Variation of Stock Return Volatility:

An International Comparison

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ABSTRACT

Using 4,916 stocks from 22 developed countries and 15 developing countries, we examine the global systematic risk and the relative magnitude of conditional volatility and of stock prices in different developmental stages and various geographical areas. The results of non-parametric Mann-Whitney tests suggest that the stock prices in emerging markets are comparatively riskier than the ones in developed countries, measured by both conditional volatility and unconditional global beta. Or empirical findings also support the geographical variation of stock risks. Specifically, the equity values in Southeast Asia, South Europe, and Latin America are more volatile than the rest of the world. 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 volatility suggests the stocks of high price exposures tend to be less volatile and the conditional volatilities of less risky stocks tended to be steadily enlarging. This finding can be viewed as evidence of an enhancement of integration of international financial markets.

Key Words: conditional volatility, global beta, international equity price, systematic risk.

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1. INTRODUCTION

An understanding of the variation of stock price exposures in different countries helps to determine equilibrium compensation and evaluate portfolio performance and assists making decision on the allocation of international portfolio. However, there are two unanswered questions regarding international asset pricing. How do different developmental stages of countries affect the risk of individual stock price? Do the risks of stock prices in the different regions demonstrate variation? In this study, we first explain the relationship between international integration of local markets and individual stock price volatility. We then report the result of an empirical test of relative magnitude, measured by non-parametric Mann-Whitney statistics, of price exposures in the nations of different developmental stages and areas by using firm-level data. We found that the stocks in emerging markets are significantly riskier than in rich countries. On the other hand, in contrast to developed countries, the volatilities in most developing nations, on the whole, are steadily decreasing. We also found similar levels of risk in equity values in the countries of the same area.

One explanation to the cross-country variation of asset price risks is the degree of integration of a domestic market with international financial markets. Bekaerk and Harvey (1995) and Bae, Bailey, and Mao (2003) suggest the influence of liberalization of financial market to equilibrium price of domestic assets differs from nation to nation. Following the opening of financial market, the exchange of capital and information flows of local market with foreign markets may trigger escalation of volatility of security prices. On the other hand, as the degree of international financial integration and market efficiency increases, any investment should only be compensated by the amount of global systematic risk. One may also expect the shrinkage of the idiosyncratic risks of asset prices. However, the empirical results suggest the mixed effect of global integration of financial markets on asset risk. The empirical findings by Bekaert and Harvey (1997, 2003) and De Santis and İmrohoroğlu (1997) support the argument that there is no straight finance theory about the change of volatility after market liberalization. Kim and Singal (2000) suggest that market openings of developing nations decrease the risk in the long-run by increasing market efficiency.

The variation of legal tradition, major financing sources, cultural background, and natural resources can also help to explain the disparity of stock risks across nations.[1] These factors affect the protection of property right, awareness of uncertainty, and attitude toward wealth and its distribution, all of which are relevant to risk aversion. These are relevant to the willingness of investment as well as the financial structure of corporations. Furthermore, the developmental stage of economy is related to the maturity of a financial market and integration with the economies of the rest of the world. Although it is hard to quantify the qualitative elements in a pricing model, previous research has suggested that they have an impact on asset price volatility.

Previous studies indicate that the distribution of systematic risk can not be modeled. Collins, Ledolter and Rayburn (1987) demonstrate the randomness of beta of stock yield. They also find that the systematic risk does not show autocorrelation, and that it relates with firm size. On the other hand, Chatterjee and Lubatkin (1990), DeJong and Collins (1985), and Denis and Kadlec (1994) argue that the variation of beta of stock

[1] See Beck, Demirgüç-Kunt, and Levine (2003); Stulz and Williamson (2003); Demirgüç-Kunt and Maksimovic (1998 and 2002.)

comes from the change of interest rate, of dividend policy of a company such as stock split and dividend payout, and of investment activities such as merger and acquisitions. Pettengill, Sundaram, and Mathur (1995) found that the systematic risk is adjusted by previous abnormal returns as measured by the Sharpe-Litner-Black asset pricing model and that there is a positive relationship between beta and return.

Empirical testing on the significance of cross-country stock risks helps us clarify the mixed theoretical effects of exposure in emerging markets. Since the assumption of a Gaussian distribution of financial parameters rarely holds, we employ distribution-free Mann-Whitney test to avoid problems with the departures from normality. In addition, to avoid the mixture of returns of stock returns brought by market-level data suggested by Carrieri, Errunza, and Sarkissian (2004), data of 4,916 stocks from 22 developed countries and 15 developing countries were collected. Our empirical findings indicate that the stock prices in emerging markets are comparatively riskier than those in developed countries, as measured by both conditional volatility and unconditional global beta. In addition, our results also support the geographical variation of stock risk. Specifically, the equity values in East Asia, Southeast Asia, South Europe, and Latin America are more volatile than the rest of the world. Although there are some exceptions in the country-level tests, relative size of stock price risks in most countries are similar to the ones of their developmental stage as well as area. In addition, the analysis of time-series of volatility suggests that the stocks of high price exposures tend to be less volatile, and the conditional volatilities of less risky stocks tended to be steadily enlarging. This finding can be viewed as evidence of the enhancement of integration of international financial markets.

Our work is distinguished by the use of a large set of firm-level data to document the cross-nation variation of stock price exposure. One of the major problems limiting the plausibility of the empirical result using market indices is the indices are not necessarily tradable. In addition, an index is a mix of prices of stocks that might have different returns during the same period. The use of stock price data provides a closer look at the risk exposure of individual assets and avoids possible ambiguities associated with evaluating indices. Use of large samples of stocks and countries also improves the robustness of empirical test.

The paper is organized as follows. Section 2 applies the domestic and international asset pricing models to explain the relationship between stock price risk and the integration between local market with international financial market. Section 3 describes the data and provides summary statistics. Application of the Mann-Whitney test is discussed in Section 4. The methodologies to measure total risk and systematic risk are presented in Section 5. Section 6 and Section 7 report the risk variation between different developmental stages, regions, and individual country, respectively. In Section 8, the analysis of time series of stock price volatility among all classifications of countries and each individual nation is presented. Section 9 concludes.

2 INTERNATIONAL MARKET INTEGRATION AND STOCK RETURN RISK

In this section, we propose a model to explain higher volatility of stock prices in developing countries when their markets become more integrated with international market. We suggest that the source of volatility comes from the process of adjusting the equilibrium security prices since the correlation between local market and international market in developing countries is less than that in developed countries.

In the past four decades, financial markets all over the world have been increasingly open to overseas investors. Most emerging markets have benefited from this trend of overseas investing. The global investments opportunities not only provide market participants a wider efficient frontier but also allow investors more hedging opportunities against undesired market movements. Previous empirical studies show the performance and risk of stock markets in developed countries and emerging markets differ (e.g., Bekaer and Harvey (1997), Ferson and Harvey (1993), Harvey (1995), and Henry (2000)). The stocks in emerging markets tend to have higher volatility and yields than those in developed countries. Since emerging markets have a low level international integration, the stock prices in emerging markets are less correlated with the world market.

The integration of international market implies the same unit of risk commends the same amount of return in different countries. In the real world, however, investors in different countries face various investment opportunity sets because of the barriers of overseas investment. On the other hand, pricing kernels vary from market to market because international investors value exposure differently cross-country.

Consider two investors who face two different sets of investment opportunities due to the differences in access to the international financial market. For the investor who is not able to diversify in the global financial market, the local non-diversifiable risk should be the only pricing factor. Suppose real yields are multivariate normal and the local riskless security is also the universal risk-free asset, with real earning r_f. in one-period static economy, the equilibrium return of any risky asset *i* to the domestically-constraint investor can be expressed as:

$$E(r_i) - r_f = \alpha_{i(H)} + \beta_i [E(r_H) - r_f], \tag{1}$$

where *E*(.) represents an expected value; r_i and r_H denotes the real logarithmic returns of asset *i* and domestic market portfolio, respectively; β_i is the home systematic risk of asset *i* characterized as $Cov(r_i, r_H) / \sigma_H^2$, where *Cov*(.,.) is a covariance and σ^2 is a variance. The term $\alpha_{i(H)}$ represents the pricing error evaluated by the local CAPM. If the market is completely segmented, the abnormal return should equal zero given the domestic CAPM hold in the home country.

We further consider the pricing of risky assets for the investors who are able diversify in the global financial market. If there is no tariffs, taxes, transaction costs, or restrictions to short selling, the investor who faces a world of homogeneous investment-consumption opportunities and a one-price law can determine the yield by using the international CAPM:

$$E(r_i) - r_f = b_i [E(r_W) - r_f], \tag{2}$$

where r_W denotes the real logarithmic returns of the international market portfolio; b_i is the international beta of asset *i*, which is defined as $Cov(r_i, r_W) / \sigma_W^2$. One may view Equation (2) as a general case, in which the benchmark portfolio contents broader investment opportunities than the one in Equation (1), in an open economy without international market barriers.

Following the model suggested by Karolyi and Stulz (2003), we then analyze the relationship between the integration of international financial market and volatility of security price returns. In a local financial market which is integrated with the global market, the local market portfolio risk premium is expressed as follows:

$$r_H - r_f = b_H [r_W - r_f] + \varepsilon_{H(W)}, \tag{3}$$

where b_H is the world systematic risk of domestic market, and the white noise $\varepsilon_{H(W)}$ is the error term of domestic market portfolio return with respect to international market portfolio. Substituting Equation (3) into the version of realized return of asset *i* shown in Equation (1), we have:

$$r_i - r_f = \alpha_{i(H)} + \beta_i b_H (r_W - r_f) + \beta_i \varepsilon_{H(W)} + \varepsilon_{i(H)}. \tag{4}$$

The global market beta of any local risky asset *i*, therefore, can be rewritten as:

$$b_i = \beta_i b_H + b_{i(\varepsilon)}, \tag{5}$$

where $b_{i(\varepsilon)} = Cov(r_W, \varepsilon_{i(H)}) / \sigma_W^2$ is the global beta of the local pricing residual error for each individual asset. The global beta of any individual asset is calculated by the product of the local beta for risky asset *i* and the global systematic risk of local market, plus the individual asset's local residual exposure, which is compensated by the global diversification. Consequently, international investments are not only for portfolio diversification but also provide a risk hedge against local idiosyncratic exposure. This concept is similar to the one suggested by Dumas and Solnik (1995).[2] The abnormal return in the domestic pricing model can specified as the premium (or discount) associated with the unit price of international market portfolio risk:

$$\alpha_{i(H)} = M_W \rho(r_W, \varepsilon_{i(H)}) \sigma_{i(H)}, \tag{6}$$

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[2] Dumas and Solnik (1995) test the international asset pricing taking into account the depravation of the purchasing power parity. They argue international investment embed hedging motivation and suggest that the selection of the pricing factor is a "competition" of econometrical explanatory power among the pricing exposures.

where $M_W \equiv [E(r_W) - r_f]/\sigma_W$ is the international price of unit risk; $\rho(.,.)$ is the coefficient of correlation between two series; and $\sigma_{i(H)}$ is the standard deviation of pricing error with a domestic asset pricing model.

Equation (6) states that the investor's pricing error caused by the domestic investment limitations can be captured by international diversification. Since the domestic market portfolio is a subset of global financial market, the investor who is able implement international investment will take the apposite strategy of arbitrage until the abnormal return caused by the local market vanishes. Given that risky assets face the same market risk premium, the higher the global beta of the local pricing residual, the greater is the local pricing error. If the majority of investors in the local market cannot gain access to the homemade investment opportunities resembling an international portfolio, the abnormal return of risky asset to the investors who can engage international diversification should not be trivial. One may be able to obtain the interval of standardized local abnormal return of asset *i*, $z_{i(H)} = \alpha_{i(H)}/\sigma_i$, by further rewriting the elements in Equation (6):

$$-M_W\sqrt{(1-\rho^2(r_H,r_W))(1-\rho^2(r_i,r_H))} \leq z_{i(H)} \leq M_W\sqrt{(1-\rho^2(r_H,r_W))(1-\rho^2(r_i,r_H))} \quad , \qquad (7)$$

where $\rho(r_d, r_W)$ and $\rho(r_i, r_d)$ are the coefficients of correlation of domestic market portfolio with international market portfolio and the domestic market portfolio with individual asset *i*, respectively.

The above analysis confirms the intuition regarding the impact of the international integration of financial market to stock price volatility. The pricing error presented in Equation (7) describes the interval in which the expected return of the risky asset will be adjusted. The volatility of asset return should relate to the coefficient of correlation of risky asset with domestic market and coefficient of correlation of local market with global market. Consider the assets of the same degree of correlation with their respective local markets in different countries. The asset in the financial market with a higher degree of international integration contains a lower absolute value of pricing error (Equation (6)) resulting from reduced access to international investments. On the other hand, stock prices in a less integrated market, generally in a developing country, tend to be more volatile because the interval for stock price adjustments (Equation (7) is larger as compared to stock prices in markets with higher international integration.

