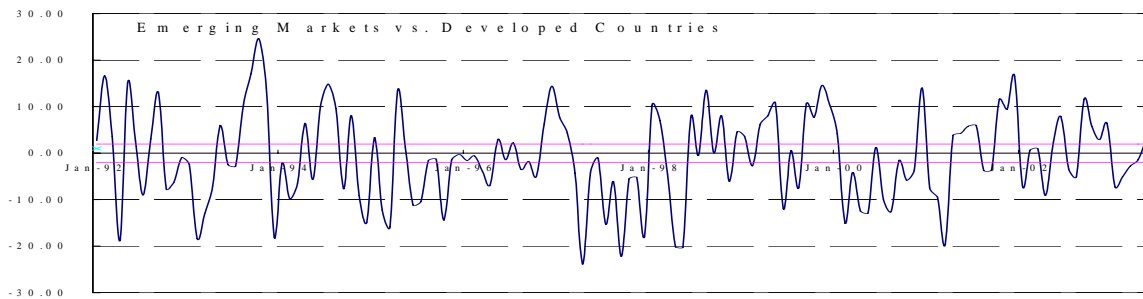
Figure 12 The Time-series of Mann-Whitney Statistics on Sharpe Index: East Asia vs.
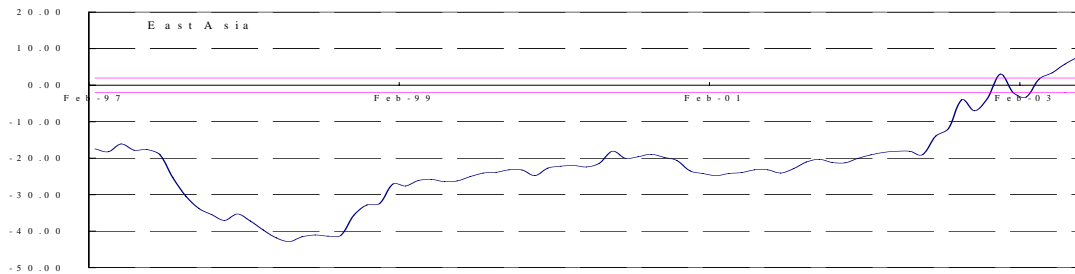Other Areas
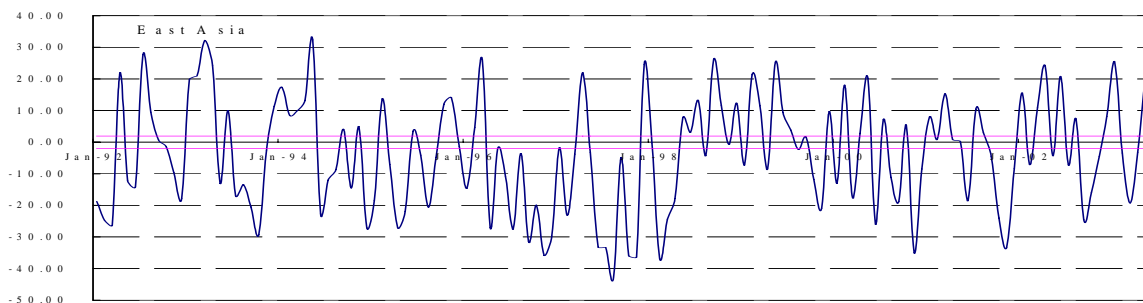
Figure 13   The Time-series of Mann-Whitney Statistics on Sharpe Index: Southeast Asia vs. Other Areas
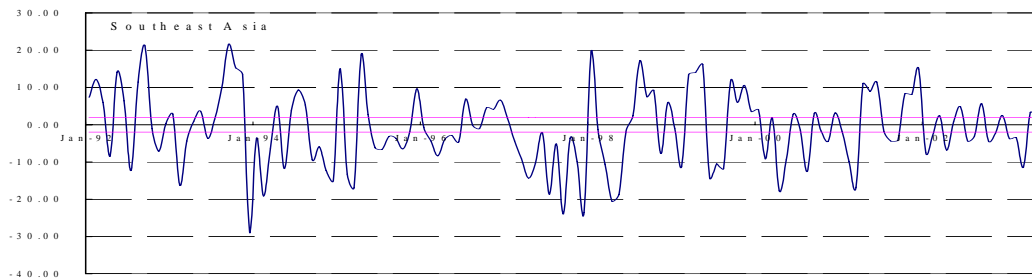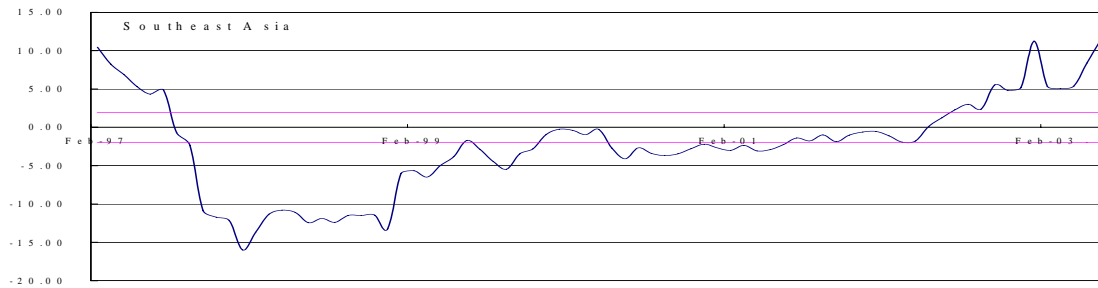

