國 立 交 通 大 學

財務金融研究所 碩士班

碩 士 論 文

公司治理指標運用於投資組合分散策略—以美國股市和 ADR 市場為例

Portfolio Diversification Strategy Based on Corporate Governance Index：Evidence from U.S. Equity Market and ADR Market

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摘要

本研究探討較佳的公司治理是否能帶來較多的分散利益。我們以 1990 年至 2005 年的美國股市為測試資產，ADR 市場為基礎資產，並沿用 Gompers, Ishii, and Metrick 等人於 2003 年建構的公司治理指標(G-index)，將測試資產之投資組合分為具有較佳公司治理的公司(G<=5)與較差公司治理的公司(G>=14)。為精確探討這些公司分別對投資組合分散效益的影響，因此使用平均數-變異數擴張檢定，觀察基礎資產之效率前緣在加入測試資產前後的移動。本文實證結果指出，在 1990 年至 2005 年間具有較佳公司治理的公司之股票並不能比公司治理差的公司之股票帶來較多的分散效益。但在 1990 至 1999 年的樣本結果中，公司治理較好的公司卻能夠比公司治理較差的公司帶來明顯較佳的分散效益。最後本文以 2000 年左右發生的網路泡沫化與 Core, Guay, and Rusticus (2006)年提出的特定時間效果之說法來解釋我們的結果。

關鍵字:公司治理指標、投資組合、平均數−變異數、效率前緣

Portfolio Diversification Strategy Based on Corporate Governance Index：Evidence from U.S. Equity Market and ADR Market

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Abstract

The purpose of this study is to examine whether stocks of better corporate governance firms provide better diversification benefits. We investigate the effects of the mean-variance frontiers before and after adding stocks of well-governed/badly governed firms to a set of benchmark assets sorted by the American Depository Receipts (ADRs) of 12 countries. We find that in the full sample period from 1990 to 2005, stocks of well-governed firms cannot provide more diversification benefits than stocks of badly-governed firms. However, during the sub-sample period from 1990 to 1999, stocks of strong governance firms can significantly improve the investment opportunity set more than that of stocks of weak governance firms. Overall, we consider the influence of the "Internet bubble" around April 2000, which is the "time-period-specificity" period suggested by Core, Guay, and Rusticus (2006), which helps to provide evidence to confirm our results.

Keywords: G-index; Investment Opportunity Set; Mean-Variance Spanning Test

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珮婷 二零零八年七月
謹誌於 新竹交大

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I. Introduction

Corporate governance deals with the ways in which suppliers of finance to corporations assure themselves of getting a return on their investment (Shleifer and Vishny (1997)). In principle, shareholders give funds to managers and make a contract with them on the condition that they retain all the residual control rights. When something unexpected happens, they get to decide what to do. But we all know that financiers perhaps are not qualified or informed enough to decide what to do, and it is just the reason why they hired managers in the first place. As a consequence, managers end up with substantial residual control rights and get discretion to allocate funds as they want. But if the managers have too much power for management, the shareholders and managers will have conflicts of interest. Thus, corporate governance mechanisms exist and help to mitigate the shareholder-manager conflict of interest. Briefly, corporate governance can be defined as the set of mechanisms to induce self-interested managers of a corporation to maximize the value of the company and the benefit of the shareholders.

Gompers, Ishii, and Metrick (GIM, 2003) used the incidence of 24 governance rules to construct a "Governance Index" (G-index) to proxy the level of shareholder rights. The G-index value is ranges from 0 to 24 by adding one point for every provision that reduces shareholder rights at every firm, and the 24 antitakeover provisions are provided from the Investor Responsibility Research Center (IRRC).[1] Firms with better governance, which have stronger shareholder rights, will use fewer antitakeover provisions and have a lower G-index. Firms that use more antitakeover provisions will undermine the shareholder rights and implies that firms are relatively close to the market for corporate control.

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[1] GIM's data is derived from publications of the Investor Responsibility Research Center (IRRC). These publications provide 24 distinct corporate-governance provisions for approximately 1500 firms since 1990. GIM divides the provisions into five thematic groups: tactics for delaying hostile bidders, voting rights, director/officer protection, other takeover defenses, and state laws.

Many empirical studies examine the relationship between corporate governance and firm performance (Gompers, Ishii, and Metrick (2003); Bebchuk, Cohen, and Ferrell (2005); Bebchuk and Cohen (2005); Core, Guay, and Rusticus (2006)). They document that firms with better governance (lower G-index) have higher firm operating performance. Furthermore, Gompers, Ishii, and Metrick (2003) find that they long lower G-index stocks and short higher G-index stocks during 1990-1999 and can generate an abnormal return of about 8.5% per year. Based on this result they conclude that better corporate governance firms exist higher stock returns.

We all know that the G-index is public information, so investors can't acquire abnormal returns through this information if the market is efficient. Although investors will expect that for low G-index firms, there exist higher performance, and the stock price will adjust immediately when the G-index changes. According to this reason, the information of the G-index should have nothing to do with future stock return which is exactly the opposite of what you expect for the results from the GIM.

Even though the outcome of GIM shows that firms with better governance demonstrate higher stock returns, but the empirical results from Core, Guay, and Rusticus (2006) find that firm operating performance cannot fully explain the abnormal returns due to the difference in shareholder rights. They consider that the obvious candidate is the influence of the "new economy," because after the burst of the Internet bubble occurred, the relation between the G-index and abnormal returns consequently becomes insignificant. Otherwise, Ferreira and Laux (2007) investigated about the G-index and idiosyncratic risk indicated that there exists a significant negative relationship between them, namely that better governance firms' stocks infer higher idiosyncratic risk. Higher idiosyncratic risk implies higher diversified risk, and therefore we will be interested is whether stocks of stronger shareholder rights firms provide better diversification benefits. In addition, we also expect that the negative relationship between the G-index and idiosyncratic risk can offer a good explanation about abnormal returns due to the difference between the low and high G-index firms' stocks.

Well-governed firms may infer higher operating performance, higher stock returns, and higher idiosyncratic risks, but a question arises as whether stocks of those firms provide better diversification benefits? We apply the portfolio selection analysis to examine this inquiry. The portfolio selection analysis, dating back to Markowitz (1952), has been a standard treatment in the investment and finance textbooks. We assume that the 126 ADRs of 12 countries are the benchmark asset, and stocks of firms with G-index<=5 (or G-index>=14) are the test asset. ADRs have a low correlation with the U.S. market under high states of global and regional shocks. Portfolio managers could use the ADRs directly in enhanced indexing strategies (V. T. Alaganar and Ramaprasad Bhar (2001)). ADRs are low-cost ways for U.S. investors to diversify their portfolios while avoiding the cumbersome process of buying foreign securities on overseas markets (Chris J. Muscarella, Michael R. Vetsuypens (1996)). We consider the ADRs benchmark asset as a diversified portfolio, thus our whole story checks whether, diversification benefits will occur when an investor already holds a global portfolio and wants to invest in the U.S. equity market?

Does a good corporate governance firm's stock portfolio significantly enlarge the investment opportunity set relative to the current ADRs portfolio? To answer this question, we employ mean-variance spanning tests to examine whether adding a new stock portfolio which a G-index lower than five can significantly enlarge the investment opportunity set for investors relative to a set of benchmark portfolios composed of ADRs of 12 countries.

Then, to what extent is the newly added portfolio able to enlarge the mean-variance frontier? The mean-variance spanning tests only examine whether the mean-variance frontier expansion is statistically significant. The Sharpe ratio is the "reward to variability" ratio and measures the slope of the line from the risk-free rate to any portfolio in the mean-standard deviation plane (see Sharpe (1994)). Bekaert and Urias (1996) suggest that one can assess the economic significance of the shift in the mean-variance frontier by evaluating the change in the Sharpe ratio. We measure the percentage change in the Sharpe ratio and mean-variance intersection test to quantitatively assess the economic and statistical significance of adding the new stock portfolio to a set of benchmark portfolios to gain diversification benefits, respectively. In addition to the Sharpe ratio, we also measure the diversification benefits by considering the risk (standard deviation) deduction due to the shift in the global minimum-variance portfolio when adding a new stock portfolio to benchmark portfolios.

We expect that adding a stock portfolio which has a G-index lower than five will improve the benchmark portfolio, and a stock portfolio which has G-index greater than 14 will not make the efficient frontier move. But as we mentioned before, if investors can realize the relationship between the quality of corporate governance and firm performance, they will lower their expectations about poorly governed firms' future cash flow, which results in stock price declines (Core, Guay, and Rusticus (2006)). In contrast, the stock price of better governance will rise, and investors will not get any abnormal returns from the G-index public information. Thus, our hypothesis is as follows: good corporate governance stocks do not provide better diversification benefits. If we can't reject the hypothesis, we indicate that the new asset cannot generate abnormal returns and is incapable of diversifying risk.

The remainder of the paper is organized as follows. In section II we present the related literature. In section III we describe our methodology which was used to evaluate the mean-variance spanning, the intersection and the step-down tests. The data description is also concluded in Section III. Section IV reports the empirical results and robustness check. Section V offers our conclusions.

II. Literature Review

2.1 Corporate Governance and Firm Performance

Empirical studies examine the relationship between corporate governance and firm performance (Gompers, Ishii, and Metrick (2003); Bebchuk, Cohen, and Ferrell (2005); Bebchuk and Cohen (2005); Core, Guay, and Rusticus (2006)). They claim that stronger shareholder rights have higher operating performance. As noted by GIM, shareholder rights can have both negative and positive effects on a firm's operating performance. GIM use three variables to measure the operating performance of firms: net profit margins, return on equity (ROE), and one-year sales growth as operating performance. Their outcomes demonstrate that the negative relation between the G-index and net profit margins or sales growth is significant, but unfortunately is insignificant with return on equity. Nevertheless, net profit margins and sales growth can reflect the difference in the firms' life cycles and financing choices only but they are not necessary indicators of a difference in overall operating performance.

Core, Guay, Rusticus (2006) replicate GIM's investigation first and also test for an association between governance and operating performance by examining operating return on assets (ROA), a more powerful measure of operating performance suggested by Barber and Lyon (1996). They conclude that weak shareholder rights are associated with lower operating performance measured as ROA. Brown and Caylor (2004) create a broad measure of corporate governance, Gov-Score, based on 51 factors encompassing eight corporate governance categories for 2,327 firms.[2] They indicate that the G-index constructed by GIM is concentrated mostly in one category, charter/bylaws, which they show is less associated with good performance than any of the other seven categories they examine. Overall, they

[2] The eight corporate governance categories are: audit, board of directors, charter/bylaws, director education, executive and director compensation, ownership, progressive practices, and state of incorporation.

find that better-governed firms have relatively higher performance, higher value, and pay out more cash to their shareholders. They also document that Gov-Score is better linked to firm performance than the G-Index.

2.2 Corporate Governance and Stock Returns

Gompers, Ishii, and Metrick (GIM, 2003) and Cremers and Nair (2005) find that governance can directly influence stock price. GIM examined the period spanning from 1990 to 1999 and found that firms with strong shareholder rights have risk-adjusted stock returns that are 8.5% per year higher than those of firms with weak shareholder rights. But a puzzling feature is that although one might expect poor operating performance in badly-governed firms, in an efficient market, one expects no relation between governance and future stock returns (Core, Holthausen, and Larcker (1999)). Even though GIM claim that their analysis has eliminated market efficiency, they conclude that the association between stock returns and governance can be explained in two ways. The first explanation is that the agency costs caused by poor governance were underestimated by investors the in1990s. When investors realize the agency costs, they will lower their expectations about poorly governed firms' future cash flows and those stocks' prices will decline. If investors misunderstand that corporate governance causes differences in stock returns, they should find that the market is surprised by the unexpected changes of cash flows and stock prices. The second explanation is that governance did not cause poor performance but rather associated with risk or other factors that influenced the stock returns during the 1990s. In this case, governance could be completely innocuous, with no influence on either shareholders rights or agency costs.[3]

[3] There is also a third explanation proposed by GIM: the managers in the 1980s predicted poor performance in the 1990s, but the investors did not. Nevertheless, their empirical results reject this hypothesis.

As above, Core, Guay, and Rusticus (2006) investigate the association between governance and stock returns, finding that a firm's operating performance cannot fully explain the abnormal return due to the differences in shareholder rights. Their evidence is contrary to the hypothesis that differences in shareholder rights cause higher returns, and suggests that time-period-specificity returns and/or differences in expected returns are more likely to play a role in explaining the documented abnormal stock returns of strong governance firms. Overall, Core, Guay, Rusticus (2006)'s evidence is inconsistent with the hypothesis that shareholder rights cause future abnormal stock returns.

2.3 Corporate Governance and Idiosyncratic Risk

Ferreira and Laux (2007) studied the relationship between corporate governance and idiosyncratic risk. Their empirical results demonstrate that firms with fewer antitakeover provisions (that is, better governance firms) display higher levels of idiosyncratic risks. High levels of idiosyncratic volatility are associated with more efficient capital allocation (Durnev, Morck, and Yeung (2004)), and stock prices with high levels of idiosyncratic volatility contain more information about future earnings (Durnev et al. (2003)).

Fewer restrictions (more opened to the market) imply a higher probability of a takeover (Ambrose and Megginson (1992)), providing traders more incentive to speculate. That is, openness can directly encourage uninformed ownership and trading, thereby providing more cover for, and indirectly encouraging, private informed trading (Ferreira and Laux (2007)). Roll (1988) also provides evidence that idiosyncratic price changes mainly reflect private information rather than public information. Thus, firms with fewer antitakeover provisions could lead to more private information collection, and display higher levels of idiosyncratic risks.

In summary, fewer anti-takeover provisions imply more openness to corporate market control or outsiders and could lead to more informative stock prices by encouraging collections of trading on private information. Fewer restrictions permit outsiders from getting private information more easily and they can adjust their investment strategies immediately and profit from correct anticipation. In other words, higher idiosyncratic risks of better governance firms mean higher diversified risks, and stocks of those firms enable investors to gain diversification benefits.

III. Methodology

3.1 Mean-Variance Spanning and Intersection Tests

The mean-variance spanning test was first introduced by Huberman and Kandel (1987). The purpose of this method is to test that whether adding a set of new assets can improve the investment opportunity set relative to a set of basis assets. More specifically, this technique is used to expand the original mean-variance frontier. Many research topics of finance have used this test. For instance, Errunza, Hogan, and Hung (1999) used the mean-variance spanning tests to examine whether the gains from international diversification can be reached without trading abroad.

Mean-variance spanning tests enable us to analyze the impact on the mean-variance frontier when adding new assets to a set of benchmark assets. As an easy illustration, we define the union of both new assets and benchmark assets as augmented assets. If the mean-variance frontiers of the benchmark portfolios and the augmented portfolios coincide, then there is spanning. In other words, investors cannot benefit from adding the stock portfolios of well-governed firms (or badly-governed firms) to their current portfolios. Using the regression-based mean-variance spanning tests can check whether an obvious shift is statistically significant. In this paper we follow the notations and treatment in Kan and Zhou (2001).[4]

Here we assume that there are K benchmark portfolios (126 ADRs of 12 counties) with return R_{1t} and one test asset (G-index<=5 stocks, G-index>=14 stocks, or stocks of all G-index firms) with return R_{2t}. The expected returns on K+1 assets are denoted as $\boldsymbol{\mu} = \boldsymbol{E[R_t]} \equiv \begin{bmatrix} \boldsymbol{\mu_1} \\ \boldsymbol{\mu_2} \end{bmatrix}$. The variance-covariance matrix of K+1 assets is

[4] The treatment is brief and the details can refer to DeRoon and Nijman (2001) and Kan and Zhou (2001).