Thus, since the magnitude of pricing error of a risky asset is a function of the correlation of the risky asset with the domestic market and of the correlation of the local market with the global market, the degree of international integration of the domestic market impacts the volatility of the individual asset price. Given, the financial markets in developed countries are more integrated with the global market, we expect that stock prices in more mature economies tend to be less volatile than stock prices in emerging markets. In addition, the mean-variance efficiency of assets in a less open market will improve with market liberalization, as investors are be able to hedge the domestically idiosyncratic exposure by including international assets.

3. DATA

The stock prices data of 4,916 stocks traded over 37 countries, which consists of 74 equity markets during the period January 1992 to June 2003, are taken from the Global Issue of Compustat. Our sample includes only companies whose adjusted stock price data are available during the entire sample period. The values of trading volume and market capitalization are obtained from the dataset provided by the World Federation of Exchanges.

Table 1 presents the list of the countries, the number of sample stocks in each country, the exchange markets in each country, and the weights of trading value and capitalization of global market of each country. The distribution of sample companies is proportional to the distribution of whole data set of Global Issue, as well as the relative magnitude of trading value and global market capitalization.[3] The countries with the largest number of stocks in the dataset are Japan (1,469) and the U.S. (1,103), which together are more than half of all sample stocks. Japan and the U.S. are also the two largest countries in terms market value of trading volume. Our sample also includes 1,037 stocks traded in European countries, which corresponds to about one-fifth of the sample. The European countries with the largest number of sample stocks are France (112), Germany (142), Italy (112), and the United Kingdom (383). The number of sample stocks in the 15 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 by different developmental stages (developed countries and emerging markets) and geographical regions (East Asia, Europe, Latin America, and North America) are presented in Table 2. Most of the sample countries and

[3] 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.

stocks are from the four major world economies: East Asia, Europe, Latin America and North America. Unlike North America, East Asia and Europe contain more countries and tend to be more culturally and politically heterogeneous within groups[4]. The two areas, correspondingly, are split into two sub-groups (Southeast Asia and Northeast Asia) and three sub-groups (South Europe, Central/West Europe, and North Europe), respectively. This breakdown of regions makes it possible to analyze the geographical difference on stock price volatility 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 markets, mainly dominated by the U.S. equity markets, represent more than half of stock market capitalization in the world. The European stock market value, 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 smaller than the ones in North America and Europe, the number of stocks represents more than 40% of whole sample. This is because the average corporation size in East Asia, especially in Southeast Asia, is smaller than the average magnitude of East European and North American company.

{Table 2}

[4] The legal tradition, cultural background, religion, and language in North America are more homogeneous than the rest of the world due to the political unification and regional 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.

To equate the basis of international comparison of performance and risk, the stock price return is then adjusted by the exchange rate between the U.S. dollar and local currency. The Financial Times Actuaries World Index and the yield of thirty-year U.S. Treasure Note 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. The compounding U.S. Dollar- basis monthly yield of each stock is calculated as:

$$r_{i,j,t} = \ln[(P_{i,j,t} \times e_{i,t})/(P_{i,j,t-1} \times e_{i,t-1})], \qquad (8)$$

where $P_{i,j,t}$ is the 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 dividend-and-stock-split-adjusted price is fine-tuned by the Cumulative Adjustment Factors (CAF), which is used to modify Successor-Predecessor events.

The statistical summary of U.S.-Dollar adjusted return of each country demonstrated in Table 3 provides a highlight to equity market of each country. To investor calculating her yield in the U.S.-Dollar, the annualized returns of markets 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 during the sample period. The enhancement of integration of global financial market and the selection of sample period are the reasons to explain the phenomena. Bekaerk and Harvey (2000, 2003) and Henry (2000) reveals a similar finding of worse stock price performance in developing countries by using the IFC indices and suggest the abnormal return of emerging markets declined after global financial market gets more integrated. On the other hand, the sample period includes the major market crashes in a number of nations and areas, such as “Tequila Crisis (in 1994),” “Asian Flu (in 1997),” and “Russian Virus (in 1998).” 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 research, most returns of 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 correlation coefficient of the domestic market with international market and international systematic risk are reported. The global coefficients of correlation of developed countries, overall, are higher than the ones of 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 five countries of top correlation coefficient are the U.S. (0.89), the U.K. (0.81), the Netherlands (0.79), France (0.78), and Canada (0.74). On the other hand, the developing countries of highest global market correlation coefficient are Korea (0.71), Philippines (0.61), Brazil (0.57), South Africa (0.53), and Mexico (0.50).

[5] Australia, Austria, and Belgrium 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. A similar phenomenon can be found in the analysis of individual stock price.

The relative magnitude of global market systematic risk of market indices between developed countries and developing countries is not as straightforward as the correlation coefficient of national index. According to the annualized standard deviation of market return, the equity prices in the developing countries tend to be more volatile than developed countries, the international betas of some emerging markets demonstrate different order than the relationship of the international correlation. For example, the coefficients of correlation between the global market and national market indices of Argentina and Turkey are relatively small (0.24 and 0.37 respectively); they can be counted "aggressive" stock markets from the viewpoint of global beta. Evaluated by global beta, Brazil (2.03) is the most risky whereas it has a moderate global correlation (0.57). In the group of mature economies, the global betas of most countries are in the interval of 0.85 to 1.15. France (1.49) and Singapore (1.24) are the most risky markets among the group of developed countries.

4. MANN-WHITNEY TEST

One of difficulty in empirical testing international asset performance and risk is the dearth of prior information regarding pricing kernel over each country. To enhance the robustness of tests, the distinction of risk between the examined group and the rest of the world is analyzed by the Mann-Whitney test. This non-parametric statistical method allows simultaneous examination of the magnitude of gap and its statistical significance without prior assumption of Gaussian distribution of parameters. The null hypothesis of test is:

H_0 : 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:

$$z_{EM} = \frac{(TR - \mu_{TR}) \pm 0.5}{\sigma_{TR}}, \quad \text{when } TR > \mu_{TR}\text{, then -0.5,} \quad \text{when } TR < \mu_{TR}\text{, then +0.5,} \tag{9}$$

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

$$\mu_{TR} = \frac{n_T(n_T + n_N + 1)}{2}, \tag{10}$$

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

$$\sigma_{TR} = \sqrt{\frac{n_1 n_2 (n_1 + n_2 + 1)}{12}}. \tag{11}$$

The statistics of Mann-Whitney test not only indicate the magnitude of the gap of the parameter among the groups, but also reveal the statistical significance of this difference. A Mann-Whitney statistic less than -1.96 denotes the equity prices in the examined group, generally, are 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, in general, are more volatile than the equities in the rest of the world.

5. STOCK RETURN RISKS

In a purely integrated global financial market, only stock price global systematic risk will be compensated. However, the financial market is between completely segmented and absolutely integrated in the real world. This leads the pricing kernels in different countries vary and the determination of correctness of international capital asset pricing model almost impossible[6]. We consider both total exposure and global systematic risk and make an international comparison.

5.1 Conditional Volatilty

To remedy the excess kurtosis and volatility clustering, the *generalized* autoregressive conditional heteroscedasticity (GARCH) model introduced by Bollerslev (1986) as a generalization of model of Engle (1982) is applied. Suppose under efficient market, the stock price return follows GARCH (1,1) process. The conditional volatility and innovations of stock price return is further structured as:

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

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

$$\sigma^2{}_{i,j,t} = \varpi_{i,j} + \upsilon\varepsilon^2_{i,j,t-1} + \varsigma\sigma^2{}_{i,j,t-1}. \qquad (12)$$

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*), σ is the conditional standard error and ε is the white noise. The algorithm to generate the optimum is follow the methodology suggested by Berndt, Hall, Hall, and Hausman (BHHH) for maximum likelihood problems, which applied Gauss-Newton for general nonlinear least squares problems. In this conditional variance setting, the volatility forecast is a weighted

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[6] Since one may synthetically form a homemade portfolio without international investment and can generate the same diversification effect like the global market portfolio, the test of international CAPM using such domestically "mimicking" portfolio will reveal nothing regarding international asset pricing. This concept is an international extension of critiques of Roll (1977) on the CAPM.

average of previous forecast of variance and last period's squared disturbance. It is frequently found that the financial return series exhibit correlation in the variance process caused by autocorrelation of return. The setting of this parsimonious model commends the requirement of the number of estimated parameters is reasonable. Furthermore, Box, Jenkins, and Reinsel (1994) suggest that the decrease of estimated parameters will shrink the probability of misestimating. In sum, the GARCH model will be remedy to the violation of assumption of Gaussian distribution due to leptokurtosis and volatility clustering, which are often found in financial return series.

5.2 Global Market Systematic Risk

The Financial Times Actuaries World Index and the yield of thirty-year U.S. Treasure Note are used to be the proxies of global market portfolio and risk-free asset return, respectively. Follow the open-economy version of CAPM with one price law, the return of asset *j* in market *i* at the time *t* is:

$$r_{i,j,t} = r_{f,t} + b_{i,j}(r_{mi,t} - r_{f,t}) + \varepsilon_{i,j,t}. \qquad (13)$$

The global beta of any asset *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 global market portfolio. The global beta of each asset is generated by the monthly data of previous five years.

6. VARIATION AMONG DEVELOPMENTAL STAGES AND REGIONS

6.1 Conditional Volatility

In this section, we present the empirical finding of comparison of stock price risk among different developmental stages and regions. First, consider the comparison of conditional volatility of stock price return between emerging markets and developed countries in Table 4 and Figure 1. The significant Mann-Whitney statistics of the whole period and the mean of monthly values reveal the stock prices in developing countries are significantly more volatile than the ones in developed countries. The phenomena of substantially higher stock price volatility in developing countries lasts from the beginning to the end of the sample period.

{Table 4}

{Figure 1}

The result demonstrated in the second panel of Table 4 and graphs from Figure 2 to 10 indicate that the continental distinction of stock price volatility is substantial. The conditional standard deviations of stock prices in Southeast Asia, South Europe, and Latin America are significantly higher than the rest of the world. Figure 3 and Figure 6 also show the higher stock price risk in Southeast Asia and South Europe is persistent during the sample period. In Figure 9, the relative size of stock price volatility in Latin American countries tends to fluctuate historically. On the other hand, the equity securities in Northeast Asia and North America, mainly Japan and the U.S., are less risky. Figure 4 and Figure 10 confirm the stock price returns in these areas are consistently less volatile than the other areas. The whole-period stock price volatilities in North and West European countries are higher than the rest of world but, according to the proportions of significant values in Table 4, Figure 7 and 8, did not carry on during the sample period.

{Figure 2 - 10}

The classification of sub-regions seems provide better understanding on the geographical variation of total risk of stock price. The outcomes of Mann-Whitney statistics of Southeast Asia and Northeast Asia suggest the relative magnitude of stock price volatility vary within East Asia. One also can find the disparity of respective values on the test of stock price among European countries by observing the Mann-Whitney statistics of South, Central/West, and North Europe.

6.2 Global Beta

The summary of statistics of whole-period and time-series of Mann-Whitney test of the U.S. Dollar-based global beta among the developmental stages and various regions is demonstrated in Table 5. Similar to the result of the test on stock price volatility, the global systematic risks of the stock prices in emerging markets, by and large, are significantly higher than the ones in developed countries. Figure 11 shows comparative magnitude of the global market exposure of stock prices in emerging markets was significantly low before 1998 and dramatically increased. The swift escalation of global betas in developing countries was triggered by the financial crisis in many emerging markets after 1997. However, the contagions among the markets and strengthened global integration enhanced the coefficient of correlation between emerging markets with the world financial market to.

{Table 5}

{Figure 11}

One will find a different geographical disparity of relative size of global market exposure from the one of stock price volatility in the second panel in Table 5 and the graphs from Figure 12 to 20. Similar to the conclusion made by the test on conditional volatility, the results of Mann-Whitney test on global betas suggest stock prices in North America are relatively static while ones in Southeast Asia are riskier. Figure 13 and 20 confirm this relative size regarding global beta holds chronologically during the sample period while the gap between the North America and the rest of the world is diminishing. On the other hand, except Southeast Asia, the stock prices in Northeast Asia, Latin America and North Europe are of higher global market exposure than the rest of the world. In the second panel of Table 5, the proportions of the historical Mann-Whitney statistics significantly higher than the world standard of global market beta in East Asia, North Europe, and Latin America are 99%, 24%, and 84%, respectively. Although the stock volatility in North Asia and North Europe is relatively low, the tighter global connection of local stock return makes the global beta in these areas higher than the other regions. Figure 14 and 18 show the chronological patterns of the two sub-regions. On the other hand, the stocks in South Europe were of moderately lower global beta than the rest of the world due to the lower global correlation. The Mann-Whitney test in Table 5 and Figure 17 suggest the global betas in West Europe, in general, were lower than the rest of the world.