Figure 14   The Time-series of Mann-Whitney Statistics on Sharpe Index: Northeast Asia vs. Other Areas
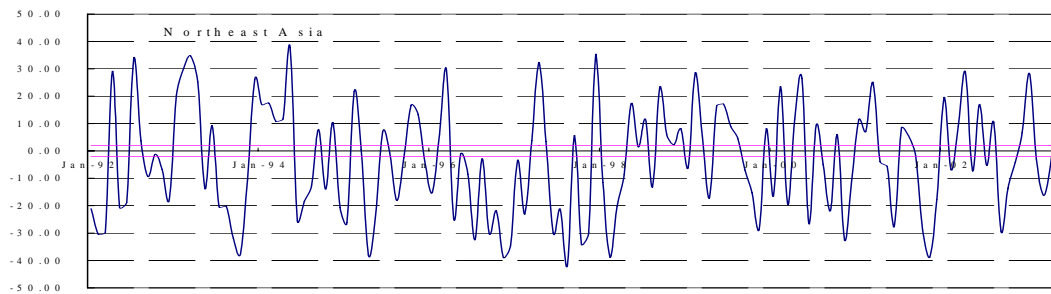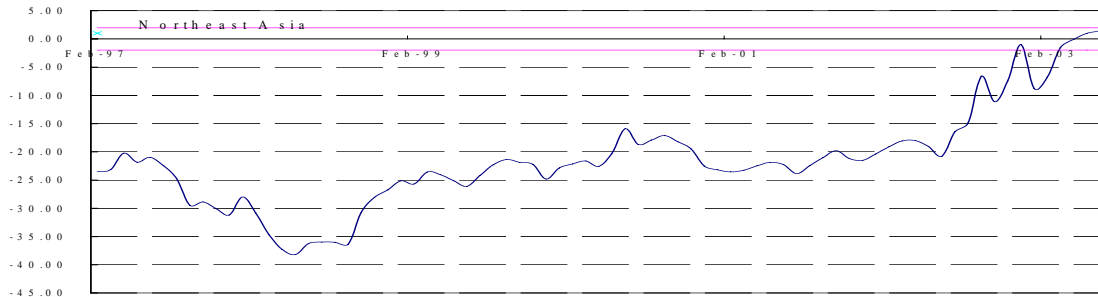

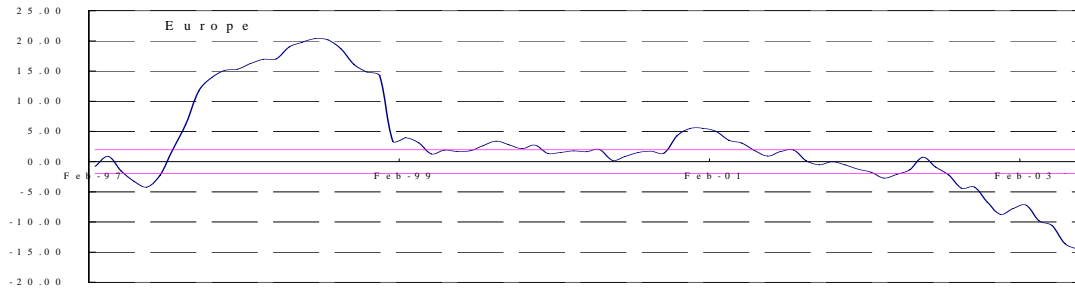Figure 15   The Time-series of Mann-Whitney Statistics on Sharpe Index: Europe vs. Other Areas

Figure 16   The Time-series of Mann-Whitney Statistics on Sharpe Index: South Europe vs. Other Areas
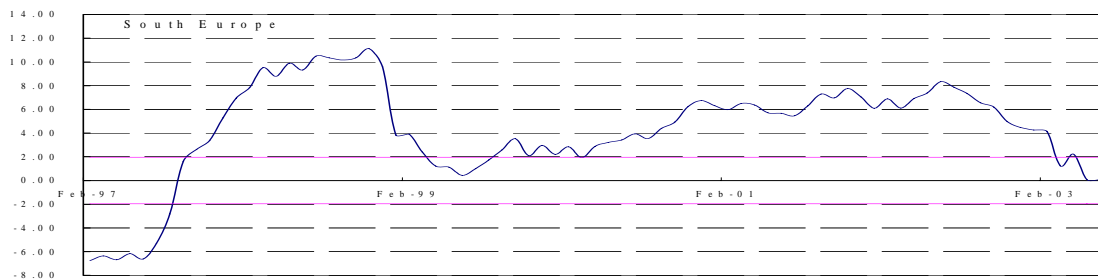