$V = Var[R_t] \equiv \begin{bmatrix} V_{11} & V_{12} \\ V_{21} & V_{22} \end{bmatrix}$, where V is non-singular. We estimate the following model using the ordinary least squares as

$$R_{2t} = \alpha + \beta R_{1t} + \xi_t \text{, } t=1,2,\ldots\ldots T. \quad (1)$$

Equation (1) can be rewritten as $R=XB+E$ in matrix notation with the estimators of B and Σ being $\hat{B} \equiv [\hat{\alpha}, \hat{\beta}]' = (X'X)^{-1}(X'R)$ and $\hat{\Sigma} = \frac{1}{T}(R - X\hat{B})'(R - X\hat{B})$. Under the normality assumption, we have

$$\xi_t \sim N(0, \Sigma), \quad vec(\hat{B}') \sim N(vec(B'), (X'X)^{-1} \otimes \Sigma).$$

Following Huberman and Kandel (1987), the null spanning hypothesis is

$$\textbf{H}_0\textbf{:} \ \alpha = 0, \ \delta = 1 - \beta 1_K = 0. \quad (2)$$

We calculate the Wald test statistic in Chi-square distribution with a degree of freedom 2 for the null hypothesis. If we fail to reject the null hypothesis, the mean-variance frontier of the benchmark assets then spans that of the augmented assets (benchmark assets plus the G-index stocks portfolio). That is to say, failing to reject the null hypothesis implies that adding the new portfolio is unable to improve the investment opportunity set. On the other hand, if the null hypothesis is rejected, investors who add the new portfolio to their benchmark portfolios can enlarge the investment opportunity set. The likelihood ratio and Lagrange multiplier tests are also used to test for mean-variance spanning since the Wald test is not the uniformly most powerful test. We can write this null hypothesis as

$$\Theta = [\alpha \delta]' = 0_2 = AB - C, \text{ where } A = \begin{bmatrix} 1 & 0'_K \\ 0 & -1'_K \end{bmatrix} \text{ and } C = \begin{bmatrix} 0 \\ -1 \end{bmatrix}.$$

The distribution of the null hypothesis is $vec(\hat{\Theta}') \sim N(vec(\Theta'), A(X'X)^{-1}A' \otimes \Sigma)$.

By defining $\hat{G} = TA(X'X)^{-1}A' = \begin{bmatrix} 1+\hat{\mu}_1'\hat{V}_{11}^{-1}\hat{\mu}_1 & \hat{\mu}_1'\hat{V}_{11}^{-1}1_K \\ \hat{\mu}_1'\hat{V}_{11}^{-1}1_K & 1_K'\hat{V}_{11}^{-1}1_K \end{bmatrix}$

and $\hat{H} = \hat{\Theta}\hat{\Sigma}^{-1}\hat{\Theta}' = \begin{bmatrix} \hat{\alpha}'\hat{\Sigma}^{-1}\hat{\alpha} & \hat{\alpha}'\hat{\Sigma}^{-1}\hat{\delta} \\ \hat{\alpha}'\hat{\Sigma}^{-1}\hat{\delta} & \hat{\delta}'\hat{\Sigma}^{-1}\hat{\delta} \end{bmatrix}$, we then denote by λ_1 and by λ_2 the two eigenvalues of the matrix, $\hat{H}\hat{G}^{-1}$. Since there is only one test asset in our mean-variance spanning test, the smaller eigenvalue, λ_2, equals zero. The distributions of the asymptotic Wald, likelihood ratio, and Lagrange multiplier test statistics for the null hypothesis are

$$W = T(\lambda_1) \overset{A}{\sim} \chi_2^2, \tag{3}$$

$$LR = T\ln(1+\lambda_1) \overset{A}{\sim} \chi_2^2, \tag{4}$$

$$LM = T\frac{\lambda_1}{1+\lambda_1} \overset{A}{\sim} \chi_2^2. \tag{5}$$

Also, we use the exact finite sample distribution of the likelihood ratio test under the null, as Huberman and Kandel (1987) and Jobson and Korkie (1989) show, is

$$\left(\frac{1}{U}-1\right)\left(\frac{T-K-1}{2}\right) \sim F_{2,(T-K-1)} \quad \text{for } N=1, \tag{6}$$

where $U = |\hat{G}| / |\hat{H}+\hat{G}|$.

Generally, we divide the test for the mean-variance spanning into two parts: (1) the spanning of the global minimum-variance (GMV) portfolio and (2) the spanning of the tangency portfolio. Therefore, we can rewrite all three asymptotic test statistics based on this geometric feature. For example, the Wald test can be rewritten as

$$W = T\left(\frac{(\hat{\sigma}_{R_1})^2}{(\hat{\sigma}_R)^2}-1\right) + T\left(\frac{1+\hat{\theta}_R(R_1^{GMV})^2}{1+\hat{\theta}_{R_1}(R_1^{GMV})^2}-1\right), \tag{7}$$

where $(\hat{\sigma}_{R_1})^2$ and $(\hat{\sigma}_R)^2$ are the global minimum-variance of the benchmark assets and augmented assets, respectively. Using the mean return of the GMV portfolio based on the benchmark assets, R_1^{GMV}, as a reference point, $\hat{\theta}_{R_1}(R_1^{GMV})$ is the slope of the asymptote of the mean-variance frontier for the benchmark assets, and $\hat{\theta}_R(R_1^{GMV})$ is the slope of the tangency line of the mean-variance frontier for the augmented assets. The first term measures the change of the GMV portfolios due to the addition of the new stock portfolio, and the second term measures whether there is an improvement of the squared tangency slope when adding the new stock portfolio to the initial benchmark portfolios.

The mean-variance spanning test, may have very good power in testing assets that can reduce the variance of the GMV portfolio, but has little power against test assets that can only improve the tangency portfolio (Kan and Zhou (2001)). The step-down procedure which is suggested by Kan and Zhou (2001) requires us to first test $\alpha=0$ and then to test $\delta=0$ conditional on $\alpha=0$. If we reject the first test, this indicates that the two tangency portfolios are statistically very different. If the rejection is due to the second test, it is because the two GMV portfolios are statistically very different. The step-down asymptotic Wald tests can be written as[5]

$$\boldsymbol{W_1 = T(\lambda_3) \overset{A}{\sim} \chi^2_1}, \tag{8}$$

$$\boldsymbol{W_2 = T(\lambda_4) \overset{A}{\sim} \chi^2_1}. \tag{9}$$

Based on Kan and Zhou (2001), Equations (8) and (9) can also be rewritten using the similar notation of the finite sample step-down F tests as (see Kan and Zhou (2001) for details)

[5] Note that $\hat{H}\hat{G}^{-1}$ then degenerates to a scalar and its eigenvalue, denoted as λ_3, is actually itself. The second test ($\delta=0$ conditional on $\alpha=0$) is a test of $\delta=0$ on estimating Equation (1) without an intercept. We follow the same asymptotic Wald test procedure detailed above. The matrix $\hat{H}\hat{G}^{-1}$ in the second test is also a scalar. Thus, its eigenvalue, denoted as λ_4, is itself.

$$W_1 = T\left(\frac{\hat{a} - \hat{a}_1}{1 + \hat{a}_1}\right), \tag{10}$$

$$W_2 = T\left(\frac{1+\hat{a}_1}{1+\hat{a}} \times \frac{\hat{c}+\hat{d}}{\hat{c}_1+\hat{d}_1} - 1\right), \tag{11}$$

where $\hat{a}_1 = \hat{\mu}_1' \hat{V}_{11}^{-1} \hat{\mu}_1$, $\hat{b}_1 = \hat{\mu}_1' \hat{V}_{11}^{-1} 1_K$, $\hat{c}_1 = 1_k' \hat{V}_{11}^{-1} 1_K$ and $\hat{d}_1 = \hat{a}_1 \hat{c}_1 - \hat{b}_1^{\,2}$. Here $\hat{a}$, $\hat{b}$, $\hat{c}$ and $\hat{d}$ are the analogues of $\hat{a}_1$, $\hat{b}_1$, $\hat{c}_1$ and $\hat{d}_1$, based on benchmark assets plus G-index stock portfolios.

The tests described so far assume that the returns are normally distributed and the error term in Equation (1) is homoskedastic. We also use a GMM Wald test to adjust for return non-normality and heteroskedasticity.[6]

Another way to test the movement or change in the tangency portfolio is the mean-variance intersection test proposed in Huberman and Kandel (1987). If the mean-variance frontier of the benchmark assets and the mean-variance frontier of the augmented assets have only one point in common, then this is known as an intersection. Using Equation (1), the null hypothesis for the intersection is

$$\mathbf{H_{0I}}: \ \alpha - \eta(1 - \beta 1_K) = 0, \tag{12}$$

where η is the risk-free rate. Following DeRoon and Nijman (2001), the test statistic for testing the intersection hypothesis can be rewritten in terms of the maximal Sharpe ratios as

$$W_I = T\left(\frac{1+\hat{\theta}_R(\eta)^2}{1+\hat{\theta}_{R_1}(\eta)^2} - 1\right) = T\left(\frac{\hat{\theta}_R(\eta)^2 - \hat{\theta}_{R_1}(\eta)^2}{1+\hat{\theta}_{R_1}(\eta)^2}\right), \tag{13}$$

where $\hat{\theta}_{R_1}(\eta)$ is the maximal Sharpe ratio attainable for the benchmark assets, and $\hat{\theta}_R(\eta)$

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[6] The results of the GMM Wald test are reported in the Appendix. The step-down GMM Wald tests are denoted as W_{a1} and W_{a2}.

is the maximal Sharpe ratio attainable for the augmented assets. The Wald test statistic for an intersection is the chi-square distributed with a degree of freedom 1. Thus we note intuitively that the empirical results from the intersection test would be very similar to the results from the first test in the step-down test. Furthermore, the test statistic specified in Equation (13) indicates that the numerator is related to the difference in the squared maximal Sharpe ratios attainable for benchmark assets and augmented assets. If we reject that the null hypothesis of the intersection test implies that the mean-variance frontier of augmented assets does not have any point in common with the mean-variance frontier of benchmark assets based on the reference point of the risk-free rate. Therefore the maximal Sharpe ratios are different between the augmented assets and benchmark assets. In the next subsection, we apply the Sharpe ratio to quantify the magnitude of the change in the mean-variance frontier caused by adding the G-index stocks portfolio. The test statistic from the intersection test can provide some evidence about whether the change in the maximal Sharpe ratio is statistically meaningful.

3.2 Measuring Diversification Benefits from Adding Stocks of G-Index Firms

Using the step-down test of Kan and Zhou (2001), the test significance for the expansion of the mean-variance frontier could be attributed to the shift of the tangency portfolio and/or the shift of the GMV portfolio. The next question is to assess the extent or economic significance of diversification benefits when one adds the well-governed (or badly governed) firms' stocks portfolio to the benchmark portfolios. Corresponding to the intersection test and step-down test, we will apply two measures to assess diversification benefits of those stocks, namely the Sharpe ratio and the risk deduction of the GMV portfolio.

Modern portfolio theory suggests that the Sharpe ratio is a natural choice to measure the shift in the tangency portfolio that it measures the slope of the line from the risk-free rate to any portfolio in the mean-standard deviation plane. Bekaert and Urias (1996) suggest that one can assess the economic significance of the shift in the mean-variance frontier by evaluating the change in the Sharpe ratio. Petrella (2005) also uses the Sharpe ratio to measure the diversification benefits of investing in European small cap stocks. If the Sharpe ratio has a positive change after adding the new portfolio, it implies that the new tangency portfolio provides an extra return for a unit increase in standard deviation. We measure the percentage change in the Sharpe ratio to assess the economic significance of adding the new stock portfolio to a set of benchmark portfolios to gain diversification benefits.

To consider the risk deduction due to the shift in the GMV portfolio is another measure of diversification benefits when adding the new stock portfolio to benchmark portfolios. The measure is defined as the difference in standard deviation between the GMV portfolio composed of the benchmark portfolios and the GMV portfolio composed of the benchmark plus the G-index stocks portfolios. As Petrella (2005) points out, the risk deduction measure assumes that investors are only concerned with minimizing risk and do not care about returns. Though this assumption is pretty strong, the risk deduction measure is independent of the expected return estimation and it is more difficult to estimate an expected return than a variance or standard deviation (see Merton (1980) and Jorion (1985)).

3.3 Data Description

Our initial sample consists of all firms that have a corporate governance index (G-index). The corporate governance index (G-index) is constructed by GIM based on the investor rights and takeover protections provided by the Investor Responsibility Research Center (IRRC). [7] A G-index of a firm represents the number of provisions restricting

[7] The publications issued by the IRRC provide 24 distinct corporate-governance provisions that include 22 firm-level provisions and six state laws (four of the laws are analogous to four of the firm-level provisions). The restrictions, for example, include poison pills, golden parachutes, supermajority requirements, and

shareholder rights that the firm applies, not requiring any judgments about the efficacy or wealth effects of these provisions but only on the impact on the balance of power. The G-index value ranges from 0 to 24 by adding one point for every provision. The IRRC released their surveys of shareholder rights and antitakeover provisions on September 1990, July 1993, July 1995, February 1998, January 2000, January 2002, and January 2004. The surveys are not issued every year, and thus we follow GIM using IRRC data of each year to classify multiple years, assuming that the adoption of anti-takeover provisions for every firm is stable and constant in the short run. For example, the G-index of 1990 is used for the period from 1990 to 1993 until the edition became available, and so on. Following GIM, we define the portfolio with the strongest shareholder rights (G<=5) as the "Democracy" portfolio and the portfolio with the weakest shareholder rights (G>=14) as the "Dictatorship" portfolio.

We use value-weighted monthly returns collected from the Center for Research in Security Prices (CRSP) for the period from 1990/09 to 2005/12, and we match our data with the G-index data provided by Fama and French. There are a total of 9150 observations. In addition, we exclude financial firms (SIC 6000-6999) and utilities (SIC 4900-4999) because of the special financial structures, regulatory requirements, and accounting standards of these types of organizations.

The data of the benchmark assets composed of ADRs are collected from the CRSP and the Bank of New York. We use the ADR data in the NYSE, the NASDAQ and the AMEX that are initially a total of 314 ADRs of 39 countries. Panel A of Table 1 presents the number of ADRs issued by each country, and Panel B of Table 1 reports the effective date of each country. We use a total of 126 ADRs for 12 countries (Australia, Chile, Denmark, Ireland, Italy, Japan, Mexico, Netherlands, Norway, South Africa, Spain, and the United Kingdom)

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classified boards.

which have an effective date available from 1990/09 as the first benchmark portfolio, and a total of 151 ADRs of 13 countries (the previous 12 countries plus China) which have an effective date since 1993/08. The addition of the China ADRs is because we are interested in China's booming development in recent years and the investment benefits that many researchers have investigated. Additionally, we use the value-weighted and the equally-weighted monthly returns of ADRs acquired from the CRSP. The purpose of an equally-weighted portfolio is to eliminate the impact of some extreme firm sizes (the capitalization of a firm) on returns. In order to be easy for illustration, we define the benchmark portfolios of 12 countries as the "12ADRs" and the benchmark portfolios of the previous 12 countries plus China as the "13ADRs".

<Table 1 is inserted about here >

We replicate the GIM return results in Table 2, and we demonstrate the return results of GIM data which are still held for our sample. GIM's Table VI shows that taking a long position in Democratic firms and a short position in Dictatorship firms can obtain an abnormal return of 0.71 percent per month from 1990/09 to 1999/12.[8] Our replication of GIM's results report abnormal returns of 0.69 percent per month, which is quite close to the 0.71 percent abnormal returns of GIM and is also statistically significant. Furthermore, we also analyze the period following the original sample period (2000/1-2005/12) and the combined sample period (1990/09-2005/12) that earn -0.07 percent and 0.42 percent per month respectively.

<Table 2 is inserted about here >

Figure 1 shows the difference of the Democracy and Dictatorship portfolio that follows

[8] The model extends the Fama-French (1993) three-factor model with an addition of a momentum factor. For details on the construction of the factors, see Fama and French (1993) and Carhart (1997). Our factor returns for SMB and HML are provided from Ken French. The momentum returns were calculated by the authors using the procedures of Carhart (1997).

the CGR's Figure 1. It shows the development of the value of Democracy, Dictatorship and the hedge portfolios from 1990/09 to 2005/12, assuming $1 is invested in the portfolio in 1990/09. The upper line plots the value of the Democracy portfolio, and the middle line and the bottom line plot the value of Dictatorship and the value of hedge portfolios respectively. The same results of the CGR, the graph indicates that nearly all of the positive returns to the hedge portfolio documented by GIM from 1990 to 1999 occur from 1997 to 1999. The hedge portfolio gains nearly flat returns prior to 1997 and gains negative returns after 1999.

<Figure 1 is inserted about here >

IV. Empirical Results and Analysis

4.1 Summary Statistics and Correlations

Table 3 presents descriptive statistics for the corporate governance index and the ADRs. Panel A of Table 3 provides the descriptive statistics of our sample firms and descriptive statistics of their returns from 1990 to 2005. The mean of the G-index is 9.0148; the minimum is 1, and the maximum is 18. The mean of return for our sample firms is 0.0038; the minimum is -0.7648, and the maximum is 0.6201; the average return of G<=5 firms is 0.0114, which is much higher than 0.0018 of G>=14 firms.