{Figure 12 - 20}

One can find the intra-variation of relative size of global beta within Europe. The Mann-Whitney statistics of South, Central/West, and North Europe suggest the relative magnitude of stock price volatility differ from each other. One also can find the major source of risk of stock price in the markets of Southeast Asia, South Europe, Latin America is the volatility caused by idiosyncratic risk of the individual company or industry, but the exposure of stock value to global market in Northeast Asia, North/West Europe, and North America tend to be of more weight in determining equity risk. This finding is consistent with the study by Bekaert and Harvey (1997) and Bekaert, Harvey and Ng (2005) regarding the cross-country difference of pricing risk.

7. CROSS-NATIONAL DIFFERENCE

7.1 Conditional Volatility

The examination of individual country not only is a closer look on the relative level of total risk of equity value in each country, but also provides an opportunity to investigate the markets that are classified in any region. In addition, the outcome of test on each nation can be a reference on the discovery of the cross-country variation among each of tested groups of developmental stages and regions.

Table 6 reports the Mann-Whitney test on the standard deviation of stock price in each country. The variation of stock price volatility within the group of developed countries seems to be more significant than the one among the developing countries. The equity values in the rich countries, in general, tend to be more stable, however the total risk of stock prices in the markets of Austria, Belgium, Finland, France, Hong Kong, Luxemburg, and Spain are relatively higher than the world average level. On the other hand, unlike the stocks in other developing nations, the equity prices in Chile and Portugal are relative unwavering. Although one can find a small number of exceptions by observing result of cross-country test, the conclusion about conditional risk variation of developmental stages holds in most nations.

{**Table 6}**

The cross-national comparison also reveals the intra-continental variation of total exposure of stock prices. One may find a straightforward case by observing the variation among European countries. Even though the countries locate in the same sub-region with a similar economic development circumstances, for instance, Austria, Belgium, France, and Luxemburg versus the rest of countries in West Europe, the distinctiveness characterized by legal tradition, property right protection, cultural background, and endowment may have impact to the stock volatility. The deviation among the Latin American countries is another illustration. Additionally, the stock prices in the largest capital markets in the world, Japan, U.K., and the U.S. are significantly less volatile.

7.2 Global Beta

The summary of Mann-Whitney statistics on the test of comparative size of global beta of individual country is demonstrated in Table 7. Similar to the result regarding stock price volatility, international market systematic risk of stock prices, generally, in most of developed countries were significantly smaller than the world average level except Hong Kong, Japan, Singapore, and Sweden. On the other hand, the equity values in India and Portugal were of relatively lower global systematic risk. The global betas of stocks in most emerging markets are somewhat higher than the ones in developed countries.

{**Table 7}**

The degree of integration with international financial market is a major source of risk to asset value in some countries. Because the stock price's global correlation fluctuates from country to country, the conclusion of comparative size regarding stock price exposures are different when the two risk measures are utilized in some countries'. The conclusion regarding relative risk of stock prices in Austria, Belgium, Finland, France, Japan, Luxemburg, Spain, Sweden, and India is contrary.

Figure 21 presents the distribution as well as descriptive summary of global betas of all sample stocks. Since the numbers of stocks from developed countries represent more than five-sixth of sample, it is not surprised to find that the mean of global beta of all stocks is lower than one. The coefficients of skewness and kurtosis, and low p-value of statistics of Cramer-von Miles test as well as Watson test suggest the normality of distribution is rejected.

{Figure 21}

The summary of distribution of global betas within each country is reported in Table 8. The Panel A shows that the means of world systematic risks in all developed countries, except Singapore, are smaller than one. On the other hand, because in general the stock prices in developing countries are volatile, the higher-than-one means of global betas indicate large proportions of aggressive equities in many emerging markets. The range of means of the largest three economic powers, Japan, the U.K., and the U.S.A., is from 0.74 to 0.79. The Gaussian assumption on the distribution of global betas within each market is violated since all countries do not simultaneously demonstrate non-zero skewness or normal value of kurtosis.

{Table 8}

A similar conclusion regarding regional variation of the global beta also can be found. In Panel B of Table 8, among Latin American countries the average of stock systematic risks in Argentina, Brazil, and Mexico are greater than one but the mean of global beta in Chile is less than the world average. Amongst the countries in East Asia, the means of global betas of the stock prices in Indonesia, Korea, Malaysia, Philippines, and Singapore are greater than one. The stock prices in Hong Kong, Japan, Taiwan, and

Thailand are relatively less risky but their global betas, on average, are higher than the other areas. The variation of the world betas among the European countries is moderate. Except the stock prices in Turkey and Norway, in general, the equity values in European countries are of lower global market systematic risks. Consistent with the finding using non-parametric method, the means of global betas in two developing countries, Brazil and India, are the highest and smallest among all, respectively. This reveals the difference of the correlation of stock price with the global market causes the impact in determining risk premium.

The negative global beta is more frequently seen in the developed markets than the newly developed countries. Only seven of twenty-two mature economies are of no negative global beta, while eight of fifteen developing countries are of all positive global betas. In Panel C of Table 8, the ratio of stock prices of negative global correlation in developed countries is slightly higher than the one in emerging markets. It is not surprised the areas in which the most countries have been industrialized tend to be of lower means of global coefficient of correlation and of higher ratios of negative correlation values. Those stocks of negative global correlation provide international investors opportunity to hedge the systematic risk brought by the change of global economy. The fact of higher fractions of negative correlation between global market movement and stock prices in mature economies suggests the mature economies seem not generate lower benefit of global diversification than the emerging markets.

8. TEMPORAL VARIATION OF STOCK RETURN VOLATILITY

The analysis of time-series of change of volatility in different countries provides information about the higher-moment stock price exposures as well as the evidence regarding steady integration of global financial market. The temporal variance of the stock risk reveals the information regarding how and how much does the relevant risk change. Investors may implement an appropriate hedge strategy basing on the dynamics of risk that is not explained by macroeconomic variables[7].

The variation of stock price volatility may come from three major channels: the feedback of volatility, the disturbance of financial leverage, and adjustment to future expectation on risk premium. Pindyck (1984) suggests that the excess risk is brought by the change of volatility, which subsequently provokes the adjustment of expectation on market risk premia. On the other hand, Christie (1982) propose the variation of stock price simultaneously alter the financial leverage and borrowing ability of a firm, which in turn may trigger expansion of volatility with the disturbance of risk. The third explanation is from the idea of intertemporal hedging demand proposed by Merton (1973) and Campbell (1993, 1996). Hamilton and Lin (1996) suggest that the volatility of economic growth, especially recessions, may trigger the variations in stock price volatility.

The changeable expectation to future markets prospect due to the variation of economic scenarios will result in change of volatility. Previous study suggests the dynamics of stock price volatility is asymmetric. The frequency of decline of variance is higher than the upsurge of volatility while the absolute value of increase of volatility is higher than the one of decrease of total risk. See Beck (1993), Madhavan, Richardson,

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[7] Please see Haugen, Talmor, and Torous (1991).

and Roomans (1997), Haugen, Talmor, and Torous (1991), Hamilton, and Lin (1996), Dumas, Fleming, and Whaley (1998), Veronesi (1999), and Bekaert and Wu (2000). Bekaert and Harvey (2000) use data of emerging markets and suggest the liberalization of does not significant change in the volatility of stock prices while in the long run the stock price dynamics tends to decline in developing countries.

To capture the dynamics of price volatility of individual stock, the change of conditional risk of stock *j* at country *i* at time *t* is defined as:

$$\Gamma_{i,j,t} = \ln(\sigma_{i,j,t} / \sigma_{i,j,t-1}) , \qquad (13)$$

where $\sigma_{i,j,t}$ is the conditional standard error modeled by GARCH (1,1) process. The change of conditional standard error of each country at time *t* is represented by the mean of conditional risk changes of all stocks at this period. Specifically,

$$\Gamma_{i,t} = \sum_{j=1}^{N_i} \Gamma_{i,j,t} / N_i \ . \qquad (14)$$

The summary of time-series of annualized change of the conditional standard error of global stock returns, which are measured by GARCH (1,1) model, of the U.S. Dollar-based equity return is demonstrated in Table 9. In most countries, the distributions of the dynamics of volatility are asymmetric because positive skewness with excess kurtosis is quite common. Moreover, one may find in most countries the maximum of annualized change of volatility, in general, is considerably higher than the absolute value of the minimum. However, the percentage of decrease of conditional volatility is higher than the one of increase of volatility. This implies the upsurge of total risk of stock price is less frequent while the dimension is larger than the drop of stock price exposure.

In Panel A, the volatility dynamics of stock price among mature economies differs from country to country in long run. The stock prices in ten countries, Australia, Canada, Finland, France, Hong Kong, Italy, Japan, New Zealand, Singapore, Sweden, display a moderate movement toward a lower level while the stock exposure in the rest twelve developed nations exhibit more or less inclination. In Panel B, the stock prices in most developing countries, except Greece and Taiwan, experienced shrinkage of volatility at an annual rate ranging from 0.1% to 3%. Although there is a tendency of dwindling volatility for stock prices in emerging markets, the individually absolute extent of escalation of volatility, although happened less frequently, is greater than the single magnitude of more repeated decline of risk. This finding also can be confirmed by the fact that the absolute values of maximum of change of volatility are greater than the ones of minimums in all developing countries.

The statistics of non-parametric comparison of the stock return volatility dynamics among the different developmental stages, regions, and countries are demonstrated in Table 10. During the sample period, compare to the equities in rich countries, the stock price volatility in emerging markets was significantly diminishing. Given the stock price risk in emerging markets was greater than the value exposure in developed countries, the difference between two groups seemed getting slighter during this period. An analogous conclusion can be found in the regional comparison. The stock volatility in East Asia, which is one of the regions of risky stocks among all areas, is diminishing. On the other hand, the stock price volatility in the areas in which stock prices were comparatively less risky than the other areas, such like Europe (especially West European countries) and North America, tend to increase. The trends of increase of stock price volatility in less risky markets and decrease of stock price volatility in more risky markets implies the strengthening of integration of international financial market drive stock price risk toward global similarity.

In the Panel B and C of Table 10, the Mann-Whitney statistics of individual country and their trends are reported. The harmonization of international stock price risks also can be found in the result of test on individual country. In most developed countries, the stock price volatility tends to increase faster than the rest of the world during the sample period, except Hong Kong, Japan, and Singapore. The conditional volatility of stock prices in the markets that equity values were significantly less volatile, such as the U.K. and the U.S.A, tend to increase. The conditional variances of Japanese stocks not only were relatively lower but also were shrinking. On the other hand, the comparatively higher-than-the-world-average stock price risks in France and Spain were enhancing. On the other hand, the signs of Mann-Whitney test regarding the relative size of change of stock price volatility in all emerging markets are significantly negative.

In this section, we empirically examine cross-national variation of change of stock volatilities. The result suggests the stocks of high price volatilities tend to be less volatile and the conditional exposures of less risky stocks were steadily enlarging. The same findings not only hold in the tests among countries of various developmental stages and areas, but also most of individual countries. This finding can be viewed as evidence of the enhancement of integration of international financial markets. In addition, we find the change of stock price volatility is asymmetric. A considerable alteration of conditional standard error usually is an adjunct to an intensification, but not diminution, of stock price risk.

9. CONCLUSION

This paper presents a possible explanation regarding the sources of stock price exposure and employs a distribution-free method to study the cross-country variation of stock price risks. We utilize international asset pricing model to describe the domestic asset pricing error which can be used to specify the connection between the degree of integration of local market with international financial market and stock price risk. Our analysis suggests that the stock price in a local market with high global market integration, which is proxied by domestic market correlation coefficient with world market, is less risky. This model is consistent with previous finding regarding the stock price risk in international capital market.

We further utilize data of 4,916 stocks from twenty-two developed countries and fifteen developing countries and reported empirical result of the relative magnitude of conditional volatility and global systematic risk of stock price between different developmental stages and various areas. The non-parametric Mann-Whitney tests suggest that the stock prices in emerging markets are comparatively riskier than the ones in developed countries, both measured by conditional volatility and unconditional global beta. The empirical findings also support the geographical variation of stock risk. Specifically, the equity values in East Asia, especially Southeast Asia, South Europe, and Latin America are more volatile than the rest of the world. Although there are a small amount of exceptions in the country-level tests, most countries' relative size of stock price risks are similar the ones of their developmental stage as well as area. In addition, the analysis of time-series of volatility suggests the stocks of high price exposures tended to be less volatile and the conditional volatilities of less risky stocks tended to be steadily enlarging. This finding can be viewed as evidence of the enhancement of integration of international financial markets.