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Figure 17   The Time-series of Mann-Whitney Statistics on Sharpe Index: Central/West Europe vs. Other Areas

Figure 18   The Time-series of Mann-Whitney Statistics on Sharpe Index: North Europe vs. Other Areas

Figure 19   The Time-series of Mann-Whitney Statistics on Sharpe Index: Latin America vs. Other Areas

Figure 20   The Time-series of Mann-Whitney Statistics on Sharpe Index: North America vs. Other Areas

Figure 21   The Time-series of Mann-Whitney Statistics on Treynor Index: Emerging Markets vs. Developed Countries

Figure 22   The Time-series of Mann-Whitney Statistics on Treynor Index: Areas: East Asia vs. Other Areas

Figure 23   The Time-series of Mann-Whitney Statistics on Sharpe Index: Southeast Asia vs. Other Areas

Figure 24   The Time-series of Mann-Whitney Statistics on Sharpe Index: Northeast Asia vs. Other Area

Figure 25   The Time-series of Mann-Whitney Statistics on Sharpe Index: Europe vs. Other Areas

Figure 26   The Time-series of Mann-Whitney Statistics on Sharpe Index: South Europe vs. Other Areas

Figure 27   The Time-series of Mann-Whitney Statistics on Sharpe Index: Central/West Europe vs. Other Areas
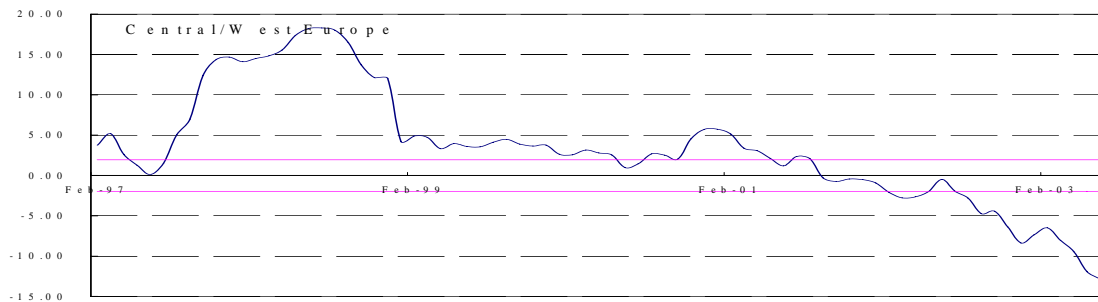

Figure 28   The Time-series of Mann-Whitney Statistics on Sharpe Index: North Europe vs. Other Areas
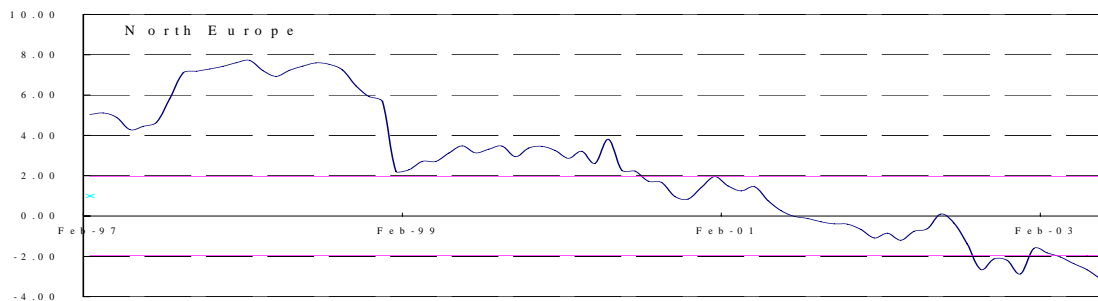
Figure 29   The Time-series of Mann-Whitney Statistics on Sharpe Index: Latin America vs. Other Areas
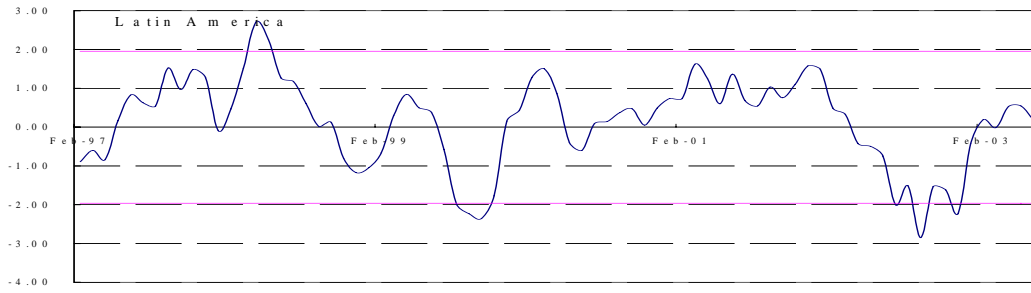

Figure 30 The Time-series of Mann-Whitney Statistics on Sharpe Index: North America vs. Other Areas