Panel B and Panel C of Table 3 are summary statistics of equally-weighted/ value-weighted returns for the ADRs from 1990 to 2005 and from 1993 to 2005. Panel B comprises the descriptive statistics of equally-weighted/value-weighted ADR returns for 12 countries which have had an effective period from 1990 to 2005, and Panel C comprises the descriptive statistics of equally-weighted/value-weighted ADR returns for the previous 12 countries plus China, in which the data period ranged from 1993 to 2005. The means of these two sets of portfolios are almost equal, but the 13ADRs portfolios have higher standard deviation (0.0949; 0.1043) than the 12ADRs portfolios (0.0912; 0.1010).

<Table 3 is inserted about here >

Table 4 provides the correlation coefficients among the corporate governance measure and the ADR benchmark assets. Panel A and Panel B of Table 4 present the correlations of various G-index stock portfolios and the 12ADRs. Pane C and Panel D reports the correlations of the three governance measure portfolios and the 13ADRs. In Table 4, almost all of the corporate governance measures and ADR benchmark assets have positive correlation. In summary, these relations suggest that qualitatively the measurement is capturing the desired effect. The positive relation between the corporate governance index and the ADR benchmark assets might imply that the three G-index stock portfolios can improve our ADR benchmark assets.

<Table 4 is inserted about here >

4.2 Empirical Results: Do Good Corporate Governance Stocks Provide Better Diversification Benefits?

In this section we use the mean-variance spanning test to examine whether adding G-index portfolios to a set of benchmark assets based on the ADRs enlarges the investment opportunity set. First, we use the 12ADRs as the benchmark asset, and Table 5 presents empirical results from the mean-variance spanning and the intersection tests.[9]

In Table 5, we find that no matter if we are examining the equally-weighted case or the value-weighted portfolios, the results of the Likelihood ratio test, the Lagrange multiplier test, and the Wald tests are all significant, and we can reject the null hypothesis. Our empirical results indicate that no matter if one adds the entire G-index portfolio or adds the Democracy and the Dictatorship portfolio to our benchmark assets, the test statistics are significant as well. In other words, the previous three G-index portfolios can all help to expand the mean-variance frontier. We also use the Kan and Zhou (2001) step-down Wald test as a robustness check. If W_1 is more significant than W_2, which means that the expansion of the mean-variance frontier mostly comes from the change in the tangency portfolio. If W_1 is less significant than W_2, this implies that the expansion comes mostly from the change in the global minimum-variance (GMV) portfolio. Panel A and Panel B of Table 5 presents that all of the W_1 are less significant than W_2, which implies that the expansion of these portfolios comes primarily from the change in the global

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9 The risk-free rate we used is the average of one-month T-bill rate from 1990 to 2005 collected from the website of French, which is 0.33% per month. The optimal portfolio weights are reported in Appendix.

minimum-variance (GMV) portfolio.[10]

Furthermore, we also follow DeRoon and Nijman (2001) to test the mean-variance intersection. The intersection occurs when the *original* mean-variance frontier and the *new* mean-variance frontier have only one point in common. As Table 5 reports, either the equally-weighted or value-weighted results for W_1 are all insignificant, and thus we cannot reject our null hypothesis. In other words, the mean-variance frontier of augmented assets has only one point in common with the mean-variance frontier of benchmark assets based on the reference point of risk-free rate.

<Table 5 is inserted about here >

As we mentioned before, the previous mean-variance spanning tests only examine whether the expansion of the mean-variance frontier is significant. Bekaert and Urias (1996) suggest that the economic significance of the shift in the mean-variance frontier can be evaluated by the change in the Sharpe ratio. The Sharpe ratio, also known as the "reward to variability" ratio, measures the slope of the line from the risk-free rate to any portfolio in the mean-standard deviation plane (Sharpe (1994)). The values of the percentage change in the Sharpe ratio are inversely related to the p-values of the first step–down test (W_1), and so does the intersection test whose test statistics involve the difference in the squared maximal Sharpe ratios. In other words, if we fail to reject the hypothesis in the first step-down test or the intersection hypothesis, then a small percentage change in the Sharpe ratio will occur. Table 6 presents the results of change in the Sharpe ratio for the tangency portfolio. In the portfolio which sums up all the G-index stocks, the change in the Sharpe ratio of the

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[10] Tobin (1958) introduces the well-known separation property and argues that portfolio choice can be separated into two steps: (1) the determination of the optimal tangency portfolio; (2) the construction of the mix between the risk-free asset and the optimal tangency portfolio, dependent on investors' preferences. Therefore, investors are more likely concerned with the change in the tangency portfolio than the global minimum-variance portfolio.

value-weighted case is 0.6542. This is more than the 0.1145 change in the Sharpe ratio of the equally-weighted case. In the Democracy (G<=5) portfolio, the change in the Sharpe ratio of the value-weighted case is 0.0327, and the change in Sharpe ratio of the equally-weighted case is 0. This represents that the Sharpe Ratio has no increase. In the Dictatorship portfolio (G>=14), the change in the Sharpe ratio of value-weighted case is 0.0327. This is greater than the 0.0286 change ratio of the equally-weighted case. The previous results indicate that the changes in the Sharpe Ratio of the value-weighted cases are approximately greater than those of the equally-weighted cases.

<Table 6 is inserted about here >

Our insignificant results of the step-down and intersection tests demonstrate that the expansions of frontiers mostly come from the change in the global minimum-variance portfolio, and that the change in the tangency portfolio which investors are more interested in is not as apparent. These results can also be confirmed in Table 6, the percentage change in the standard deviation of the GMV portfolio is -18.6% for adding all G-index stocks to the equally-weighted case and -12.5% for adding all G-index stocks to the value-weighted case. The standard deviations of the GMV portfolios for the Democracy portfolio (G<=5) and the Dictatorship portfolio (G>=14) have negative percentage changes as well. The extension is mostly due to the GMV portfolio but not the tangency portfolio which denotes that the newly added portfolios can only reduce the risk but are unable to improve the investment opportunity set.

Panel A of Figure 2 shows the expansion of the mean-variance frontier when adding each of G-index stocks portfolio to the equally-weighted benchmark assets for 12ADRs. Panel B of Figure 2 presents the improvement of the mean-variance frontier that takes value-weighted 12ADRs as benchmark assets. Significantly, the extensions of the mean-variance frontiers at the equally-weighted benchmark portfolios are more apparent than in the value-weighted benchmark portfolios. The significant results for the cases of equally-weighted portfolios, compared to value-weighted cases, can be verified from the previous test statistics results in Table 5. Obviously, they are more statistical significant for equally-weighted portfolios than for value-weighted ones. No matter in the equally-weighted or the value-weighted cases, we can intuitively find that taking all of the G-index stocks as test assets has the largest impact on diversification benefits. Nevertheless, our results indicate that not only stocks of well-governed firms (G<=5) but also stocks of badly-governed firms (G>=14) can expand the mean-variance frontier. Eventually, stocks of badly-governed firms (G>=14) will provide more diversification benefits than stocks of well-governed firms (G<=5). Additionally, the outcome that well-governed firms and badly-governed firms have similar impact on the original benchmark assets can be documented by the previous correlation reported in Table 4. The correlations between well-governed firms (G<=5) and badly-governed firms (G>=14) is 0.6719, which is much higher than other correlations in the table, implying that the results of well-governed firms will intuitively resemble that of badly-governed firms.

<Figure 2 is inserted about here >

Overall, we find that the previous three G-index stock portfolios can provide significant diversification benefits by reducing risk, especially for the equally-weighted case in this section. Investors who add all G-index stock portfolios or well-governed/ badly-governed firm stocks will only reduce risk but cannot make their investment opportunity sets more progressive.

4.3 Results for 13ADRs as Benchmark Portfolios plus the G-Index Stock Portfolios

Table 7 presents the mean-variance spanning and intersection test results for adding various G-index stock portfolios to benchmark assets that are composed of 13ADRs. No matter in the equally-weighted or the value-weighted portfolios, we reject the null hypothesis by using the Likelihood ratio test, the Lagrange multiplier test, and the Wald test. All of the statistics are significant, implying that adding G-index stock portfolios can expand the mean-variance frontier. Using the mean-variance intersection test, we can find that the original mean-variance frontier of benchmark assets and the new mean-variance frontier have only one point in common. Besides, the step-down test results in Panel A and Panel B of Table 7 demonstrating that all the statistics of W_1 in each portfolio are less significant than W_2. That is to say, the expansions of mean-variance frontiers are due to the change in the GMV portfolio rather than in the change of the tangency portfolio. These results can be confirmed in Table 8, and the percentage change in the standard deviation of the GMV portfolio is -13.9% for adding all G-index stocks in the equally-weighted case and -11.7% for adding all G-index stocks in the value-weighted case. In addition, the standard deviations of GMV portfolios for the Democracy portfolio (G<=5) and the Dictatorship portfolio (G>=14) also have negative percentage changes. As above, these results emphasize that adding G-index stock portfolios can only reduce the risk but fail to increase returns. Also worthy of mention is that adding the Democracy portfolio (G<=5) to the 13ADRs benchmark assets will obtain absolutely no change in the Sharpe ratio for the tangency portfolio (0%). This once again documents the low contribution of the tangency portfolio.

<Table 7 and Table 8 are inserted about here >

Panel A of Figure 3 shows the expansion of the mean-variance frontier from adding the various G-index stock portfolio to the equally-weighted benchmark assets for 13ADRs. Panel B of Figure 3 presents the improvement of the mean-variance frontier that takes value-weighted 13ADRs as benchmark assets. Similar to above, adding various G-index stock portfolios can extend the mean-variance frontier, even for the Dictatorship portfolio (G>=14) as well. The frontiers which add stocks of well-governed firms (G<=5) extend less than the frontiers adding stocks of badly-governed firms (G>=14), no matter in the equally-weighted or in the value-weighted cases. Test statistics in Table 7 confirm these results, and the outcomes of badly-governed firms (G>=14) are more significant. In summary, in this section we document that adding the various G-index stock portfolios to the benchmark assets that are composed of 13ADRs can provide significant diversification benefits by reducing risk but with no creation of extra returns.

<Figure 3 is inserted about here >

4.4 Robustness Check

So far, our previous results all indicate that adding stocks of well-governed firms (G<=5) to our ADR benchmark assets cannot significantly provide more diversification benefits than stocks of badly-governed firms (G>=14). Even stocks of badly-governed firms will shift the mean-variance frontier more than stocks of well-governed firms. This is in contrast to our prior expectations. In addition, they identically gain less extra returns for a unit increase in standard deviations attributed to a low percentage change in the Sharpe ratio for a tangency portfolio during the period from 1990 to 2005. In this section, we consider the issue of "time-period-specificity" proposed by Core, Guay, and Rusticus(2006), and divide our full-sample period into two sub-sample periods (1990-1999, 2000-2005). The cumulative raw returns reported in Figure 1 indicate that nearly all of the positive returns to the hedge portfolios documented by GIM for the 1990-1999 time period occur from 1997 to 1999 (Core, Guay, and Rusticus(2006)). After 2000, the hedge portfolio earns negative returns, which is regarded as an influence of the Internet bubble around April 2000. We add the Democracy portfolio and the Dictatorship portfolio to the 12ADRs benchmark assets in the two sample periods respectively. The results are displayed in Table 9 and Table 10.

We can find evidence from Panel A in Table 9 that the test statistics of the intersection test (W_I) and the step-down test (W_1) for the Democracy portfolio are much more significant than that for the Dictatorship portfolio during the sample period 1990-1999. This can be confirmed in Panel A of Table 10, the percentage changes in the Sharpe ratio of the Democracy portfolio are 11.488% for the equally-weighted case and 4.4673% for the value-weighted case. This is much higher than the changes for the Dictatorship portfolio (which are 0.1538% for the equally-weighted case and 0.0419% for the value-weighted case, respectively). Therefore we can document that in the period from 1990 to 1999, investors adding stocks of well-governed firms to their benchmark portfolios can not only reduce more risk but can also earn more extra returns than adding stocks of badly-governed firms. In other words, stocks of well-governed firms will improve the investment opportunity set more apparently than stocks of badly-governed firms, which entirely corresponds to our prior expectations.

Panel B of Table 9 reports the test statistic results of the sub-sample period 2000-2005. Though the test statistics of the intersection test (W_I) and the step-down test (W_1) for the Democracy portfolio are still more statistically significant than that for the Dictatorship portfolio, they are not as significant as before (compared with the results in Panel A for the period 1990-1999). The insignificant test statistics of W_I and W_1 in Panel B reveal that the expansion of frontiers are mostly due to the change in the global minimum-variance portfolio, therefore we acquire low percentage changes in the tangency portfolio. The percentage decreases in the standard deviation of the GMV portfolio in Table 10 are quite obvious but the percentage changes in the Sharpe ratio are quite small both in Democratic and Dictatorship cases. Briefly, during the period from 2000 to 2005, neither the well-governed firms nor the badly-governed firms could improve the investment opportunity set as efficacious as in the period from 1990-1999. The expansion of mean-variance frontiers when adding G<=5 or G>=14 portfolios to the equally-weighted/value-weighted benchmark assets during the sample period 1990-1999 are reported in Panel A and B of Figure 4. Panel C and D in Figure 4 then display the shift of the mean-variance frontiers taking equally-weighted/value-weighted 12ADRs as benchmark assets from 2000 to 2005.

<Table 9 and Table 10 are inserted about here >

<Figure 4 is inserted about here >

In summary, following the original GIM sample period ranging from 1990-1999, stocks of well-governed firms can improve the investment opportunity set more than stocks of badly-governed firms can as we expected. However, during 2000-2005, both can reduce the risk of the investment opportunity set only and can acquire low extra returns. Our expected differences between well-governed and badly-governed firms seems to be unclear. An obvious candidate to consider is the influence of the "Internet bubble" around April 2000. As Figure 1 presents, nearly all of the positive returns to the hedge portfolios occurred from 1997 to 1999 and was negative after 2000 helping to provide evidence explaining our results as above. Overall, the "time-period-specificity" suggested by Core, Guay, and Rusticus (2006) likely play a role in explaining the difference between well-governed and badly-governed firms cause conspicuously different impacts on diversification benefits contributing during 1990-1999.

V. Conclusions

The purpose of this study is to investigate the impact of adding G-index stocks to the benchmark assets composed of ADRs from the perspective of asset allocations for the period from 1990-2005. We apply the mean-variance spanning test and the intersection test to analyze whether the well-governed firm stocks can provide significant diversification benefits.

Our results do not entirely reveal the positive answers. As our previous results revealed, almost all of the test statistics indicate that investors who invest in the various G-index stocks are able to expand their mean-variance frontiers relative to investments in benchmark portfolios composed of 12ADRs or 13ADRs. Besides, according to the insignificant results of W_I andW_I, investors who add all G-index stock portfolios or the well-governed/ badly-governed firm stocks will provide diversification benefits only by reducing risk but cannot improve their investment opportunity set. However, our evidence indicates that the stocks of badly-governed firms will improve the investment opportunity set more than the stocks of well-governed firms which is absolutely in contrast to our prior expectations. This finding might imply that the corporate governance index may not be a useful measurement to distinguish the diversification benefits when investing in the full sample period from 1990-2005. In other words, corporate governance has no direct relation with the degree of mean- variance frontier's improvement in this sample period.

For explanation, we consider the problem of "time-period-specificity" proposed by Core, Guay, and Rusticus (2006), dividing our full-sample period into two sub-sample periods (1990-1999, 2000-2005). Our result of sub-sample periods reveal that following the original GIM sample period 1990-1999, the stocks of strong governance firms can significantly improve the investment opportunity set more than the stocks of weak governance firms. However, the significant difference in diversification benefits between well-governed and badly-governed firms diminishes immediately during 2000-2005. Thus, our consideration of the influence of the “Internet bubble” around April 2000, which is the “time-period-specificity” suggested by Core, Guay, and Rusticus (2006), helps to provide evidence to confirm our conclusion. Overall, the reason that the well-governed firm stocks are unable to contribute more diversification benefits than the poorly-governed firm stocks in the entire sample period from 1990-2005 show significant differences in diversification benefits during 1990-1999, and could be due to the time-period-specificity nature for structure change.

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Figure 1

Cumulative Raw Returns : Democracies and Dictatorships from 1990 to 2005

This figure is replicated from the Figure 1 in Core, Guay, and Rusticus(2006) and shows the development of the value of Democracy(G<=5), Dictatorship(G>=14), and hedge portfolios from 1990 to 2005. The upper line plots value of the Democracy portfolio over time, assuming $1 is invested in the portfolios in September 1990. The middle line plots the value of the Dictatorship portfolio and the bottom line plots the value of the hedge portfolio.