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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, weight of trading value over the world value, 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)	Weights of Trading Value	Weight of Capitalization	**Local Market Index**
ARGENTINA	15	Buenos Aires (1)	0.01%	0.07%	Buenos Aires SE General Index (IVBNG)
AUSTRALIA	119	Australian Stock Exchange National Market, Brisbane, Hobart, Melbourne, Perth, Sydney (6)	0.88%	1.67%	Australia ASX All-Ordinaries
AUSTRIA	40	Vienna (1)	0.02%	0.15%	Composites - Austria Trading Index (ATX)
BELGIUM	24	Brussels (1)	0.04%	0.11%	Belgium CBB Spot Price Index
BRAZIL	40	Rio de Janeiro, Sao Paulo (2)	0.14%	0.56%	Brazil Bolsa de Valores de Sao Paulo (Bovespa)
CANADA	200	Montreal, Toronto, Vancouver (3)	1.21%	2.50%	Canada S&P/TSX 300 Composite Index
CHILE	26	Santiago (1)	0.01%	0.22%	Santiago SE Indice General de Precios de Acciones
DENMARK	22	Copenhagen (1)	0.16%	0.34%	Copenhagen KAX All-Share Index
FINLAND	21	Helsinki (1)	0.53%	0.61%	Finland HEX All-Share Composite
FRANCE	112	Bordeaux, Lyon, Marseille, Paris (4)	5.91%	6.75%	France SBF-250 Index
GERMANY	142	Bremen, Dusseldorf, Frankfurt, Hamburg, Hanover, Munich (6)	3.60%	3.01%	Germany Frankfuter Allgemeine Aktien Index
GREECE	11	Athens (1)	0.07%	0.29%	Athens SE General Index
HONG KONG	117	Hong Kong (1)	0.58%	2.03%	Hong Kong Hang Seng Composite Index

(Continue)

Country	Number of Companies	Market (Number)	Weights of Trading Value	Weight of Capitalization	Local Market Index
INDIA	59	Bombay, Calcutta, Delhi (3)	0.59%	1.07%	Mumbai (Bombay) SE Sensitive Index
INDONESIA	63	Jakarta (1)	0.04%	0.13%	Jakarta SE Composite Index
IRELAND	20	Irish (1)	0.10%	0.26%	Ireland ISEQ Overall Price Index
ITALY	112	Bologna, Florence, Genoa, Naples, Rome, Turin, Venice (7)	1.89%	2.09%	Banca Commerciale Italiana General Index
JAPAN	1,469	Fukuoka, Hiroshima, Kyoto, Nagoya, Niigata, Osaka, Sapporo, Tokyo (8)	5.01%	9.08%	Japan Nikkei 225 Stock Average
KOREA	43	Souel (1)	1.77%	0.95%	Korea SE Stock Price Index (KOSPI)
LUXEMBOURG	8	Luxembourg (1)	0.00%	0.11%	Luxembourg SE LUXX Index
MEXICO	11	Mexico City (1)	0.10%	0.46%	Mexico SE Indice de Precios y Cotizaciones (IPC)
MALAYSIA	142	Kuala Lumpur (1)	0.10%	0.54%	Malaysia KLSE Composite
NEW ZEALAND	20	Auckland (1)	0.03%	0.10%	Mumbai (Bombay) SE Sensitive Index
NORWAY	30	Oslo (1)	0.17%	0.30%	Oslo SE All-Share Index
NETHERLANDS	82	Amsterdam-AEX Aptiebeurs (1)	0.09%	0.35%	Netherlands All-Share Price Index
PHILIPPINES	11	Manila (1)	0.01%	0.08%	Manila SE Composite Index
PORTUGAL	17	Lisbon (1)	0.00%	0.02%	Portugal Banca Torres & Acores General Index
SINGAPORE	61	Singapore (1)	0.19%	0.45%	Singapore Straits-Times Index
SOUTH AFRICA	57	Seoul (1)	0.23%	0.51%	FTSE/JSE All-Share Index
SPAIN	56	Barcelona, Bilbao, Madrid, Valencia (4)	1.94%	2.03%	Madrid SE General Index

(Continue)

Country	Number of Companies	Market (Number)	Weights of Trading Value	Weight of Capitalization	Local Market Index
SWEDEN	35	Stockholm (1)	0.83%	0.79%	Sweden Affarsvarlden General Index
SWITZERLAND	34	Zurich (1)	1.78%	2.40%	Switzerland Price Index
THAILAND	119	Bangkok (1)	0.12%	0.20%	Thailand SET General Index
TAIWAN	77	Taipei (1)	1.88%	1.15%	Taiwan SE Capitalization Weighted Index
TURKEY	15	Istanbul (1)	0.21%	0.15%	Istanbul SE IMKB-100 Price Index
UNITED KINGDOM	383	Granville, London (2)	11.89%	7.90%	UK Financial Times-SE 100 Index
UNITED STATES	1,103	AMEX, NASDAQ, NYSE (3)	55.67%	48.52%	S&P 501 Composite
Total	4,916		97.77%	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)

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 Price Volatility Between Developmental Stages and Geographical Regions

The summary of time-series of Mann-Whitney statistics on monthly return volatilities on developmental stages and geographic regions from 1992:01 to 2003:06 is reported. The null hypothesis of test is the U.S. Dollar-based stock return volatility of the tested group equals to the one in the rest of the sample. The standard deviation of each period is estimated by GARCH (1,1) model

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

$$\sigma^2_{i,j,t} = \varpi + \upsilon h_{i,j,t-1} \varepsilon^2_{i,j,t-1} + \varsigma \sigma^2_{i,j,t-1}.$$

The Whole Period is the Mann-Whitney statistics of the unconditional variance of the whole sample period. The mean, skewness, and kurtosis are from the time-series of Mann-Whitney statistics in the sample period. The groups of MW>1.96 and MW<-1.96 indicate the ratios of period that stock price conditional volatility in the tested group is statistically significant greater/smaller than the one in the rest of the sample at 2.5% level.

	Whole Period	Mean	Skewness	Kurtosis	>1.96	< -1.96
Emerging Market	19.542	15.459	0.734	-0.014	1.000	0.000
Region						
East Asia	4.366	1.251	1.165	2.527	0.372	0.241
Southeast Asia	16.950	9.298	1.033	0.133	0.978	0.000
Northeast Asia	-4.689	-5.181	0.796	0.992	0.080	0.752
Europe	1.549	1.362	-0.898	2.176	0.847	0.051
South Europe	6.671	4.178	0.002	-0.562	0.971	0.000
West Europe	2.319	-0.973	-0.851	1.814	0.161	0.292
North Europe	1.759	-1.305	-0.565	0.816	0.022	0.285
Latin America	4.600	1.465	-0.270	0.000	0.350	0.022
North America	-11.540	-13.094	0.031	-0.618	0.000	0.985

Table 5 The Mann-Whitney Test of Global Beta Between Developmental Stages and Geographical Regions

The summary of time-series of Mann-Whitney statistics on the magnitude of international beta between developmental stages and geographic regions from 1992:01 to 2003:06 is reported. The null hypothesis is the international beta of the U.S. Dollar-based stock returns of the tested group is equal to the one in the rest of sample. The Whole Period is the Mann-Whitney statistics of the global beta of the whole sample period. The mean, skewness, and kurtosis are from the time-series of Mann-Whitney statistics in the sample period. The groups of MW>1.96 and MW<-1.96 indicate the ratios of period that stock price conditional volatility in the tested group is statistically significant greater/smaller than the one in the rest of the sample at 2.5% level.

	Whole Period	Mean	Skewness	Kurtosis	>1.96	< -1.96
Emerging Market	14.891	16.906	-2.048	2.921	0.875	0.100
Region						
East Asia	20.984	25.215	-0.648	-0.330	0.988	0.000
Southeast Asia	20.100	22.586	-2.006	2.861	0.875	0.100
Northeast Asia	11.491	14.675	0.967	0.247	0.863	0.000
Europe	-11.633	-19.106	0.471	-0.653	0.000	0.975
South Europe	-3.163	-5.677	-0.254	-1.184	0.000	0.925
West Europe	-14.045	-22.198	0.569	-0.640	0.000	0.975
North Europe	2.402	0.118	0.233	-1.023	0.238	0.288
Latin America	5.677	4.996	-1.911	2.320	0.838	0.100
North America	-9.984	-8.292	-1.240	0.028	0.000	0.825

Table 6 The Mann-Whitney Test on Stock Price Volatility Among the Countries

The summary of time-series of Mann-Whitney statistics on monthly return volatilities among the countries from 1992:01 to 2003:06 is reported. The null hypothesis of test is the U.S. Dollar-based stock return volatility of the tested country equals to the one in the rest of the sample. The standard deviation of each period is estimated by GARCH (1,1) model

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

$$\sigma^2{}_{i,j,t} = \varpi + \upsilon h_{i,j,t-1}\varepsilon^2_{i,j,t-1} + \varsigma\sigma^2{}_{i,j,t-1}.$$

The Whole Period is the Mann-Whitney statistics of the unconditional variance of the whole sample period. The mean, skewness, and kurtosis are from the time-series of Mann-Whitney statistics in the sample period. The groups of MW>1.96 and MW<-1.96 indicate the ratios of period that stock price conditional volatility 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 Among Countries – Developed Countries

Country	Whole Period	Average	Skewness	Kurtosis	>1.96	< -1.96
AUS	-3.421	-4.746	-0.564	-0.263	0.000	0.993
AUT	9.698	7.654	-1.431	1.654	1.000	0.000
BEL	8.127	6.222	-0.500	0.511	1.000	0.000
CAN	-1.752	-3.350	0.020	1.983	0.000	0.934
DNK	-3.545	-5.100	-0.310	-0.930	0.000	0.993
FIN	5.222	3.229	-0.570	-0.415	0.971	0.000
FRA	12.803	9.763	-0.503	0.420	1.000	0.000
DUE	-2.852	-4.474	1.826	5.876	0.022	0.891
HKG	4.417	2.295	1.145	1.140	0.511	0.000
IRE	-1.582	-3.200	0.364	-0.748	0.000	0.854
ITL	-2.217	-3.347	0.252	-0.254	0.000	0.818
JPN	-8.783	-7.791	0.727	0.499	0.066	0.869
LUX	4.659	2.890	-0.514	0.118	1.000	0.000
NZL	-3.157	-4.575	0.075	-0.226	0.000	0.993
NLD	0.786	-1.123	0.785	1.889	0.015	0.241
NOR	0.595	-1.198	0.948	0.524	0.000	0.131
SGP	1.516	-1.563	1.011	-0.005	0.175	0.569
ESP	12.835	10.844	-0.416	0.221	1.000	0.000
SWE	-1.859	-3.964	0.379	-0.414	0.000	0.869
CHE	0.287	-1.551	-0.219	-0.140	0.000	0.263
GBR	-7.318	-9.128	-0.206	-0.228	0.000	0.993
USA	-11.380	-11.998	0.164	-0.808	0.000	0.985

Panel B: Tests Among Countries – Emerging Markets

Country	Whole Period	Average	Skewness	Kurtosis	>1.96	< -1.96
ARG	3.389	0.938	0.514	0.529	0.109	0.000
BRZ	6.091	3.867	0.216	-0.578	0.993	0.000
CHL	-2.152	-3.703	0.275	-0.851	0.000	0.942
GRC	1.544	-0.550	-0.084	-1.085	0.000	0.036
IND	4.386	2.285	0.449	0.521	0.613	0.000
IDN	10.817	6.642	0.664	-0.506	1.000	0.000
KOR	7.005	3.223	0.383	0.022	0.737	0.000
MYS	8.877	4.296	0.846	-0.324	0.693	0.000
MEX	0.960	-0.657	0.764	1.018	0.007	0.029
PHL	3.073	1.181	-0.168	-0.398	0.080	0.000
PRT	-1.118	-0.866	1.047	1.307	0.000	0.832
ZAF	0.864	-1.326	1.515	3.130	0.051	0.401
TWN	3.726	2.273	-0.448	-0.628	0.569	0.000
THA	8.948	4.875	0.690	-0.262	0.883	0.000
TUR	5.686	3.731	-1.061	0.652	1.000	0.000

Table 7 The Mann-Whitney Test on Global Beta Among the Countries

The summary of time-series of Mann-Whitney statistics on the magnitude of international beta among the countries from 1997:01 to 2003:06 is reported. The null hypothesis is the international beta of the U.S. Dollar-based stock returns of the tested country is equal to the one in the rest of sample. The Whole Period is the Mann-Whitney statistics of the global beta of the whole sample period. The mean, skewness, and kurtosis are from the time-series of Mann-Whitney statistics during the sample period. The groups of MW>1.96 and MW<-1.96 indicate the ratios of period that stock price conditional volatility 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 Among Countries – Developed Countries

Country	Whole Period	Average	Skewness	Kurtosis	>1.96	< -1.96
AUS	-7.371	-4.888	0.879	0.913	0.000	0.875
AUT	-8.555	-7.712	1.214	0.404	0.000	0.975
BEL	-5.896	-5.460	1.071	0.105	0.000	0.975
CAN	-3.739	-1.649	-0.850	-0.514	0.025	0.238
DNK	-1.919	-2.283	0.689	1.291	0.000	0.750
FIN	-2.278	-1.901	0.781	-1.195	0.000	0.688
FRA	-5.209	-6.952	0.680	-0.694	0.000	0.888
DUE	-8.830	-9.390	-0.061	-1.271	0.000	0.975
HKG	7.306	8.487	-1.984	2.708	0.875	0.075
IRE	-0.370	-1.702	0.298	-1.082	0.000	0.450
ITL	-1.137	-3.482	0.580	-0.883	0.075	0.688
JPN	6.879	9.931	1.376	1.015	0.700	0.150
LUX	-3.516	-3.975	0.720	0.169	0.000	0.975
NZL	-0.319	0.169	0.274	-0.416	0.000	0.000
NLD	-1.932	-5.147	0.158	-1.151	0.000	0.925
NOR	2.330	0.299	0.174	-1.098	0.088	0.013
SGP	8.881	9.089	-1.914	2.564	0.950	0.000
ESP	-5.840	-5.542	0.809	-1.223	0.138	0.688
SWE	3.354	1.381	0.077	-1.259	0.413	0.000
CHE	-0.122	-1.335	0.674	-0.736	0.000	0.450
GBR	-1.669	-8.984	0.732	-0.437	0.063	0.788
USA	-8.792	-7.992	-1.204	0.049	0.000	0.825

Panel B: Tests Among Countries – Emerging Markets

Country	Whole Period	Average	Skewness	Kurtosis	>1.96	< -1.96
ARG	3.330	3.765	-0.543	-0.736	0.913	0.000
BRZ	7.046	4.216	-1.365	1.053	0.813	0.100
CHL	-1.866	-0.338	-1.563	1.568	0.013	0.163
GRC	-0.012	-1.015	0.386	0.172	0.000	0.150
IND	-8.333	-5.057	-1.212	1.731	0.000	0.950
IDN	9.191	8.659	-2.176	3.763	0.900	0.075
KOR	7.975	6.534	-1.698	1.530	0.838	0.100
MYS	12.918	13.925	-1.963	2.785	0.900	0.075
MEX	1.863	2.438	-1.626	1.933	0.750	0.000
PHL	2.126	2.510	-1.541	0.888	0.750	0.125
PRT	-2.049	-1.551	1.059	-0.332	0.000	0.650
ZAF	0.713	2.023	-1.140	-0.516	0.713	0.225
TWN	3.746	4.331	-0.321	-0.036	0.875	0.000
THA	4.101	6.882	-1.834	2.074	0.825	0.150
TUR	4.882	1.741	0.079	-1.484	0.425	0.125

Table 8 The Distributions of International Systematic Risk

The mean, maximum, minimum, standard deviation, skewness, kurtosis, and the proportion of negative global beta of international market systematic risk of sample stocks in each country is reported. Using the Financial Times Actuaries World Index and the yield of thirty-year U.S. Treasure Note as the proxies of global market portfolio and risk-free asset return, we generate global beta of stock *j* in market *i* at the time *t* by the international CAPM: $r_{i,j,t} = r_{f,t} + b_{i,j}(r_{mi,t} - r_{f,t}) + \varepsilon_{i,j,t}$.

Panel A: Developed Countries

Country	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	% of Negative beta
AUS	0.493	1.971	-0.162	0.360	1.167	5.547	5.88%
AUT	0.513	1.318	-1.473	0.420	-0.267	7.028	40.00%
BEL	0.290	1.149	-0.431	0.386	0.318	2.723	33.33%
CAN	0.684	3.025	-0.596	0.493	1.059	5.490	4.00%
DNK	0.597	1.627	0.006	0.400	0.795	3.172	0.00%
FIN	0.558	1.821	0.089	0.393	1.591	6.069	0.00%
FRA	0.550	1.706	-0.208	0.458	0.651	2.573	4.46%
DUE	0.448	1.712	-0.297	0.435	0.786	3.052	8.45%
HKG	0.911	2.720	-0.030	0.497	0.692	3.713	0.85%
IRE	0.724	1.321	0.082	0.342	-0.162	2.076	0.00%
ITL	0.776	1.941	-0.048	0.393	0.578	3.130	0.89%
JPN	0.789	2.376	-2.783	0.331	-0.386	12.762	0.27%
LUX	0.780	0.839	-0.431	0.431	0.547	2.284	25.00%
NZL	0.695	2.393	0.119	0.485	0.802	3.750	0.00%
NLD	0.667	1.283	0.217	0.289	0.691	2.854	0.00%
NOR	0.956	1.889	0.384	0.360	0.894	3.381	0.00%
SGP	1.245	2.066	0.345	0.452	-0.150	2.381	0.00%
ESP	0.340	1.170	-0.393	0.382	0.191	2.415	10.71%
SWE	0.786	1.403	0.323	0.252	0.702	3.502	0.00%
CHE	0.849	1.738	-0.077	0.448	0.432	2.377	2.94%
GBR	0.794	4.175	-0.609	0.500	1.725	11.200	1.57%
USA	0.736	3.321	-1.152	0.515	0.873	4.850	4.17%

Panel B: Emerging Markets

Country	Mean	Max	Min	Std. Dev.	Skewness	Kurtosis	% of Negative beta
ARG	1.152	1.649	0.368	0.421	-0.435	1.904	0.00%
BRZ	1.513	2.971	0.322	0.663	0.108	3.787	0.00%
CHL	0.544	1.135	-0.194	0.343	-0.093	2.445	3.85%
GRC	0.757	1.248	0.187	0.311	-0.119	2.582	0.00%
IND	0.256	1.215	-0.250	0.295	0.980	4.768	13.56%
IDN	1.221	2.461	0.134	0.596	-0.109	2.415	0.00%
KOR	1.412	2.038	0.721	0.277	-0.245	3.131	0.00%
MYS	1.045	2.080	0.047	0.411	0.170	2.580	0.70%
MEX	1.019	1.602	0.250	0.439	-0.282	1.953	0.00%
PHL	1.236	2.021	0.646	0.448	0.649	2.289	0.00%
PRT	0.527	1.424	-0.022	0.343	0.845	4.126	5.88%
ZAF	0.698	1.987	-0.605	0.435	0.084	3.847	1.75%
TWN	0.800	1.584	-0.285	0.264	0.493	2.785	3.90%
THA	0.809	2.477	-0.595	0.582	0.557	3.117	3.36%
TUR	1.599	2.155	1.014	0.419	-0.115	1.402	0.00%

Panel C: Summary of Stock Price Correlation Coefficient with World Market Portfolio

	Mean	% of Negative CC
Emerging Markets	0.259	2.27%
Developed Countries	0.249	2.92%
East Asia	0.288	0.62%
Southeast Asia	0.306	1.17%
Northeast Asia	0.284	0.47%
Europe	0.210	4.98%
South Europe	0.188	3.79%
Central/West Europe	0.236	5.77%
North Europe	0.251	0.00%
Latin America	0.276	1.09%
North America	0.236	4.14%

Table 9 Summary of Temporal Change of Conditional Volatility

The summary of time-series of annualized change of the conditional standard error, which is measured by GARCG (1,1) model, of US dollar based stock return is presented. The change of conditional risk of stock *j* at country *i* at time *t* is $\Gamma_{i,j,t} = \ln(\sigma_{i,j,t} / \sigma_{i,j,t-1})$. The change of conditional standard error of each country at time *t* is represented by the mean of conditional risk changes of all stocks at this period. Specifically, $\Gamma_{i,t} = \sum_{j=1}^{N_i} \Gamma_{i,j,t} / N_i$.

The mean of annualized ratio of stock volatility change, standard deviation, maximum, minimum, and the ratios of month of positive and negative change of stock price volatility are reported.

Panel A: Developed Countries

Country	Mean	St Dev	Skewness	Kurtosis	Max	Min	% of positive	% of negative
AUS	-0.03%	6.04%	1.022	3.220	86.04%	-52.39%	42.34%	57.66%
AUT	0.47%	9.89%	7.380	74.067	343.11%	-57.68%	40.15%	59.85%
BEL	0.48%	2.86%	6.703	51.574	84.65%	-7.37%	38.69%	61.31%
CAN	-0.14%	10.00%	3.253	23.114	261.02%	-85.60%	42.34%	57.66%
DNK	0.45%	8.84%	0.580	0.007	89.69%	-60.46%	45.26%	54.74%
FIN	-0.55%	12.86%	5.713	51.980	408.15%	-93.78%	45.99%	54.01%
FRA	-0.53%	11.11%	5.398	55.927	355.56%	-162.13%	41.61%	58.39%
DUE	0.55%	24.22%	6.423	70.134	821.62%	-357.76%	45.99%	54.01%
HKG	-1.17%	14.84%	3.062	17.014	345.84%	-111.90%	39.42%	60.58%
IRE	0.73%	19.74%	1.494	3.387	267.82%	-160.62%	37.23%	62.77%
ITL	-0.39%	13.91%	1.367	3.906	209.87%	-114.18%	37.23%	62.77%
JPN	-0.61%	12.38%	0.643	0.784	146.37%	-116.51%	41.61%	58.39%
LUX	1.21%	0.11%	0.540	-0.834	122.09%	-100.68%	78.23%	21.77%
NZL	-0.49%	14.27%	0.860	1.389	188.70%	-98.00%	43.80%	56.20%
NLD	1.20%	19.90%	5.749	60.309	651.21%	-287.94%	41.61%	58.39%
NOR	0.37%	9.02%	1.541	6.090	172.23%	-66.65%	40.88%	59.12%
SGP	-1.16%	24.59%	2.205	7.004	461.36%	-136.85%	33.58%	66.42%
ESP	0.77%	3.38%	-0.906	12.177	53.14%	-70.57%	59.85%	40.15%
SWE	-0.65%	13.74%	1.953	5.676	208.94%	-118.70%	35.77%	64.23%
CHE	0.20%	10.06%	1.291	4.437	176.38%	-80.25%	45.99%	54.01%
GBR	0.66%	7.38%	1.744	5.370	131.14%	-54.11%	40.15%	59.85%
USA	0.31%	6.32%	3.466	21.765	160.91%	-40.43%	43.80%	56.20%

Panel B: Emerging Markets

Country	Mean	St Dev	Skewness	Kurtosis	Max	Min	% of positive	% of negative
ARG	-0.14%	28.82%	2.619	11.611	579.93%	-192.67%	38.69%	61.31%
BRZ	-0.38%	20.03%	1.452	4.759	322.76%	-198.38%	39.42%	60.58%
CHL	-0.36%	13.06%	1.857	6.968	253.03%	-80.45%	38.69%	61.31%
GRC	0.84%	22.03%	2.089	6.022	331.72%	-124.01%	37.96%	62.04%
IND	-0.78%	13.90%	1.550	4.895	249.52%	-107.75%	37.23%	62.77%
IDN	-1.77%	26.65%	2.531	11.563	559.58%	-167.11%	37.96%	62.04%
KOR	-0.80%	30.59%	1.387	6.392	581.30%	-279.12%	40.15%	59.85%
MYS	-2.95%	28.08%	2.465	12.380	624.37%	-190.68%	38.69%	61.31%
MEX	-0.72%	20.84%	2.206	10.216	406.00%	-146.80%	40.88%	59.12%
PHL	-1.26%	15.18%	1.948	5.022	246.20%	-73.29%	33.58%	66.42%
PRT	-1.86%	21.40%	1.018	1.822	277.64%	-151.27%	40.15%	59.85%
ZAF	-1.35%	20.45%	2.418	13.690	442.76%	-177.73%	43.07%	56.93%
TWN	1.40%	9.89%	1.556	4.394	157.31%	-82.01%	42.34%	57.66%
THA	-2.57%	15.69%	1.344	2.620	200.55%	-96.42%	37.96%	62.04%
TUR	-0.60%	18.70%	0.049	2.499	244.31%	-195.85%	51.09%	48.91%

Table 10 The Mann-Whitney Test of Temporal Change of Stock Return Volatility

The summary of time-series of Mann-Whitney statistics on change of volatilities 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 change of volatility of the tested group equals to the one in the rest of sample. The change of conditional risk of stock *j* at country *i* at time *t* is defined as:

$\Gamma_{i,j,t} = \ln(\sigma_{i,j,t} / \sigma_{i,j,t-1})$,

where $\sigma_{i,j,t}$ is the conditional standard error modeled by GARCH (1,1) process. The change of conditional standard error of each country at time *t* is represented by the mean of conditional risk changes of all stocks at this period. That is, $\Gamma_{i,t} = \sum_{j=1}^{N_i} \Gamma_{i,j,t} / N_i$.