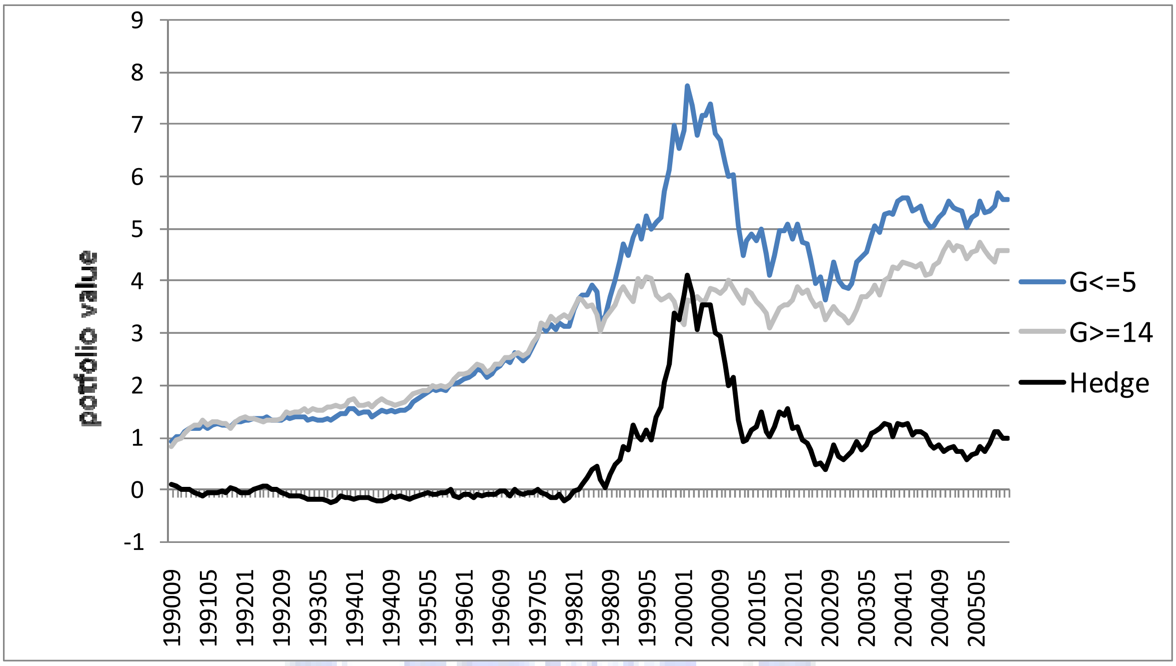
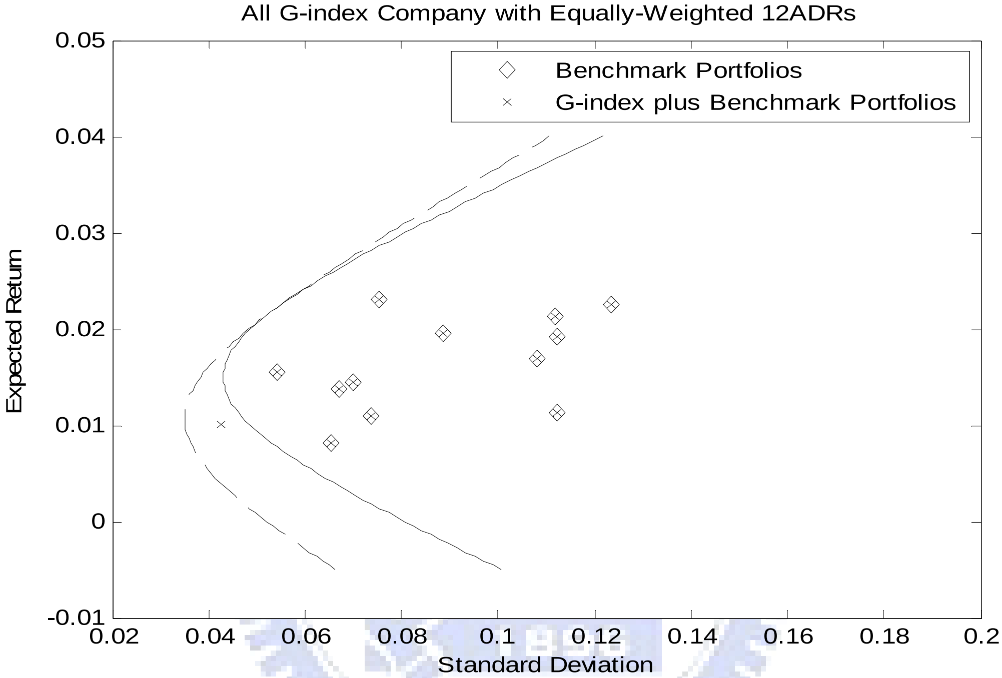


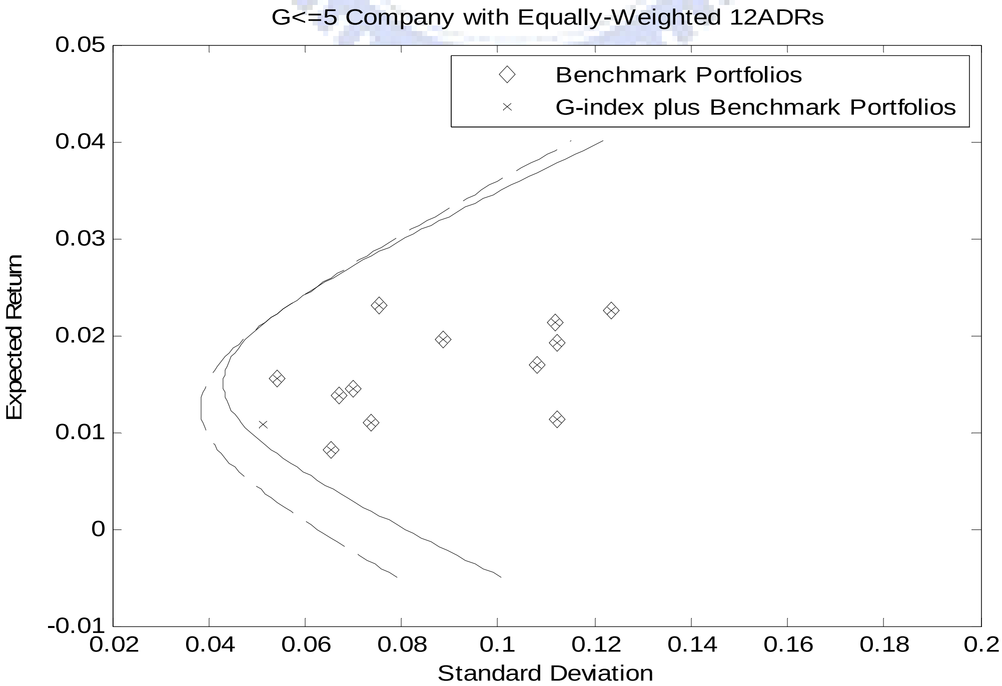
Figure 2

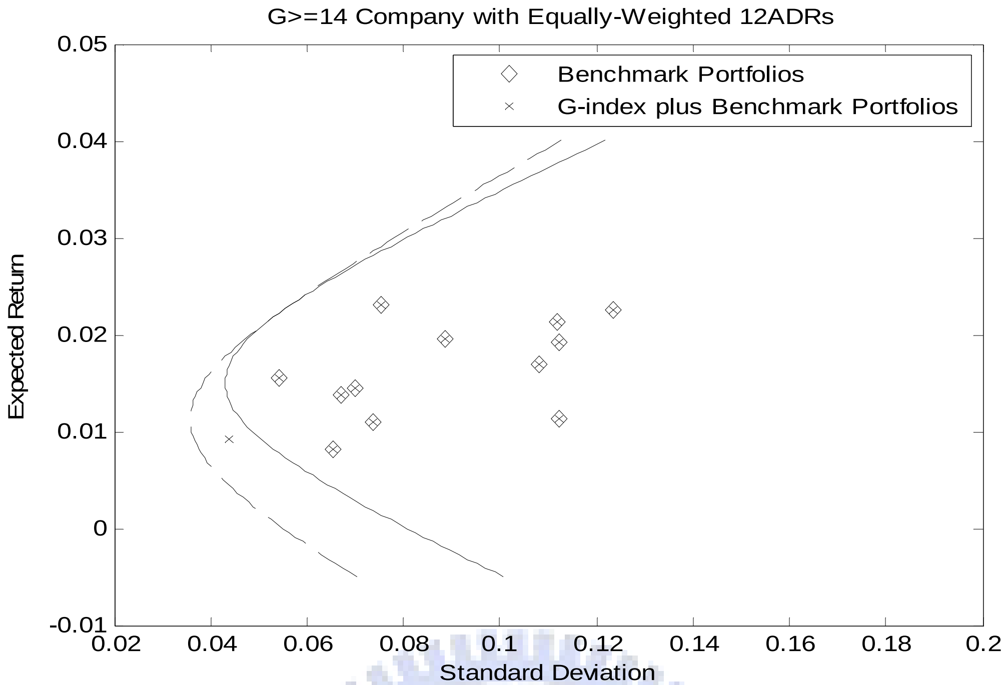
Mean- Variance Frontiers of 12ADRs and Augmented Assets

This figure plots the mean-variance frontier of equally-weighted/value-weighted 12 countires' ADRs benchmark portfolios (the inner solid frontier) and the mean-variance frontier of augmented assets (benchmark portfolios plus all G-index stocks, G<=5 stocks and G>=14 stocks, the outer dashed frontier). The sample period is from September 1990 to December 2005. The expected returns and the standard deviations in the figure are presented monthly.

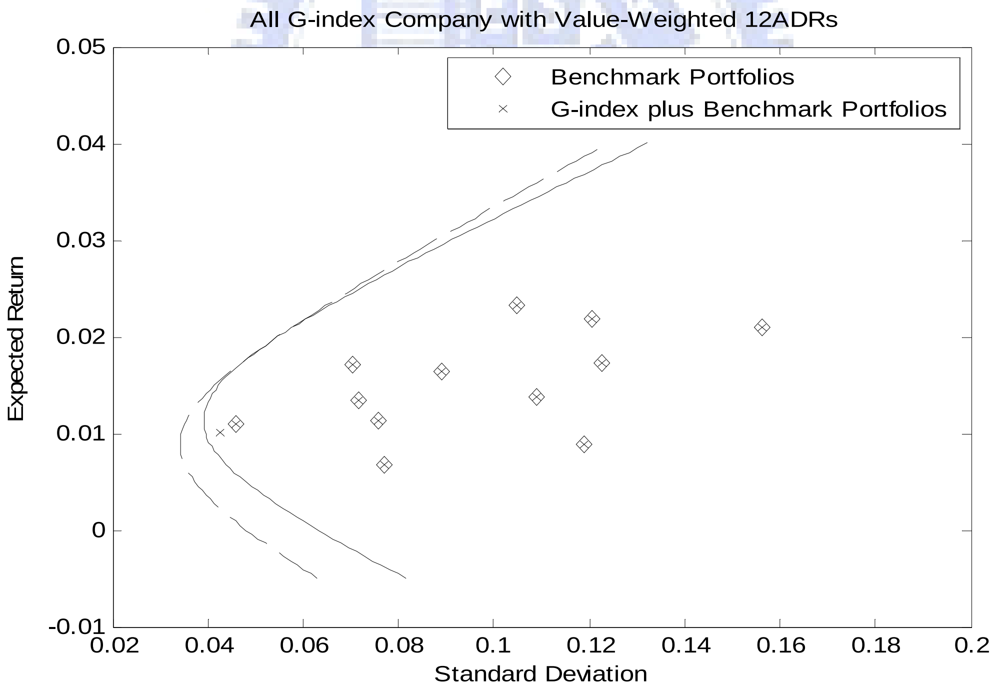
Panel A: Frontiers of the G-index portfolios and equally-weighted 12ADRs benchmark portfolios

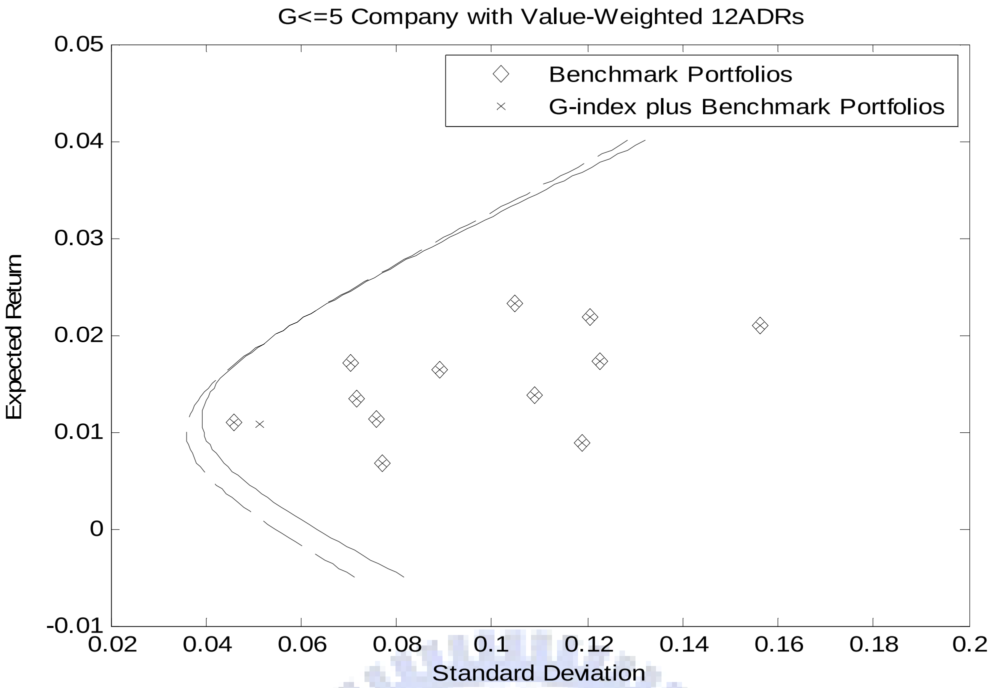






Panel B: Frontiers of the G-index portfolios and value-weighted 12ADRs benchmark portfolios




G<=5 Company with Value-Weighted 12ADRs
Benchmark Portfolios
G-index plus Benchmark Portfolios
Expected Return
Standard Deviation
0.05
0.04
0.03
0.02
0.01
0
-0.01
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0.16
0.18
0.2

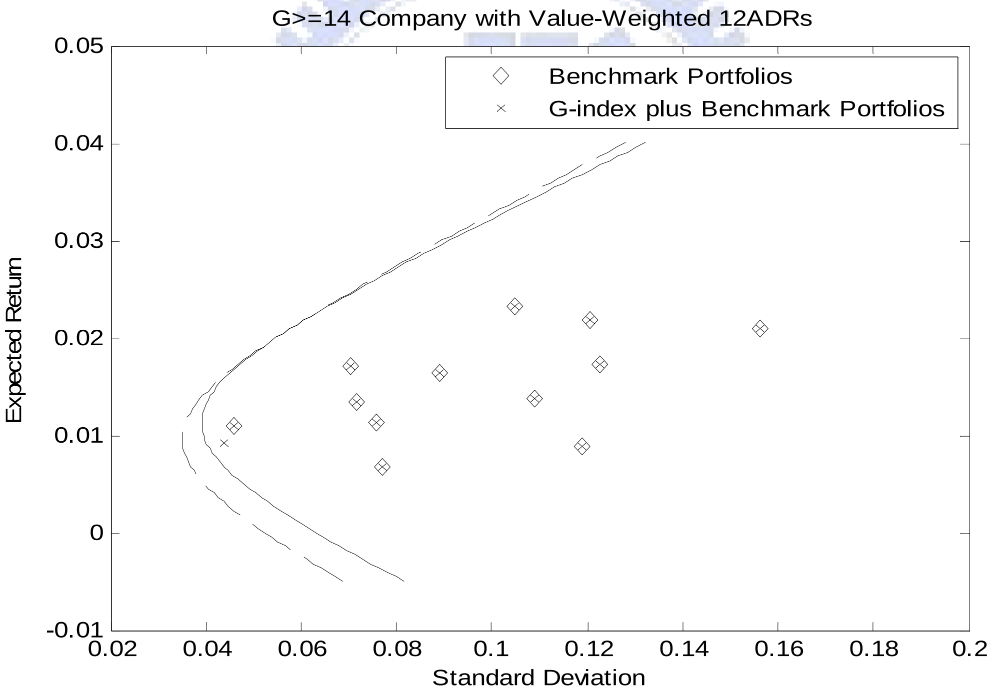
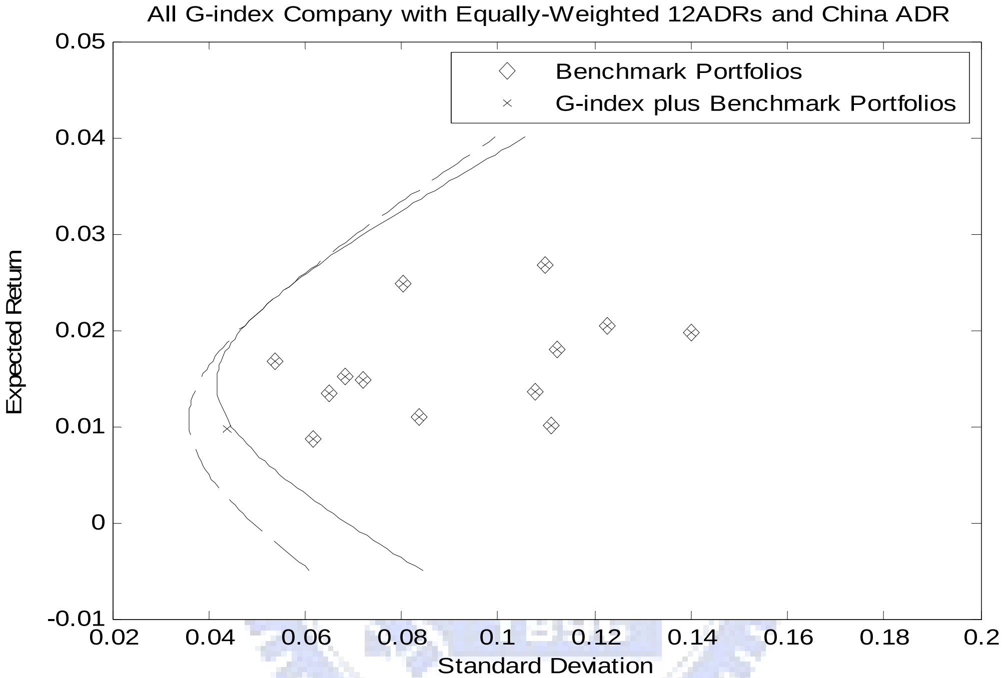

G>=14 Company with Value-Weighted 12ADRs
Benchmark Portfolios
G-index plus Benchmark Portfolios
Expected Return
Standard Deviation
0.05
0.04
0.03
0.02
0.01
0
-0.01
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0.16
0.18
0.2

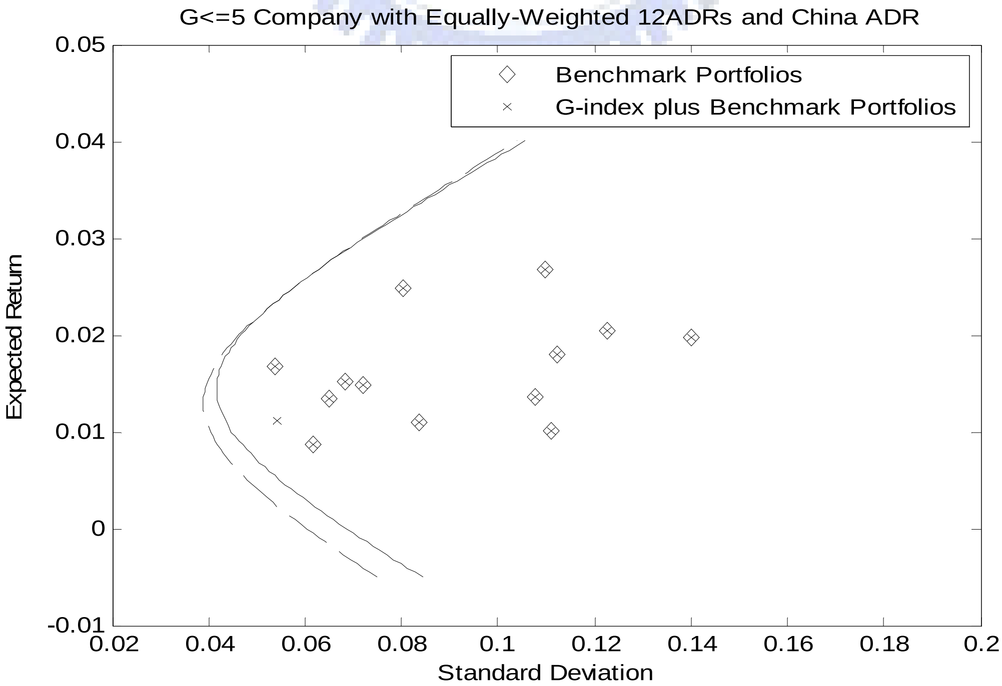
Figure 3

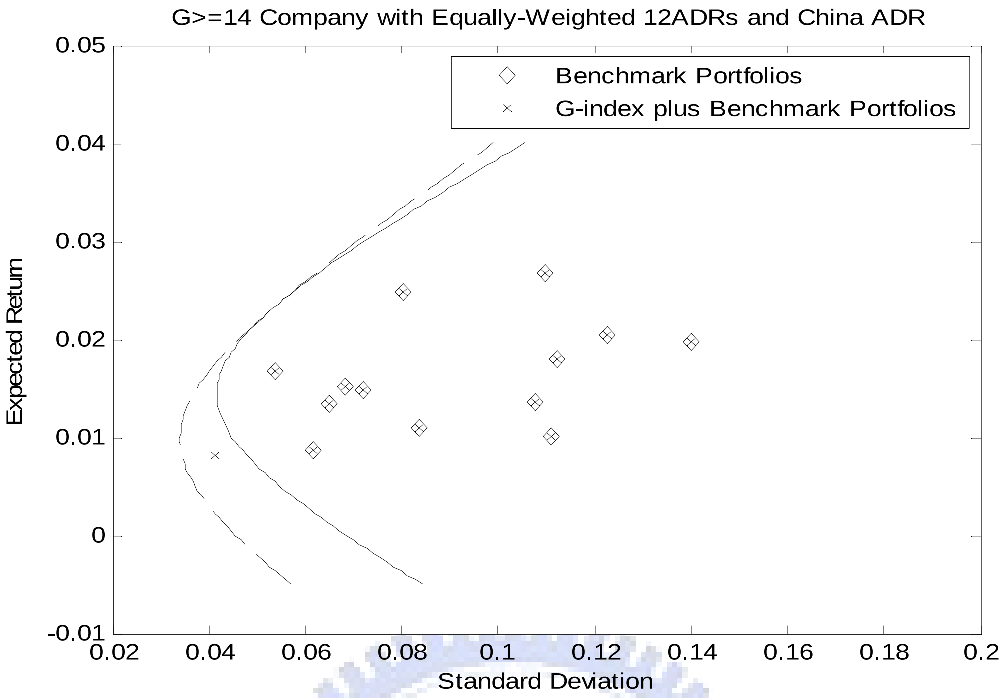
Mean- Variance Frontiers of 13ADRs and Augmented Assets

This figure plots the mean-variance frontier of equally-weighted/value-weighted 13 countires' ADRs benchmark portfolios (the previous 12 countries' ADRs plus ADRs of China, the inner solid frontier) and the mean-variance frontier of augmented assets (benchmark portfolios plus all G-index stocks, G<=5 stocks and G>=14 stocks, the outer dashed frontier). The sample period is from August 1993 to December 2005. The expected returns and the standard deviations in the figure are presented monthly.

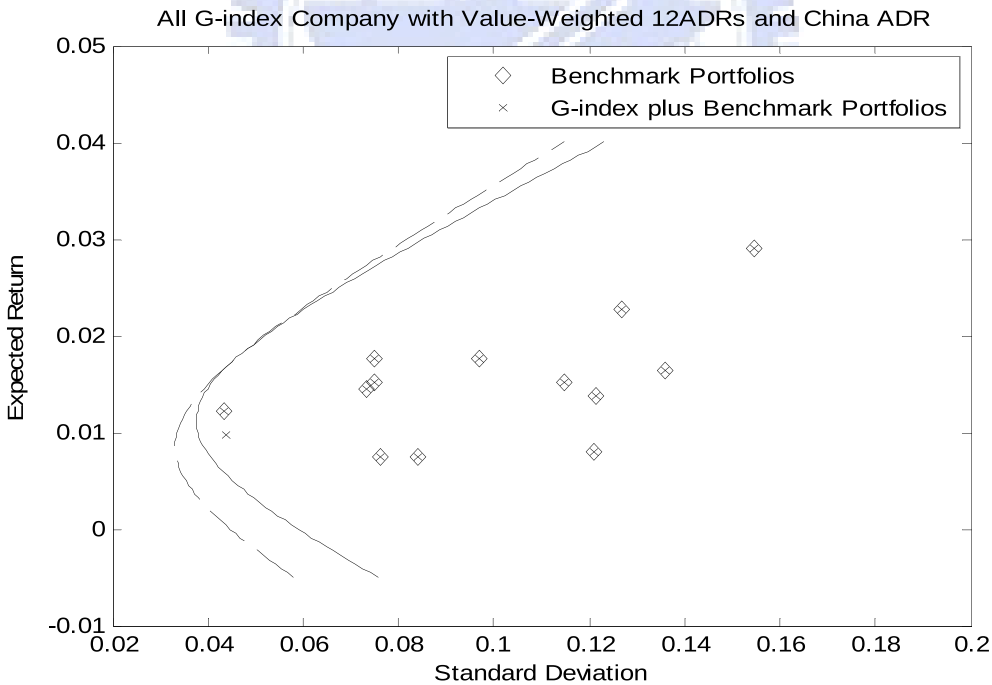
Panel A: Frontiers of the G-index portfolios and equally-weighted 13ADRs benchmark portfolios

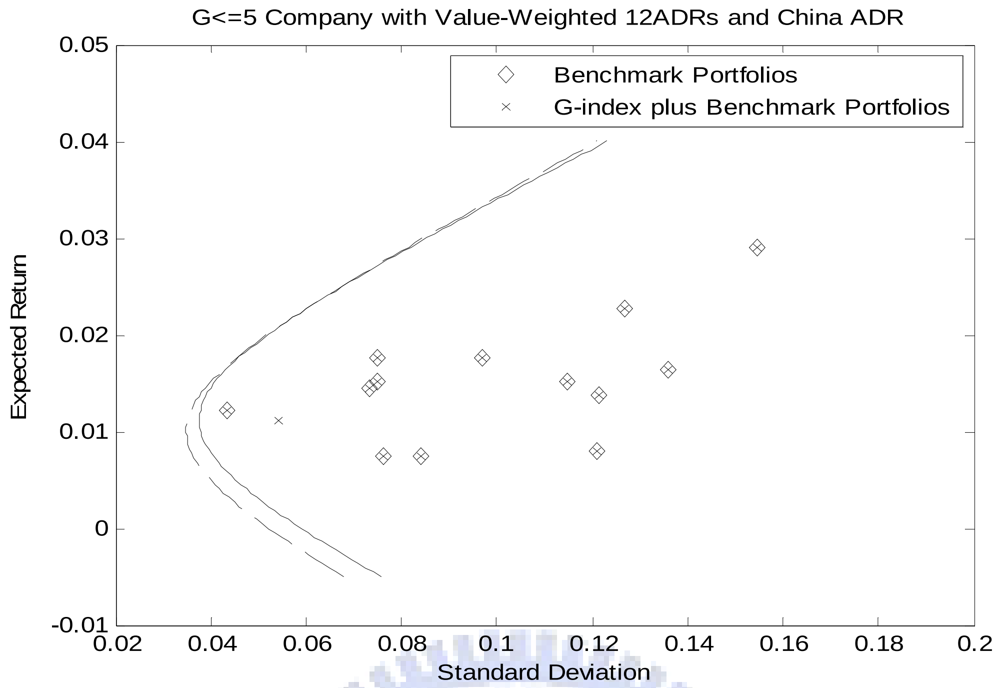






Panel B: Frontiers of the G-index portfolios and value-weighted 13ADRs benchmark portfolios




G<=5 Company with Value-Weighted 12ADRs and China ADR
Benchmark Portfolios
G-index plus Benchmark Portfolios
Expected Return
Standard Deviation
0.05
0.04
0.03
0.02
0.01
0
-0.01
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0.16
0.18
0.2

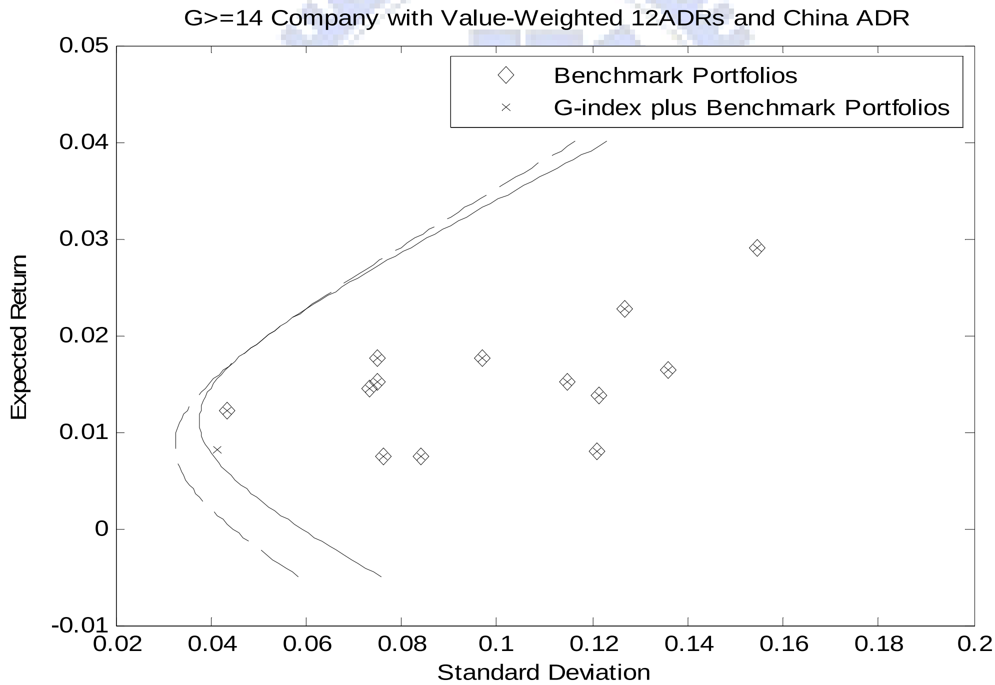
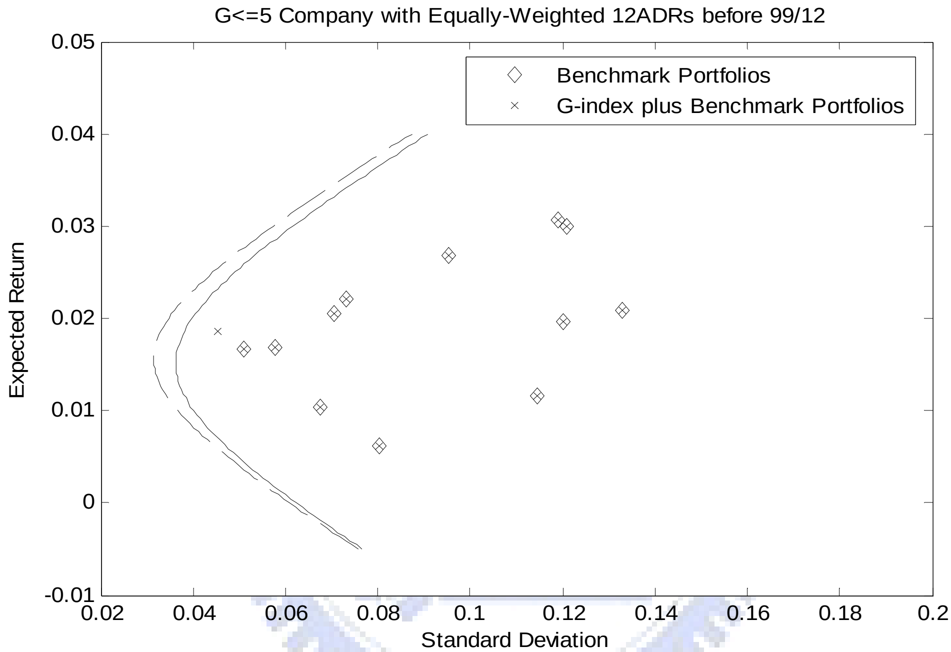