The whole period is the test of the unconditional standard deviation. The mean, skewness, and kurtosis of time-series of Mann-Whitney statistics are reported. The ratios of period with a significant Mann-Whitney statistics are demonstrated.

Panel A: Tests Between the Developmental Stages and Geographic Region

	Whole Period	Mean	Skewness	Kurtosis	>1.96	< -1.96
Emerging Market	-13.029	-3.631	0.501	0.426	0.169	0.662
Region						
East Asia	-18.146	-3.000	0.372	-0.488	0.294	0.588
Southeast Asia	-18.422	-5.130	0.664	0.971	0.118	0.706
Northeast Asia	-8.729	-0.321	0.397	-0.153	0.353	0.485
Europe	16.339	8.741	-0.325	-0.161	0.831	0.051
South Europe	3.011	2.936	0.320	0.639	0.647	0.066
West Europe	13.485	5.016	-0.243	0.194	0.699	0.103
North Europe	0.378	1.189	-0.250	-0.622	0.456	0.081
Latin America	-0.998	-0.253	0.521	0.219	0.199	0.279
North America	9.521	0.904	0.127	0.016	0.426	0.324

Panel B: Tests Among Countries - Developed Countries

	Whole Period	Average	Skewness	Kurtosis	>1.96	< -1.96
AUS	1.099	0.800	-0.139	-0.345	0.294	0.088
AUT	-3.868	-1.345	-0.570	-0.060	0.022	0.419
BEL	-3.668	-1.203	-0.748	0.520	0.015	0.301
CAN	1.590	1.401	0.089	1.032	0.368	0.066
DNK	2.569	1.463	-0.161	-0.723	0.353	0.000
FIN	0.220	0.008	-0.217	-0.388	0.051	0.029
FRA	-1.955	-2.877	-0.519	-0.122	0.022	0.699
DUE	4.939	1.577	0.315	2.658	0.287	0.176
HKG	-4.537	-2.624	0.635	2.145	0.603	0.081
IRE	2.146	1.947	0.616	1.110	0.551	0.029
ITL	1.301	1.296	0.662	0.868	0.441	0.199
JPN	-9.050	-1.885	0.384	-0.190	0.507	0.338
LUX	1.020	1.175	-0.764	0.495	0.007	0.000
NZL	-0.917	-1.768	0.299	-0.154	0.515	0.015
NLD	0.771	-0.116	0.057	2.095	0.147	0.176
NOR	2.190	1.402	0.096	-0.191	0.368	0.015
SGP	-3.411	-3.182	0.873	0.239	0.706	0.132
ESP	6.966	3.123	-0.780	0.555	0.015	0.757
SWE	-1.609	-1.592	0.277	0.052	0.449	0.037
CHE	1.742	-0.851	-0.496	0.439	0.169	0.007
GBR	8.329	1.121	-0.045	0.277	0.412	0.169
USA	9.320	1.965	0.075	-0.215	0.426	0.301

Panel C: Tests Among Countries – Emerging Markets

	Whole Period	Average	Skewness	Kurtosis	>1.96	< -1.96
ARG	-2.334	-2.423	0.611	0.195	0.051	0.625
BRZ	-1.990	-2.058	0.455	-0.309	0.125	0.574
CHL	-2.130	-1.471	0.304	-0.287	0.022	0.426
GRC	-2.879	-2.206	0.649	0.651	0.022	0.574
IND	-1.970	-2.149	0.404	0.048	0.074	0.544
IDN	-4.596	-3.830	0.648	0.508	0.088	0.713
KOR	-1.691	-3.044	0.476	-0.180	0.125	0.647
MYS	-13.336	-4.979	0.657	0.240	0.169	0.691
MEX	-1.169	-1.555	0.133	-0.016	0.007	0.404
PHL	-1.848	-2.135	0.776	1.079	0.015	0.566
PRT	-2.402	-2.218	0.741	0.964	0.022	0.618
ZAF	-3.453	-2.421	0.723	1.027	0.066	0.625
TWN	-2.733	-0.466	0.562	0.254	0.213	0.375
THA	-10.455	-4.238	0.611	0.335	0.059	0.743
TUR	-1.575	-0.707	-0.045	-0.547	0.022	0.213

Figure 1 The Time-series of Mann-Whitney Statistics on Conditional Risk: Emerging Markets vs. Developed Countries

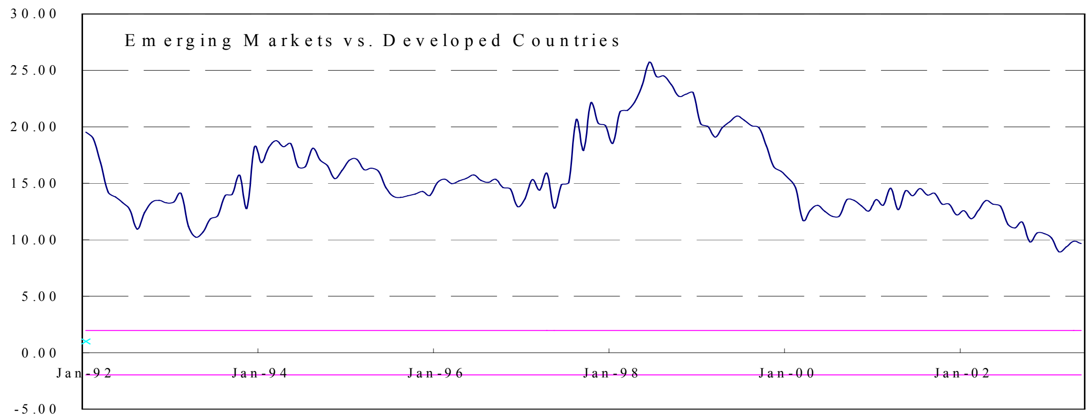


Figure 2 The Time-series of Mann-Whitney Statistics on Conditional Risk: East Asia vs. Other Areas

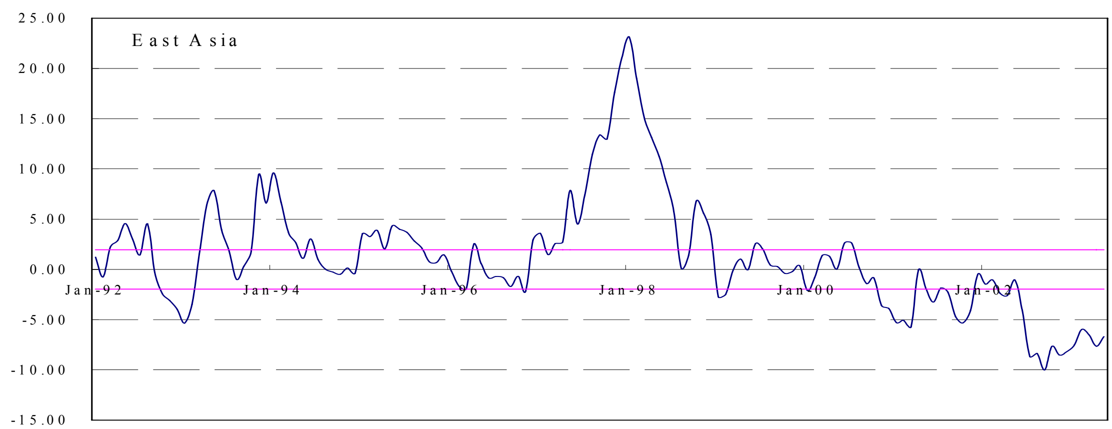


Figure 3 The Time-series of Mann-Whitney Statistics on Conditional Risk: Southeast Asia vs. Other Areas

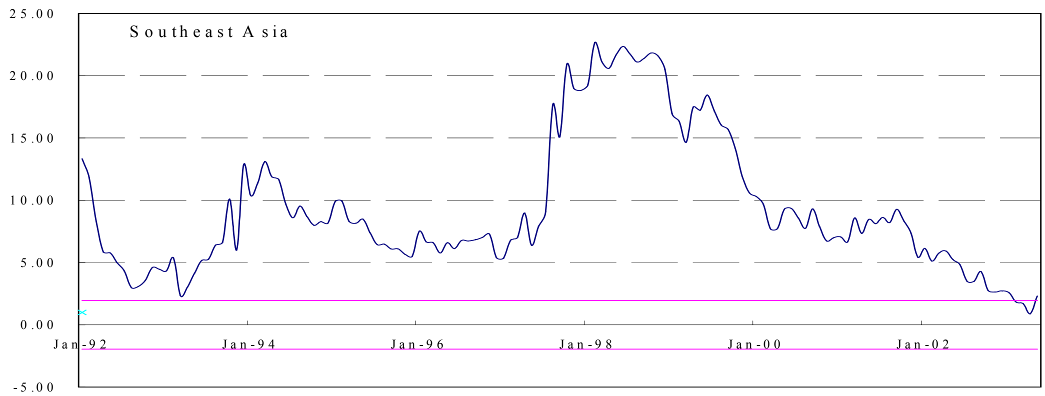


Figure 4 The Time-series of Mann-Whitney Statistics on Conditional Risk: Northeast Asia vs. Other Areas

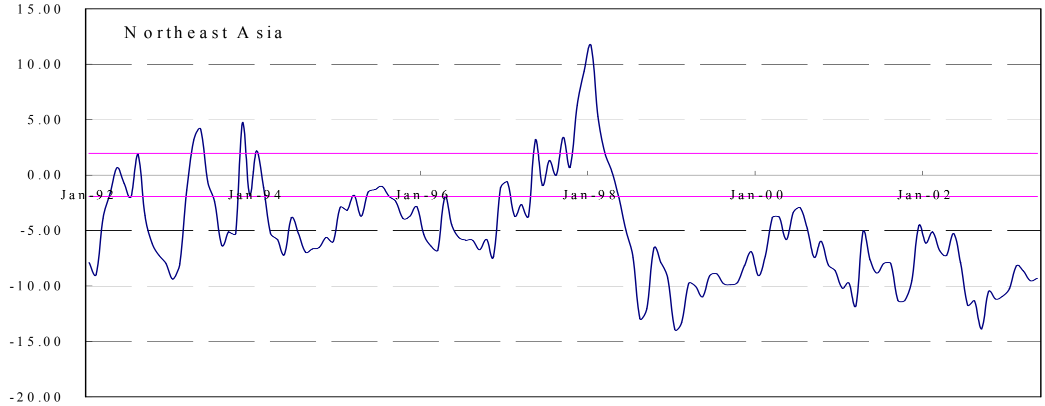


Figure 5 The Time-series of Mann-Whitney Statistics on Conditional Risk: Europe vs. Other Areas

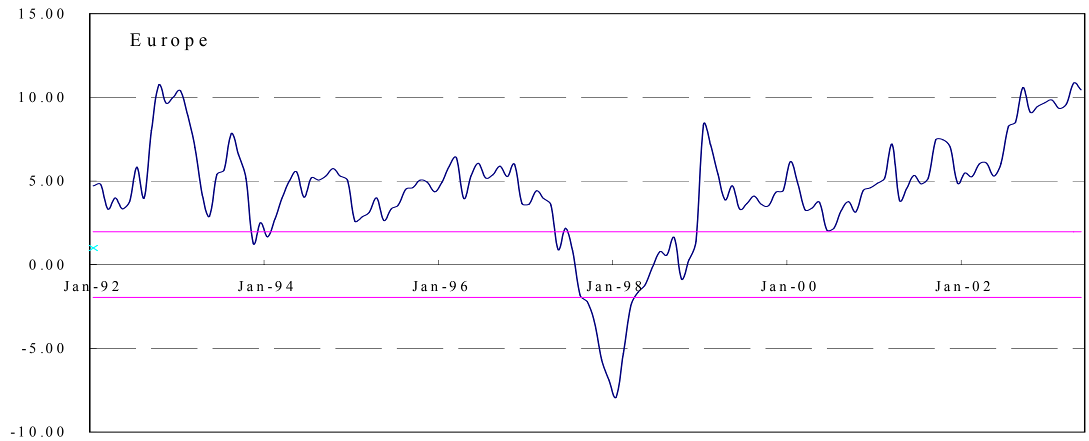


Figure 6 The Time-series of Mann-Whitney Statistics on Conditional Risk: South Europe vs. Other Areas

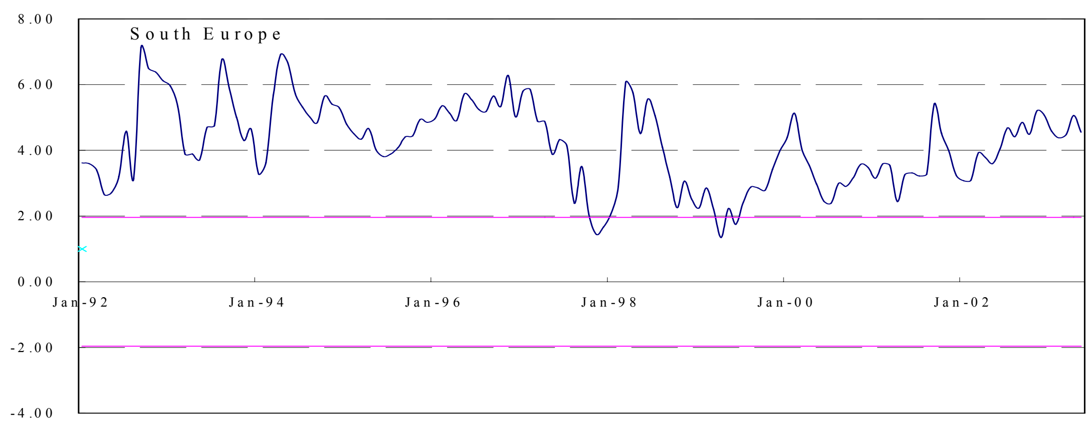


Figure 7 The Time-series of Mann-Whitney Statistics on Conditional Risk: Central/West Europe vs. Other Areas

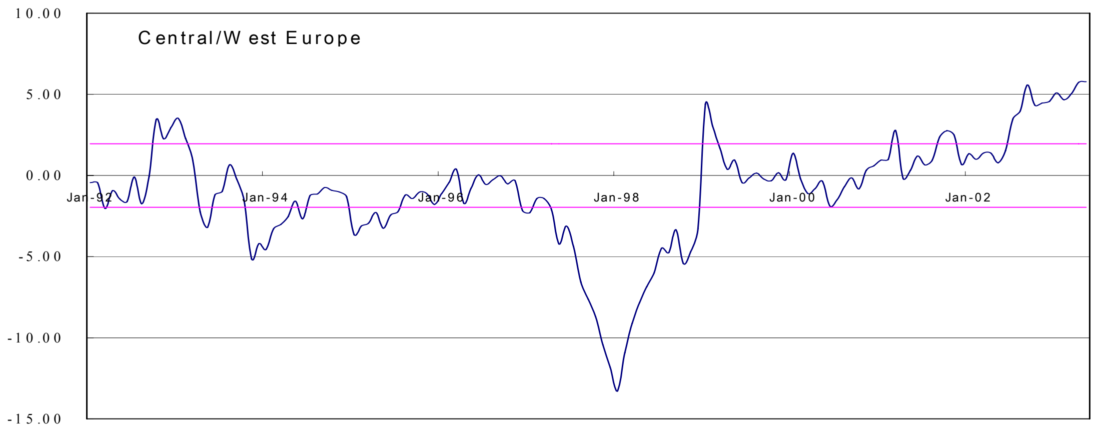


Figure 8 The Time-series of Mann-Whitney Statistics on Conditional Risk: North Europe vs. Other Areas

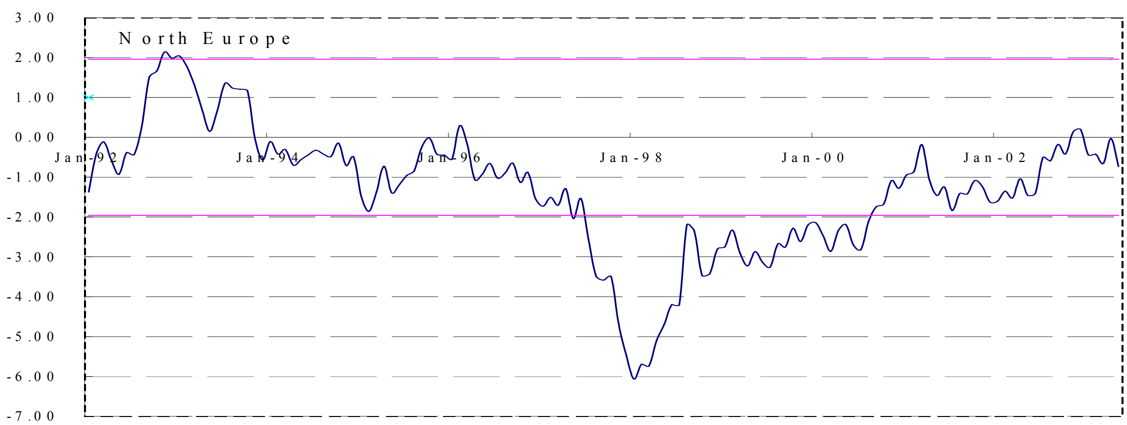


Figure 9 The Time-series of Mann-Whitney Statistics on Conditional Risk: Latin America vs. Other Areas

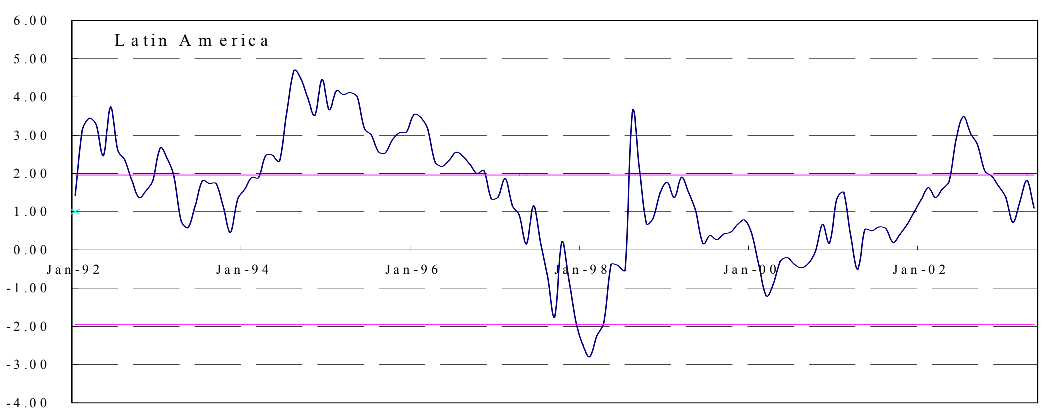


Figure 10 The Time-series of Mann-Whitney Statistics on Conditional Risk: North America vs. Other Areas

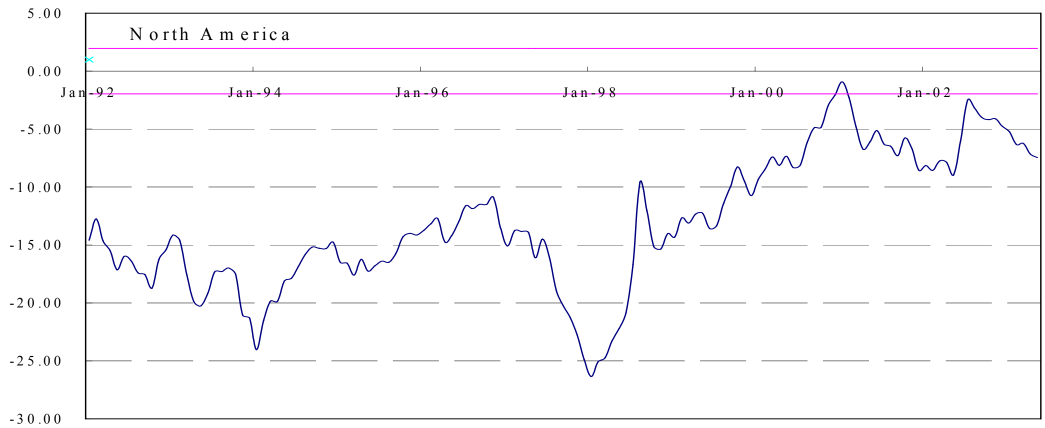


Figure 11 The Time-series of Mann-Whitney Statistics on International Beta: Emerging Markets vs. Developed Countries

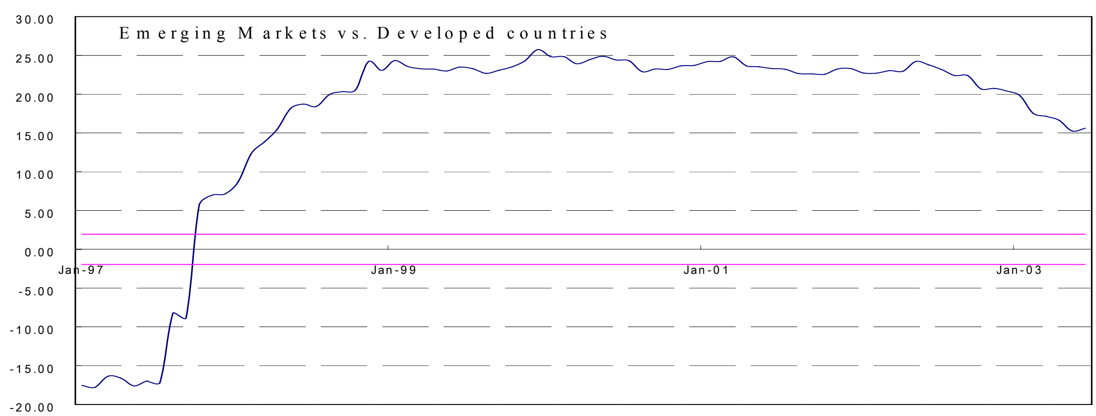


Figure 12 The Time-series of Mann-Whitney Statistics on International Beta: East Asia vs. Other Areas

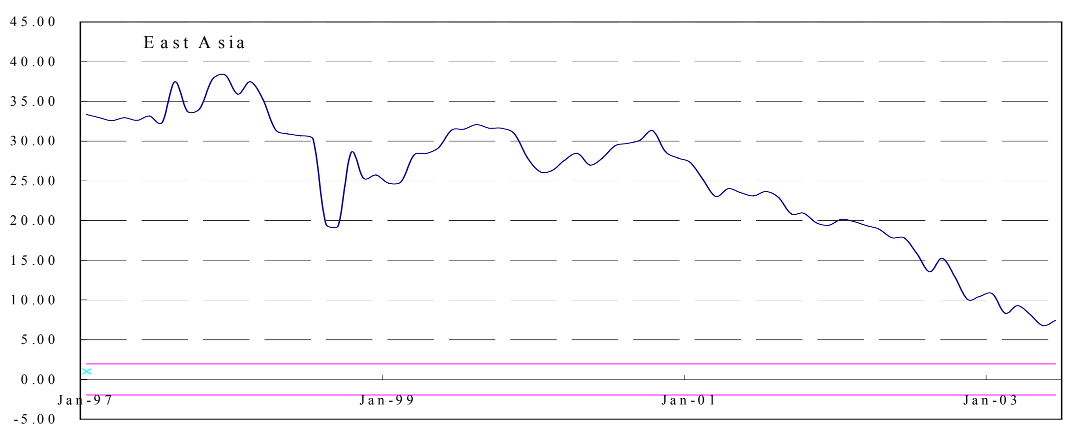


Figure 13 The Time-series of Mann-Whitney Statistics on International Beta: Southeast Asia vs. Other Areas

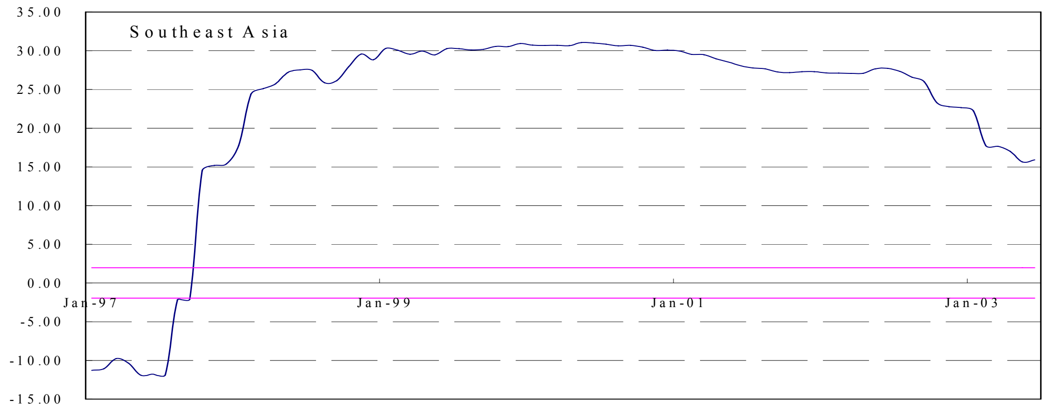


Figure 14 The Time-series of Mann-Whitney Statistics on International Beta: Northeast Asia vs. Other Areas