G>=14 Company with Value-Weighted 12ADRs and China ADR
Benchmark Portfolios
G-index plus Benchmark Portfolios
Expected Return
Standard Deviation
0.05
0.04
0.03
0.02
0.01
0
-0.01
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0.16
0.18
0.2

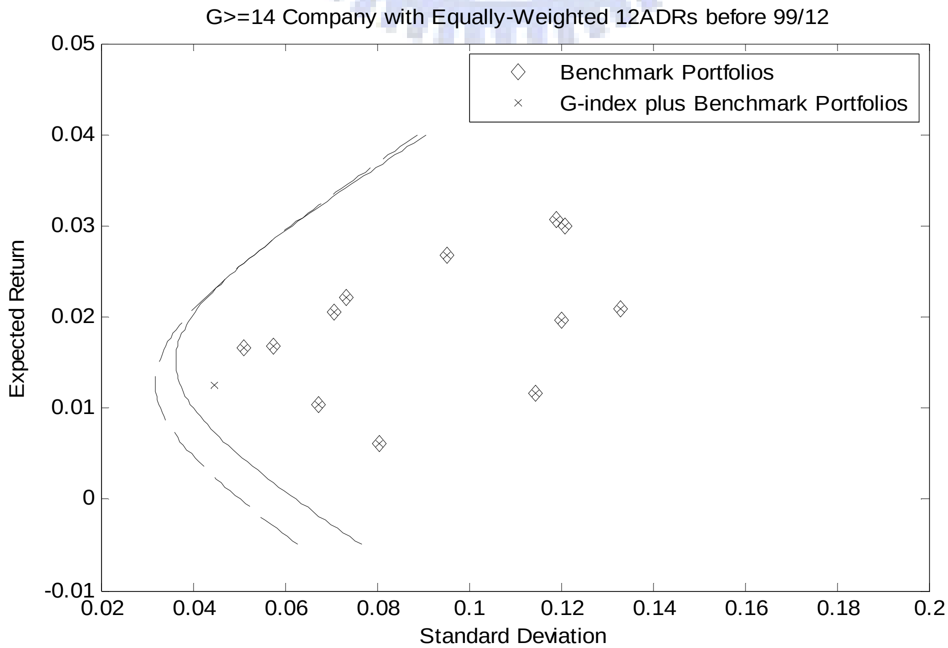
Figure 4

Mean- Variance Frontiers of Sub-Sample Periods

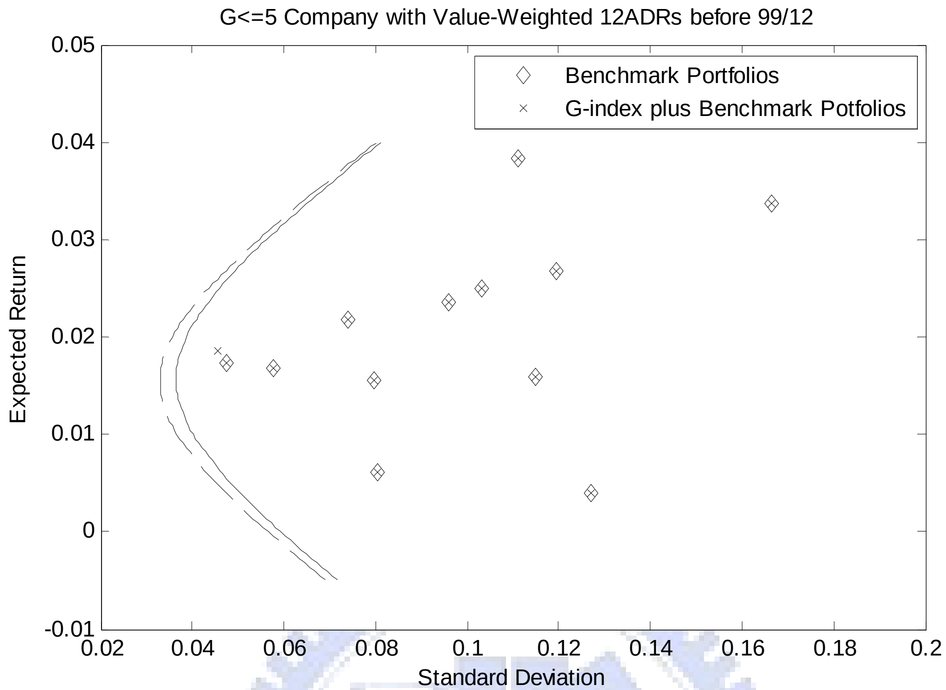
This figure plots the mean-variance frontier of equally-weighted/value-weighted 12 countires' ADRs benchmark portfolios (the inner solid frontier) and the mean-variance frontier of augmented assets (benchmark portfolios plus G<=5 stocks and G>=14stocks, the outer dashed frontier) is the same as before. There is something different here in which we divide our full-sample period into two sub-sample periods (1990-1999, 2000-2005). The figure displays the mean-variance frontiers before and after December 1999. The expected returns and the standard deviations in the figure are presented monthly.

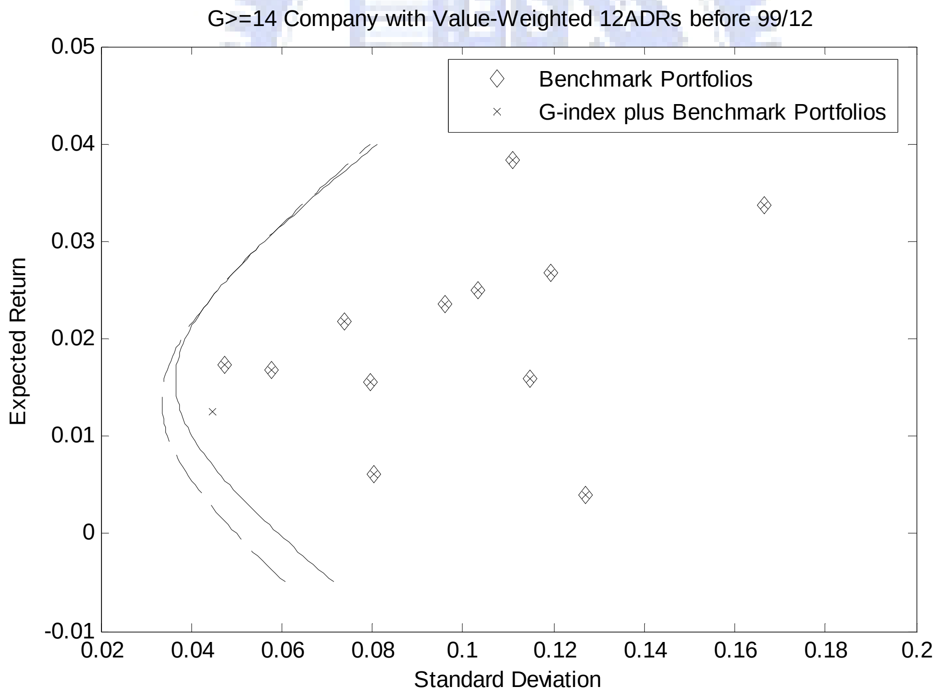
Panel A: Frontiers of the G-index portfolios and equally-weighted benchmark portfolios before 1999/12



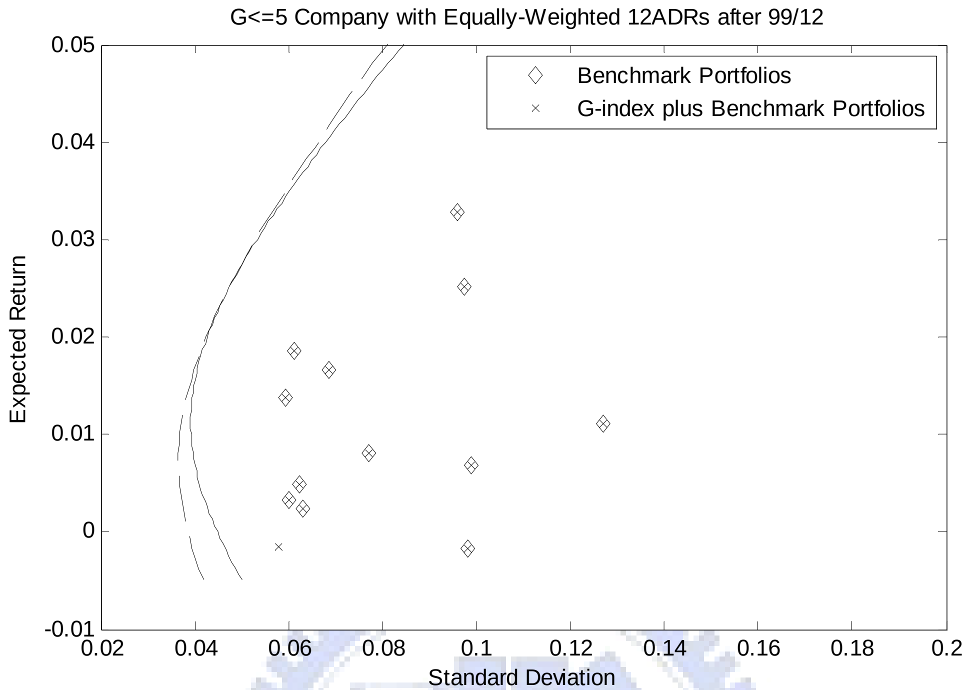


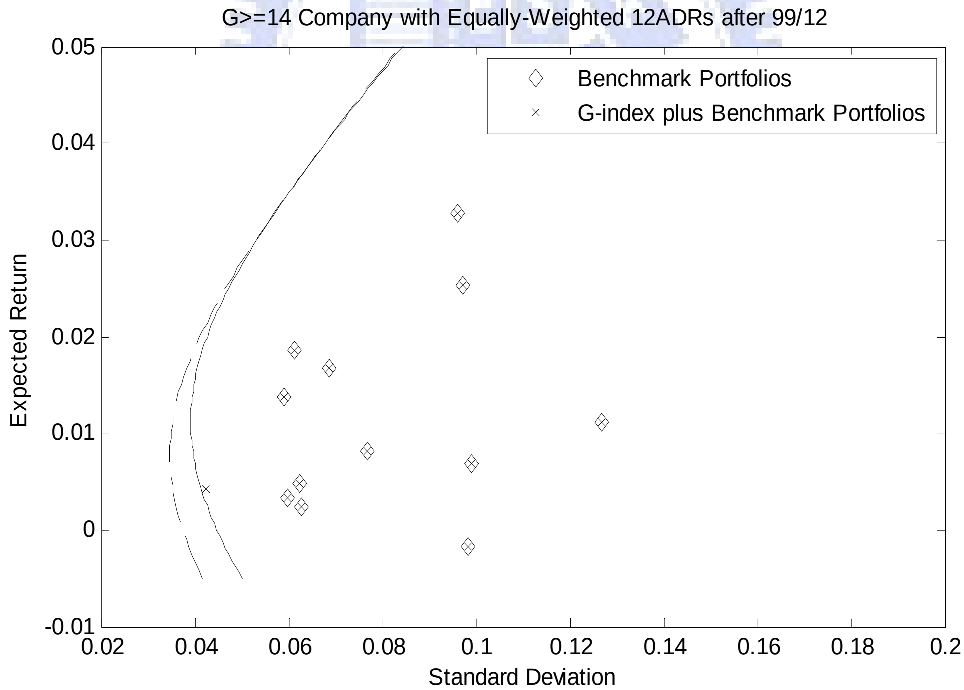
Panel B: Frontiers of the G-index portfolios and value-weighted benchmark portfolios before 1999/12



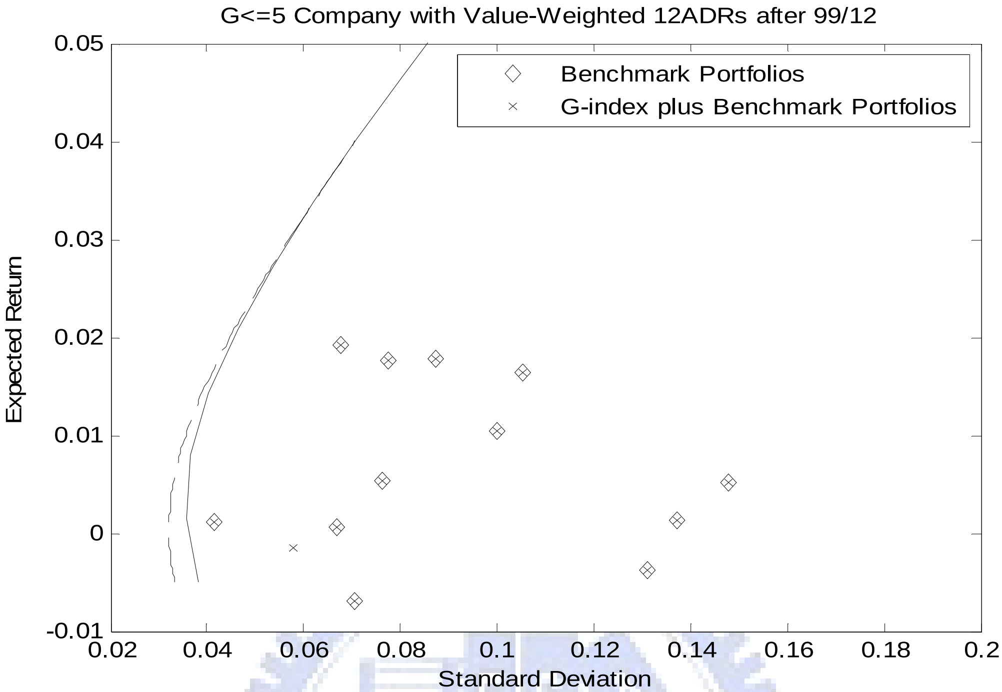


Panel C: Frontiers of the G-index portfolios and equally-weighted benchmark portfolios after 1999/12





Panel D: Frontiers of the G-index portfolios and value-weighted benchmark portfolios after 1999/12



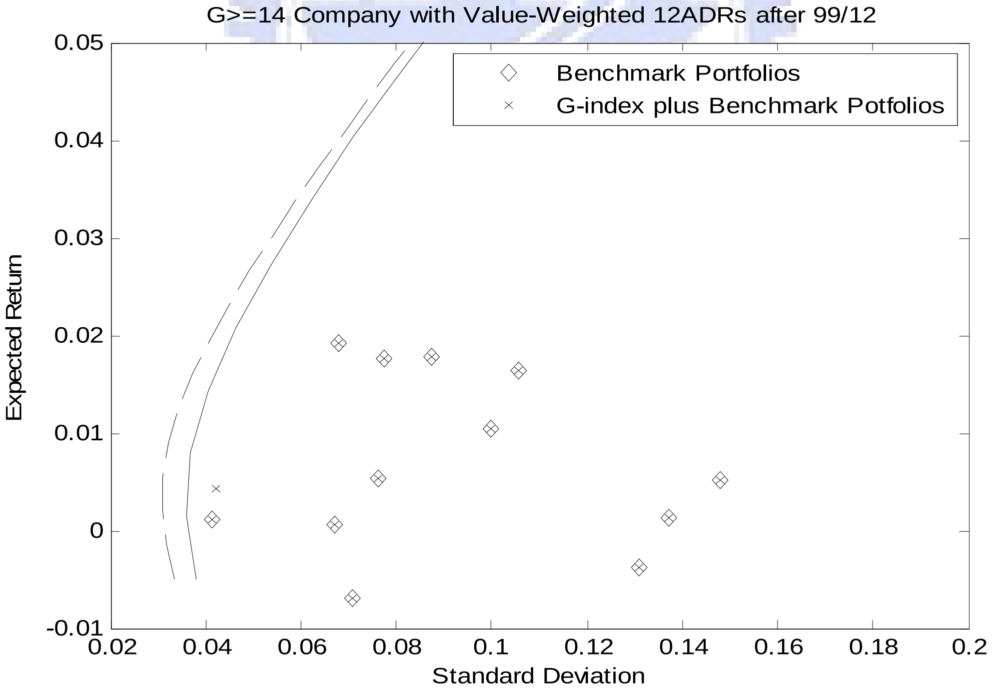


Table 1

ADR Countries, Numbers, and Effective Dates

This table presents the ADR Countries, ADR numbers and their effective dates. Panel A presents countries which issue ADRs and the number of ADRs they issued. Panel B provides the earliest effective date of each country. We take a total of 126 ADRs of 12 countries in Panel B which have effective dates since 1990/09 as the 12ADRs benchmark assets and a total of 151 ADRs of the previous 12 countries plus China which have effective dates since 1993/08 as the 13ADRs benchmark assets. The boldfaces represent the countries included in our benchmarks.