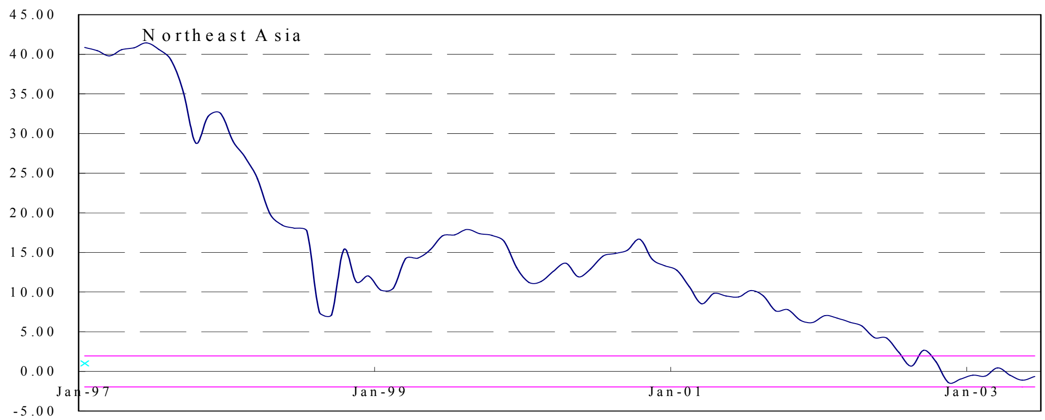


Figure 15 The Time-series of Mann-Whitney Statistics on International Beta: Europe vs. Other Areas

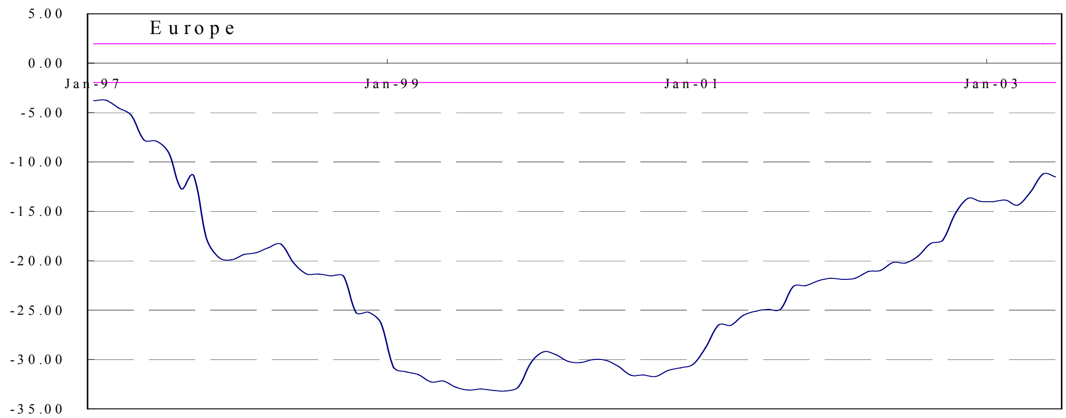


Figure 16 The Time-series of Mann-Whitney Statistics on International Beta: South Europe vs. Other Areas

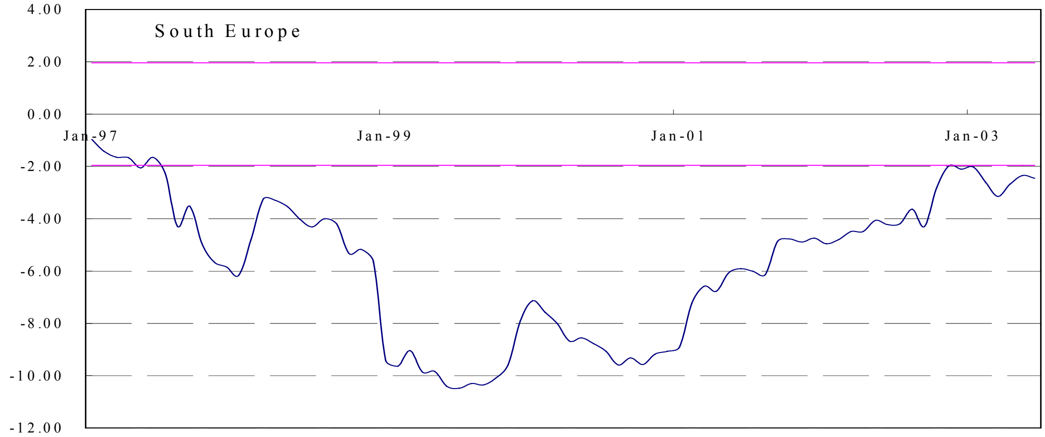


Figure 17 The Time-series of Mann-Whitney Statistics on International Beta: Central/West Europe vs. Other Areas

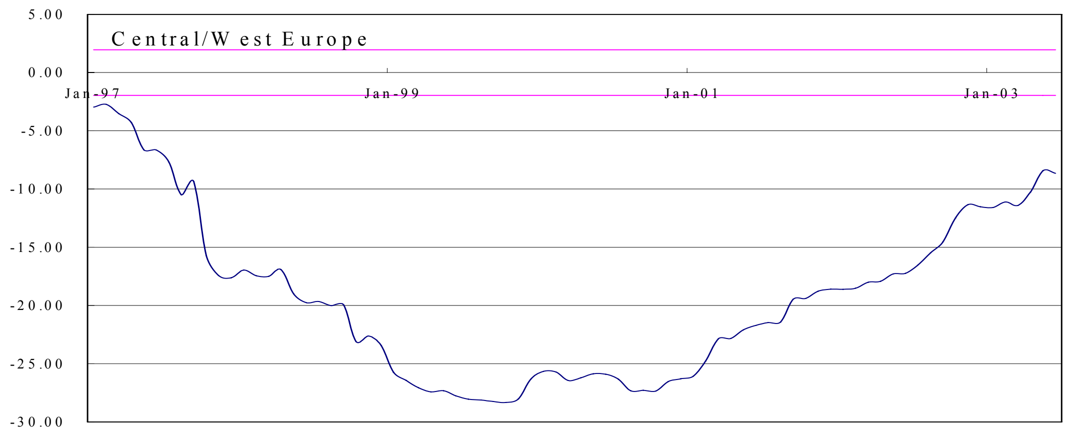


Figure 18 The Time-series of Mann-Whitney Statistics on International Beta: North Europe vs. Other Areas

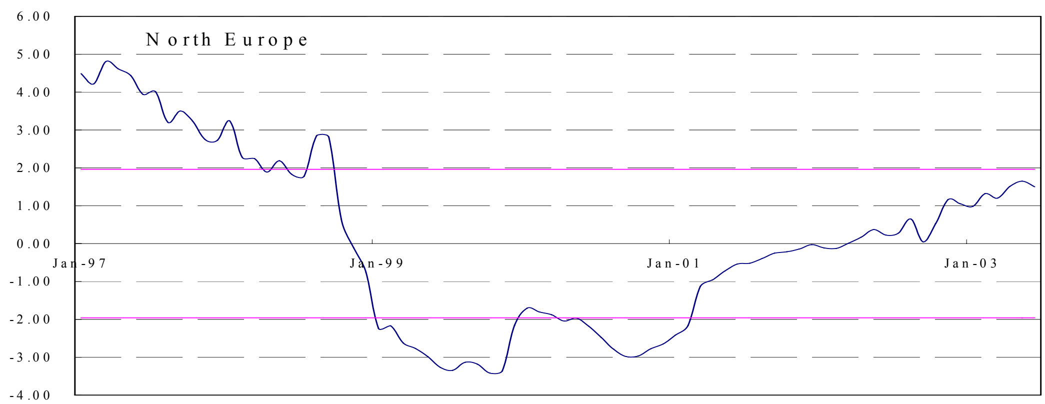


Figure 19 The Time-series of Mann-Whitney Statistics on International Beta: Latin America vs. Other Areas

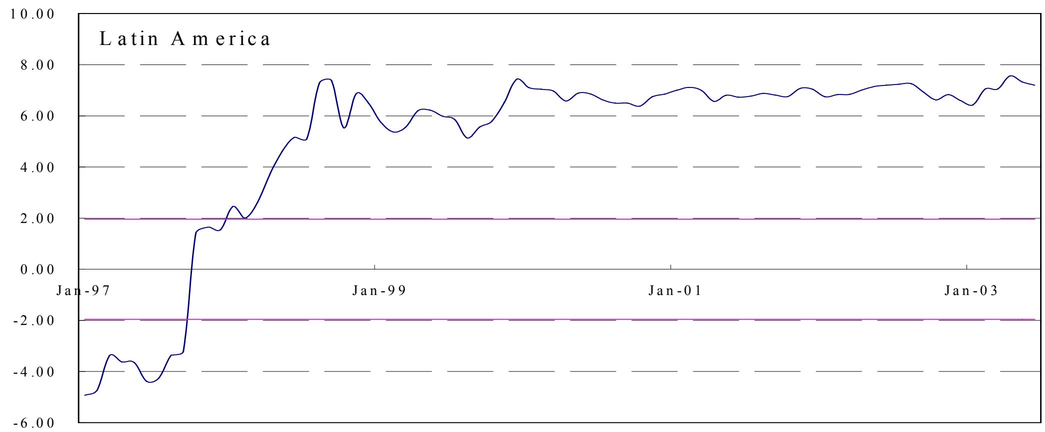


Figure 20 The Time-series of Mann-Whitney Statistics on International Beta: North America vs. Other Areas

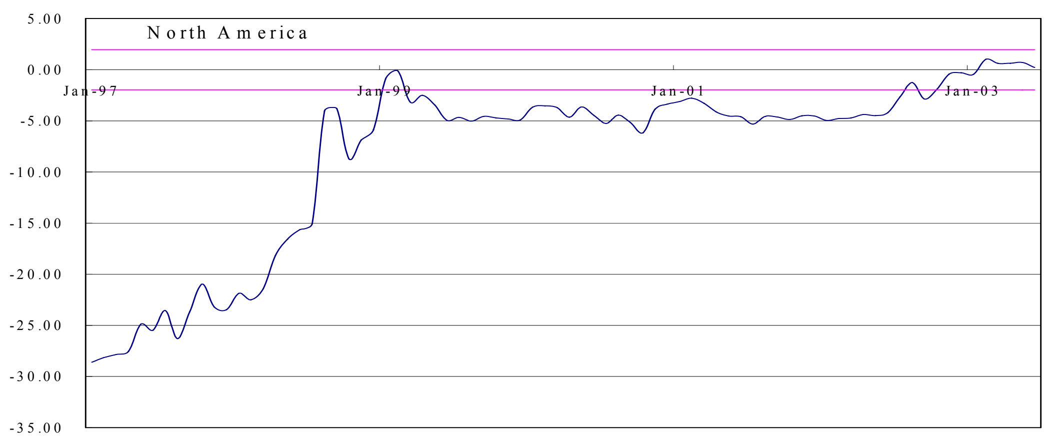
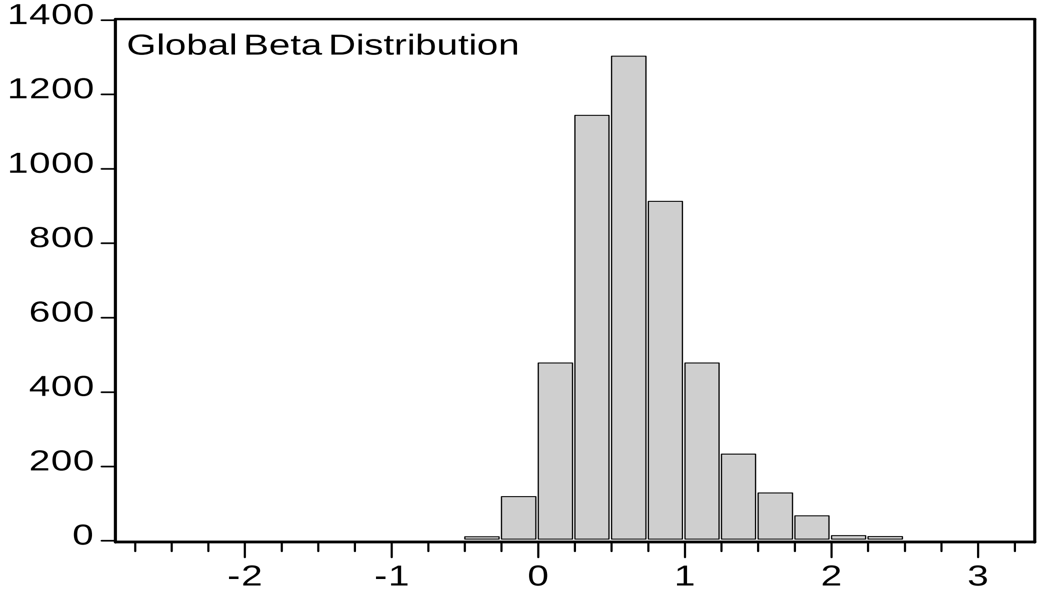


Figure 21 Global Beta Distribution



International Beta Distribution		
Number of Stocks	4,916	
Mean	0.68	
Median	0.64	
Max.	2.97	
Min.	-2.52	
Std. Dev.	0.43	
Skewness	0.64	
Kurtosis	5.37	
Cramer-von Mises Test	6.16	**
Watson Test	4.85	**

** p-value = 0.00