Panel A: Countries and ADR Numbers			
Country	ADR Numbers	Country	ADR Numbers
Argentina	7	Korea	8
Australia	11	Luxembourg	1
Belgium	1	**México**	16
Brazil	8	**Netherlands**	9
Chile	11	New Zealand	1
China	26	**Norway**	3
Denmark	2	Perú	1
Finland	3	Philippines	2
France	12	Portugal	1
Germany	9	Russia	5
Greece	2	Singapore	2
Hong Kong	13	**South Africa**	9
Hungary	1	**Spain**	2
India	10	Sweden	2
Indonesia	2	Switzerland	3
Ireland	7	Taiwan	6
Israel	6	Turkey	1
Italy	7	**United Kingdom**	31
Japan	22	Venezuela	1
Jersey	1	Total	265
Panel B: Countries and the Effective date			
Country	Effective Date	Country	Effective Date
Argentina	1993	Singapore	1999
Australia	**1990**	Taiwan	1997
Brazil	1997	**United Kingdom**	**1990**
Chile	**1990**	**South Africa**	**1990**
China	**1993**	Indonesia	1994
France	1991	**Italy**	**1990**
Germany	1993	**Denmark**	**1990**
Hong Kong	1996	Russia	1996
India	1999	**Spain**	**1990**
Japan	**1990**	**Irland**	**1990**
Korea	1994	**Netherland**	**1990**
México	**1990**	**Norway**	**1990**

Table 2

Monthly Abnormal Returns from September 1990 to December 2005

We estimated the four-factor regressions with value-weighted monthly returns of stock portfolios sorted by the G-index. We use the trading strategy following Gompers et al. (2003) that took a long position of the Democracy portfolio (G≦5) and a short position of the Dictatorship portfolio (G≧14). The intercept measures the abnormal returns of the strategy after controlling the four factors. The first regression is our replication of the GIM result. The second regression is the result from the period of January 2000 to December 2005. The third regression is the result of our full sample period (September 1990-December 2005). The portfolio is reset in September 1990, July 1993, July 1995, February 1998, January 2000, January 2002, and January 2004, which are the months after the new data on G-index became available.

Monthly abnormal returns (Democracy-Dictatorship)					
	Intercept	RMRF	SMB	HML	Momentum
	Original Results by GIM, Table VI				
GIM coefficient	0.71**	-0.04	-0.22*	-0.55**	-0.01
	Our replication of GIM Results over the Original Sample Period(1990/9-1999/12)				
Coefficient	0.69*	-0.08	-0.38**	-0.68**	-0.09
Standard error	0.33	0.09	0.11	0.13	0.07
t-statistic	2.08	-0.91	-3.43	-4.95	-1.16
	Analysis of Period following the Original Sample Period (2000/01-2005/12)				
Coefficient	-0.07	0.2*	0.07	-0.46**	0.02
Standard error	0.44	0.10	0.11	0.13	0.04
t-statistic	-0.17	2.12	0.67	-3.42	0.39
	Analysis of the Combined Sample Period (1990/9-2005/12)				
Coefficient	0.42	0.05	-0.14	-0.62	-0.02
Standard error	0.26	0.07	0.08	0.10	0.04
t-statistic	1.58	0.74	-1.87	-6.52	-0.52

*Significant at 0.05 level;**significant at the 0.01level

Table 3

Summary Statistics

This table provides the descriptive statistics of our variables. Panel A presents the G-index firms and returns consists of 9150 observations from 1990 to 2005 covered by the IRRC antitakeover provision database, excluding financial firms and utilities (sic 6000-6999 and 4900-4999). Panel B and Panel C are summary statistics of equally-weighted/value-weighted cases for 12ADRs and 13ADRs.

Panel A: Descriptive Statistics of G-index and Rerurn (1990-2005)

Variable	Obs.	Mean	Std Dev.	Minimum	Maximum
G-index	9150	9.0148	2.7087	1	18
Return (All)	9150	0.0038	0.0415	-0.7648	0.6201
Return (G<=5)	911	0.0114	0.0328	-0.6102	0.5914
Return (G>=14)	468	0.0018	0.0442	-0.0484	0.3000

Panel B: Descriptive Statistics of 12ADRs (1990-2005)

Equally-Weighted

Country	Obs.	Mean	Median	Std Dev.	Minimum	Maximum
Australia	184	0.0114	0.0107	0.1123	-0.2271	0.4154
Chile	184	0.0195	0.0136	0.0888	-0.3796	0.3305
Japan	184	0.0082	0.0058	0.0653	-0.1648	0.1773
México	184	0.0192	0.0178	0.1121	-0.3502	0.5225
United Kingdom	184	0.0155	0.0133	0.0542	-0.1604	0.1620
South Africa	184	0.0169	0.0186	0.1080	-0.2568	0.5203
Italy	184	0.0144	0.0140	0.0699	-0.2109	0.2776
Denmark	184	0.0230	0.0186	0.0752	-0.2626	0.2524
Spain	184	0.0138	0.0101	0.0671	-0.2158	0.2269
Irland	184	0.0226	0.0224	0.1234	-0.2633	0.4648
Netherland	184	0.0213	0.0139	0.1119	-0.2663	0.5273
Norway	184	0.0111	0.0165	0.0736	-0.2232	0.2366
Total	2208	0.0164	0.0140	0.0912	-0.3796	0.5273

Value-Weighted

Country	Obs.	Mean	Median	Std Dev.	Minimum	Maximum
Australia	184	0.0137	0.0034	0.1090	-0.2264	0.4294
Chile	184	0.0164	0.0158	0.0889	-0.3437	0.3305
Japan	184	0.0068	0.0087	0.0769	-0.1614	0.3781
México	184	0.0232	0.0238	0.1049	-0.2923	0.5225
United Kingdom	184	0.0110	0.0121	0.0458	-0.1197	0.1459
South Africa	184	0.0089	0.0026	0.1190	-0.2656	0.6461
Italy	184	0.0218	0.0179	0.1207	-0.3240	0.4223
Denmark	184	0.0172	0.0148	0.0706	-0.2763	0.2702
Spain	184	0.0135	0.0093	0.0718	-0.2284	0.2413
Irland	184	0.0172	0.0235	0.1226	-0.5074	0.3571
Netherland	184	0.0210	-0.0021	0.1561	-0.3492	0.6586
Norway	184	0.0113	0.0132	0.0759	-0.2232	0.2366
Total	2208	0.0152	0.0136	0.1010	-0.5074	0.6586

Panel C: Descriptive Statistics of 13ADRs (1993-2005)

Country	Obs.	Mean	Median	Std Dev.	Minimum	Maximum
Equally-Weighted						
Australia	149	0.0101	0.0127	0.1109	-0.2271	0.4154
Chile	149	0.0109	0.0048	0.0838	-0.3796	0.2353
Japan	149	0.0086	0.0073	0.0619	-0.1648	0.1708
México	149	0.0136	0.0181	0.1078	-0.3502	0.2942
United Kingdom	149	0.0168	0.0136	0.0539	-0.1604	0.1620
South Africa	149	0.0180	0.0201	0.1122	-0.2568	0.5203
Italy	149	0.0134	0.0134	0.0649	-0.2109	0.1953
Denmark	149	0.0249	0.0208	0.0802	-0.2626	0.2524
Spain	149	0.0152	0.0107	0.0682	-0.2158	0.2269
Irland	149	0.0204	0.0147	0.1227	-0.2633	0.4648
Netherland	149	0.0268	0.0154	0.1097	-0.2663	0.5273
Norway	149	0.0149	0.0171	0.0720	-0.2232	0.2366
China	149	0.0197	0.0115	0.1399	-0.3588	0.6699
Total	1937	0.0164	0.0142	0.0949	-0.3796	0.6699
Value-Weighted						
Country	Obs.	Mean	Median	Std Dev.	Minimum	Maximum
Australia	149	0.0151	0.0070	0.1147	-0.2264	0.4294
Chile	149	0.0074	0.0106	0.0841	-0.3437	0.2135
Japan	149	0.0075	0.0129	0.0762	-0.1614	0.3781
México	149	0.0176	0.0252	0.0969	-0.2923	0.2350
United Kingdom	149	0.0123	0.0125	0.0436	-0.1197	0.1459
South Africa	149	0.0081	0.0037	0.1210	-0.2656	0.6461
Italy	149	0.0228	0.0156	0.1270	-0.3240	0.4223
Denmark	149	0.0176	0.0185	0.0749	-0.2763	0.2702
Spain	149	0.0145	0.0094	0.0735	-0.2284	0.2413
Irland	149	0.0137	0.0199	0.1213	-0.5074	0.3571
Netherland	149	0.0291	0.0143	0.1547	-0.3492	0.6586
Norway	149	0.0151	0.0184	0.0748	-0.2232	0.2366
China	149	0.0164	0.0027	0.1360	-0.3446	0.6722
Total	1937	0.0152	0.0136	0.1043	-0.5074	0.6722

Table 4

Correlation Matrix

The table provides the correlations among different corporate governance portfolios and ADR benchmark assets. Panel A and Panel B provide the correlations between corporate governance portfolios and equally-weighted/value-weighted 12ADRs benchmark assets from 1990-2005. Panel C and Panel D provide the correlations between corporate governance portfolios and equally-weighted/value-weighted 13ADRs benchmark assets from 1993-2005. We take G<=5 as the better corporate governance portfolio (Democracy portfolio) and G>=14 as the worse corporate governance portfolio (Dictatorship portfolio).

Panel A :Correlations of G-index and Equally-Weighted 12ADRs

	All	G<=5	G>=14	Australia	Chile	Japen	Mexico	U.K.	South Africa	Italy	Denmark	Spain	Irland	Netherlanc	Norway
All	1.0000														
G<=5	0.9053	1.0000													
G>=14	0.7683	0.6719	1.0000												
Australia	0.2790	0.2065	0.2422	1.0000											
Chile	0.4679	0.3744	0.3939	0.3546	1.0000										
Japen	0.4470	0.3821	0.2972	0.3622	0.2515	1.0000									
Mexico	0.4805	0.4237	0.3851	0.1953	0.4779	0.3412	1.0000								
U.K.	0.6436	0.5967	0.5036	0.3406	0.4364	0.4636	0.4849	1.0000							
South Africa	0.0820	0.0349	0.0979	0.3027	0.2146	0.1944	0.1548	0.1598	1.0000						
Italy	0.5257	0.4592	0.4261	0.3643	0.3791	0.4950	0.3533	0.5249	0.1179	1.0000					
Denmark	0.2305	0.1657	0.1989	0.1016	0.1398	0.1135	0.0735	0.2654	-0.0123	0.2574	1.0000				
Spain	0.5640	0.4932	0.4212	0.2101	0.4220	0.4203	0.3746	0.5796	0.0609	0.5255	0.3137	1.0000			
Irland	0.5631	0.5335	0.4107	0.2710	0.3167	0.2764	0.3539	0.4649	0.0508	0.3188	0.2317	0.4269	1.0000		
Netherland	0.5632	0.5191	0.4051	0.2862	0.3554	0.3348	0.3314	0.5416	0.1032	0.4703	0.1692	0.4655	0.3947	1.0000	
Norway	0.4744	0.4088	0.4342	0.3086	0.3625	0.3576	0.3198	0.5151	0.3022	0.3948	0.1911	0.4578	0.2469	0.3629	1.0000

Panel B :Correlations of G-index and Value-Weighted 12ADRs

	All	G<=5	G>=14	Australia	Chile	Japen	Mexico	U.K.	South Africa	Italy	Denmark	Spain	Irland	Netherlanc	Norway
All	1.0000														
G<=5	0.9053	1.0000													
G>=14	0.7683	0.6719	1.0000												
Australia	0.2402	0.1494	0.2398	1.0000											
Chile	0.4922	0.3975	0.4356	0.2952	1.0000										
Japen	0.4869	0.4495	0.2749	0.3087	0.2673	1.0000									
Mexico	0.5338	0.4635	0.3664	0.1334	0.4780	0.3632	1.0000								
U.K.	0.6433	0.5045	0.5303	0.3017	0.3502	0.3509	0.3536	1.0000							
South Africa	0.0845	0.0545	0.1150	0.3079	0.1614	0.1823	0.1282	0.1878	1.0000						
Italy	0.5862	0.5582	0.3396	0.2374	0.2772	0.4918	0.2942	0.4456	0.0271	1.0000					
Denmark	0.2140	0.1665	0.1815	0.0026	0.0917	0.0776	0.0083	0.2211	-0.0164	0.1557	1.0000				
Spain	0.5646	0.5005	0.3882	0.1188	0.3903	0.4471	0.3986	0.5062	0.0175	0.4831	0.2161	1.0000			
Irland	0.4245	0.3769	0.3067	0.1158	0.2269	0.2235	0.3418	0.2568	-0.0091	0.1788	0.1717	0.3229	1.0000		
Netherland	0.5488	0.5237	0.3619	0.2244	0.3150	0.3360	0.2824	0.3626	0.0320	0.5643	0.0788	0.4105	0.2082	1.0000	
Norway	0.4388	0.3732	0.4226	0.3504	0.3828	0.3364	0.3127	0.5232	0.2774	0.2800	0.1338	0.3877	0.1705	0.3316	1.0000

Panel C :Correlations of G-index and Equally-Weighted 13ADRs

	All	G<=5	G>=14	Australia	Chile	Japen	Mexico	U.K.	South Africa	Italy	Denmark	Spain	Irland	Netherlanc	Norway	China
All	1.0000															
G<=5	0.9095	1.0000														
G>=14	0.7504	0.6579	1.0000													
Australia	0.3840	0.3039	0.3918	1.0000												
Chile	0.5438	0.4337	0.4596	0.3917	1.0000											
Japen	0.5364	0.4834	0.3845	0.4056	0.3806	1.0000										
Mexico	0.5200	0.4895	0.4148	0.2699	0.5202	0.4380	1.0000									
U.K.	0.6857	0.6385	0.5533	0.4306	0.5284	0.4359	0.5184	1.0000								
South Africa	0.1204	0.0522	0.1562	0.3297	0.2859	0.2419	0.2256	0.1998	1.0000							
Italy	0.6817	0.6114	0.6230	0.4529	0.5071	0.4937	0.4779	0.6397	0.1227	1.0000						
Denmark	0.2388	0.1638	0.2379	0.1431	0.1705	0.1017	0.1174	0.2906	-0.0215	0.2518	1.0000					
Spain	0.5999	0.5173	0.4574	0.2743	0.5283	0.3956	0.4338	0.5841	0.0503	0.5985	0.2967	1.0000				
Irland	0.5457	0.5249	0.3391	0.3352	0.3490	0.3686	0.3725	0.5299	0.0532	0.4155	0.2619	0.4474	1.0000			
Netherland	0.6092	0.5473	0.4578	0.2751	0.4315	0.4145	0.4231	0.5908	0.0879	0.6049	0.1882	0.4924	0.4270	1.0000		
Norway	0.4995	0.4144	0.4748	0.4128	0.5137	0.3827	0.4454	0.5292	0.3273	0.4828	0.2145	0.5207	0.2441	0.4245	1.0000	
China	0.3451	0.2662	0.4557	0.3029	0.5013	0.2158	0.2866	0.3136	0.4507	0.3230	0.0528	0.2845	0.1541	0.2858	0.3510	1.0000

Panel D :Correlations of G-index and Value-Weighted 13ADRs

	All	G<=5	G>=14	Australia	Chile	Japen	Mexico	U.K.	South Africa	Italy	Denmark	Spain	Irland	Netherlanc	Norway	China
All	1.0000															
G<=5	0.9095	1.0000														
G>=14	0.7504	0.6579	1.0000													
Australia	0.2791	0.1841	0.3137	1.0000												
Chile	0.5707	0.4562	0.5124	0.3280	1.0000											
Japen	0.5679	0.5386	0.3409	0.3068	0.3913	1.0000										
Mexico	0.5934	0.5497	0.3875	0.1706	0.5178	0.4940	1.0000									
U.K.	0.6439	0.5098	0.5347	0.3532	0.4959	0.3852	0.4053	1.0000								
South Africa	0.1229	0.0633	0.1616	0.3162	0.2489	0.2039	0.2443	0.2265	1.0000							
Italy	0.6686	0.6384	0.4353	0.2550	0.3447	0.5076	0.3864	0.5225	0.0058	1.0000						
Denmark	0.2189	0.1648	0.2147	0.0224	0.1047	0.0632	0.0462	0.1963	-0.0276	0.1311	1.0000					
Spain	0.5914	0.5193	0.4092	0.1431	0.4973	0.4629	0.4834	0.4950	-0.0094	0.5219	0.1784	1.0000				
Irland	0.3829	0.3483	0.2056	0.1260	0.2159	0.2737	0.3467	0.1721	0.0144	0.1948	0.1940	0.3195	1.0000			
Netherland	0.6002	0.5634	0.4122	0.1810	0.3917	0.4252	0.3851	0.4119	-0.0019	0.6525	0.0932	0.4731	0.2156	1.0000		
Norway	0.4547	0.3708	0.4587	0.3955	0.5396	0.3459	0.4466	0.5462	0.3001	0.3055	0.1505	0.4250	0.1527	0.3820	1.0000	
China	0.3303	0.2381	0.4324	0.3203	0.4887	0.1279	0.2695	0.3509	0.4206	0.1616	0.0107	0.2245	0.0575	0.2275	0.3505	1.0000

Table 5

Mean-Variance Spanning, Intersection and Step-Down Tests using the 12ADRs Portfolios as Benchmarks

The table shows the mean-variance spanning, intersection, and step-down tests when adding various G-index portfolios to the 12ADRs benchmark assets. We exclude financial firms and utilities (sic 6000-6999 and 4900-4999). The sample covered by the IRRC antitakeover provision database. *F, LM, and LR* present the Finite sample, the Lagrange multiplier, and the Likelihood ratio tests. The *W* represents the asymptotic Wald test for spanning. W_1 and W_2 are the step-down Wald tests for spanning. W_I represents the asymptotic Wald test for intersection, and the mean monthly risk-free rate, 0.33%, is used for intersection test. *and ** denote the significance level at 5% and 1% respectively.

12ADRs as Benchmark

Panel A	Equally-Weighted						
						Step-Down Tests	
	F	LM	LR	W	W_I	W1	W2
All G-index Firms							
Test Statistics	47.0269	65.2920	80.6415	101.2041	0.0472	0.2243	100.8568
P Value	(0.0000)**	(0.0000)**	(0.0000)**	(0.0000)**	(0.8280)	(0.6358)	(0.0000)**
Democracy Portfolio(G<=5)							
Test Statistics	24.3599	40.7994	46.1269	0.2251	0.0005	0.2251	52.1348
P Value	(0.0000)**	(0.0000)**	(0.0000)**	(0.0000)**	(0.9820)	(0.6352)	(0.0000)**
Dictatorship Portfolio(G>=14)							
Test Statistics	40.9048	59.5427	71.9391	88.0291	0.0069	0.3150	87.5642
P Value	(0.0000)**	(0.0000)**	(0.0000)**	(0.0000)**	(0.9340)	(0.5746)	(0.0000)**

Panel B	Value-Weighted						
						Step-Down Tests	
	F	LM	LR	W	W_I	W1	W2
All G-index Firms							
Test Statistics	27.8093	45.1588	51.8153	59.8470	0.2017	0.0237	59.8156
P Value	(0.0000)**	(0.0000)**	(0.0000)**	(0.0000)**	(0.6533)	(0.8777)	(0.0000)**
Democracy Portfolio(G<=5)							
Test Statistics	16.2965	29.4564	32.1005	35.0708	0.0074	0.1408	34.9033
P Value	(0.0000)**	(0.0000)**	(0.0000)**	(0.0000)**	(0.9312)	(0.7075)	(0.0000)**
Dictatorship Portfolio(G>=14)							
Test Statistics	21.7162	37.2684	41.6448	46.7342	0.0075	0.1989	46.4851
P Value	(0.0000)**	(0.0000)**	(0.0000)**	(0.0000)**	(0.9308)	(0.6556)	(0.0000)**

Table 6

Sharpe Ratios and Properties of Tangency and Global Minimum-Variance Portfolios Before and After Adding the G-Index Portfolios

The table reports the mean returns and standard deviations of the tangency and global minimum-variance (GMV) portfolios before and after adding the G-index portfolios. This table also reports percentage changes in the Sharpe ratio and the reductions in the standard deviation of the GMV portfolio. The test assets are constructed by stocks of the G-index firms trading on the NYSE, the AMEX, and the NASDAQ. The sample period is from 1990 to 2005, which takes the 12ADRs as benchmark assets.

12ADRs as Benchmark

	Equally-Weighted				Value-Weighted			
All G-index Firms	before	after	before	after	before	after	before	after
Tangency Portfolio								
Mean Return	0.0226	0.0236			0.0212	0.0233		
Standard Deviation	0.0554	0.0580			0.0585	0.0649		
Sharpe Ratio	0.3493	0.3497			0.3057	0.3077		
% change in Sharp Ratio	0.1145				0.6542			
GMV Portfolio								
Mean Return			0.0150	0.0107			0.0113	0.0089
Standard Deviation			0.0431	0.0351			0.0391	0.0342
% change in Standard Deviation			-18.5615				-12.5320	
Democracy Portfolio(G<=5)	before	after	before	after	before	after	before	after
Tangency Portfolio								
Mean Return	0.0226	0.0227			0.0212	0.0214		
Standard Deviation	0.0554	0.0556			0.0585	0.0593		
Sharpe Ratio	0.3493	0.3493			0.3057	0.3058		
% change in Sharp Ratio	0.0000				0.0327			
GMV Portfolio								
Mean Return			0.0150	0.0125			0.0113	0.0100
Standard Deviation			0.0431	0.0383			0.0391	0.0359
% change in Standard Deviation			-11.1369				-8.1841	
Dictatorship Portfolio(G>=14)	before	after	before	after	before	after	before	after
Tangency Portfolio								
Mean Return	0.0226	0.0230			0.0212	0.0215		
Standard Deviation	0.0554	0.0563			0.0585	0.0594		
Sharpe Ratio	0.3493	0.3494			0.3057	0.3058		
% change in Sharp Ratio	0.0286				0.0327			
GMV Portfolio								
Mean Return			0.0150	0.0113			0.0113	0.0096
Standard Deviation			0.0431	0.0358			0.0391	0.0351
% change in Standard Deviation			-16.9374				-10.2302	

Table 7
Mean-Variance Spanning, Intersection and Step-Down Tests using the 13ADRs Portfolios as Benchmarks

The table shows the mean-variance spanning, intersection, and step-down tests when adding various G-index portfolios to the 13ADRs benchmark assets. We exclude financial firms and utilities (sic 6000-6999 and 4900-4999). The sample covered by the IRRC antitakeover provision database. *F, LM, and LR* present the Finite sample, the Lagrange multiplier, and the Likelihood ratio tests. The *W* represents the asymptotic Wald test for spanning. W_1 and W_2 are the step-down Wald tests for spanning. W_I represents the asymptotic Wald test for intersection, and the mean monthly risk-free rate, 0.33%, is used for intersection test. *and ** denote the significance level at 5% and 1% respectively.

13ADRs as Benchmark

Panel A	Equally-Weighted						
						Step-Down Tests	
	F	LM	LR	W	W_I	W1	W2
All G-index Firms							
Test Statistics	26.3192	41.7991	49.0570	58.0972	0.2795	0.0001	58.0971
P Value	(0.0000)**	(0.0000)**	(0.0000)**	(0.0000)**	(0.5971)	(0.9932)	(0.0000)**
Democracy Portfolio(G<=5)							
Test Statistics	10.6021	20.2263	21.7376	23.4033	0.0000	0.1140	23.2715
P Value	(0.0001)**	(0.0000)**	(0.0000)**	(0.0000)**	(0.9974)	(0.7357)	(0.0000)**
Dictatorship Portfolio(G>=14)							
Test Statistics	37.0090	52.7642	65.1346	81.6939	0.2335	0.0237	81.6572
P Value	(0.0000)**	(0.0000)**	(0.0000)**	(0.0000)**	(0.6290)	(0.8776)	(0.0000)**

Panel B	Value-Weighted						
						Step-Down Tests	
	F	LM	LR	W	W_I	W1	W2
All G-index Firms							
Test Statistics	21.0136	35.3734	40.3833	46.3856	0.3971	0.0068	46.3767
P Value	(0.0000)**	(0.0000)**	(0.0000)**	(0.0000)**	(0.5286)	(0.9343)	(0.0000)**
Democracy Portfolio(G<=5)							
Test Statistics	11.4388	21.5912	23.3253	25.2501	0.0006	0.1448	25.0809
P Value	(0.0000)**	(0.0000)**	(0.0000)**	(0.0000)**	(0.9810)	(0.7035)	(0.0000)**
Dictatorship Portfolio(G>=14)							
Test Statistics	24.7277	39.9492	46.5078	54.5841	0.1559	0.0400	54.5294
P Value	(0.0000)**	(0.0000)**	(0.0000)**	(0.0000)**	(0.6930)	(0.8415)	(0.0000)**

Table 8

Sharpe Ratios and Properties of Tangency and Global Minimum-Variance Portfolios Before and After Adding the G-Index Portfolios

The table reports the mean returns and standard deviations of the tangency and global minimum-variance (GMV) portfolios before and after adding G-index portfolios. This table also reports percentage changes in the Sharpe ratio and the reductions in the standard deviation of the GMV portfolio. The test assets are constructed by stocks of G-index firms trading on the NYSE, the AMEX, and the NASDAQ. The sample period is from 1993 to 2005, taking the 13ADRs as benchmark assets.

13ADRs as Benchmark

	Equally-Weighted				Value-Weighted			
All G-index Firms	before	after	before	after	before	after	before	after
Tangency Portfolio								
Mean Return	0.0254	0.0283			0.0220	0.0256		
Standard Deviation	0.0589	0.0661			0.0580	0.0682		
Sharpe Ratio	0.3745	0.3774			0.3231	0.3276		
% change in Sharp Ratio	0.7744				1.3928			
GMV Portfolio								
Mean Return			0.0144	0.0107			0.0112	0.0086
Standard Deviation			0.0417	0.0359			0.0376	0.0332
% change in Standard Deviation			-13.9089				-11.7021	
Democracy Portfolio(G<=5)	before	after	before	after	before	after	before	after
Tangency Portfolio								
Mean Return	0.0254	0.0254			0.0220	0.0221		
Standard Deviation	0.0589	0.0589			0.0580	0.0582		
Sharpe Ratio	0.3745	0.3745			0.3231	0.3231		
% change in Sharp Ratio	0.0000				0.0000			
GMV Portfolio								
Mean Return			0.0144	0.0129			0.0112	0.0101
Standard Deviation			0.0417	0.0389			0.0376	0.0349
% change in Standard Deviation			-6.7146				-7.1809	
Dictatorship Portfolio(G>=14)	before	after	before	after	before	after	before	after
Tangency Portfolio								
Mean Return	0.0254	0.0285			0.0220	0.0242		
Standard Deviation	0.0589	0.0667			0.0580	0.0644		
Sharpe Ratio	0.3745	0.3769			0.3231	0.3249		
% change in Sharp Ratio	0.6409				0.5571			
GMV Portfolio								
Mean Return			0.0144	0.0099			0.0112	0.0086
Standard Deviation			0.0417	0.0341			0.0376	0.0324
% change in Standard Deviation			-18.2254				-13.8298	

Table 9
Mean-Variance spanning, Intersection and Step-Down Tests (Sub-Sample Periods)

The table shows the mean-variance spanning, intersection, and step-down tests when adding various G-index portfolios to the 12ADRs benchmark assets before and after December 1999. We divide our full-sample period into two sub-sample periods (1990-1999, 2000-2005) for the reason of time-period-specificity. Panel A presents our results from 1990 to 1999, and Panel B are the results during 2000-2005. The sample covered by the IRRC antitakeover provision database. *F, LM, and LR* present the Finite sample, the Lagrange multiplier, and the Likelihood ratio tests. The W represents the asymptotic Wald test for spanning. W_1 and W_2 are the step-down Wald tests for spanning. W_I represents the asymptotic Wald test for intersection, and the mean monthly risk-free rate, 0.33%, is used for intersection test. *denotes the 10% significance level, ** denote the 5% significance level, and *** denotes the 1% significance level.

Panel A: 12ADRs as Benchmark (Period from 1990/09 to 1999/12)

Panel A	Equally-Weighted						
						Step-Down Tests	
	F	LM	LR	W	W_I	W1	W2
Democracy Portfolio(G<=5)							
Test Statistics	16.2789	27.7177	31.8446	36.8331	4.4770	6.5041	28.6643
P Value	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0344)**	(0.0108)**	(0.0000)***
Dictatorship Portfolio(G>=14)							
Test Statistics	15.9666	27.6156	31.3116	36.1265	0.0532	0.4836	35.4897
P Value	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.8176)	(0.4868)	(0.0000)***

	Value-Weighted						
						Step-Down Tests	
	F	LM	LR	W	W_I	W1	W2
Democracy Portfolio(G<=5)							
Test Statistics	11.3632	20.9105	23.1455	25.7107	1.9091	3.0540	22.0553
P Value	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.1671)	(0.0805)*	(0.0000)***
Dictatorship Portfolio(G>=14)							
Test Statistics	10.4491	19.5216	21.4506	23.6424	0.0156	0.0595	23.5705
P Value	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.9005)	(0.8074)	(0.0000)***

Panel B: 12ADRs as Benchmark (Period from 2000/01 to 2005/12)

	Equally-Weighted						
						Step-Down Tests	
	F	LM	LR	W	W_I	W1	W2
Democracy Portfolio(G<=5)							
Test Statistics	6.5988	13.1615	14.5346	16.1055	2.7470	2.1955	13.4984
P Value	(0.0026)***	(0.0014)***	(0.0007)***	(0.0003)***	(0.0974)*	(0.1384)	(0.0002)***
Dictatorship Portfolio(G>=14)							
Test Statistics	9.1366	17.0262	19.4262	22.2994	0.5249	0.2517	21.9708
P Value	(0.0003)***	(0.0002)***	(0.0001)***	(0.0000)***	(0.4688)	(0.6159)	(0.0000)***

	Value-Weighted						
						Step-Down Tests	
	F	LM	LR	W	W_I	W1	W2
Democracy Portfolio(G<=5)							
Test Statistics	7.5668	14.6980	16.4398	18.4681	1.5500	1.0526	17.1646
P Value	(0.0012)***	(0.0006)***	(0.0003)***	(0.0001)***	(0.2131)	(0.3049)	(0.0000)***
Dictatorship Portfolio(G>=14)							
Test Statistics	10.2146	18.5184	21.4076	24.9305	0.0489	0.2346	24.6157
P Value	(0.0002)***	(0.0001)***	(0.0000)***	(0.0000)***	(0.8250)	(0.6282)	(0.0000)***

Table 10

Sharpe Ratios and Properties of Tangency and Global Minimum-Variance Portfolios Before and After Adding the G-Index Portfolios (Sub-Sample Periods)

The table reports the mean returns and standard deviations of the tangency and global minimum-variance (GMV) portfolios before and after adding G-index portfolios. This table also reports percentage changes in the Sharpe ratio and the reductions in the standard deviation of the GMV portfolio. We divide our full-sample period into two sub-sample periods (1990-1999, 2000-2005) for the reason of time-period-specificity, taking the 12ADRs as benchmark assets. Panel A presents our results from 1990 to 1999, and Panel B is the results during 2000-2005. The test assets are constructed by stocks of G-index firms trading on the NYSE, the AMEX, and the NASDAQ.

Panel A: 12ADRs as Benchmark (Period from 1990/09 to 2005/12)

	Equally-Weighted				Value-Weighted			
Democracy Portfolio(G<=5)	before	after	before	after	before	after	before	after
Tangency Portfolio								
Mean Return	0.0250	0.0228			0.0278	0.0255		
Standard Deviation	0.0491	0.0390			0.0514	0.0440		
Sharpe Ratio	0.4422	0.4930			0.4768	0.4981		
% change in Sharp Ratio	11.4880				4.4673			
GMV Portfolio								
Mean Return			0.0151	0.0156			0.0157	0.0154
Standard Deviation			0.0363	0.0315			0.0365	0.0329
% change in Standard Deviation			-13.2231				-9.8630	
Dictatorship Portfolio(G>=14)	before	after	before	after	before	after	before	after
Tangency Portfolio								
Mean Return	0.0250	0.0243			0.0278	0.0282		
Standard Deviation	0.0491	0.0470			0.0514	0.0520		
Sharpe Ratio	0.4422	0.4429			0.4768	0.4770		
% change in Sharp Ratio	0.1583				0.0419			
GMV Portfolio								
Mean Return			0.0151	0.0128			0.0157	0.0135
Standard Deviation			0.0363	0.0318			0.0365	0.0335
% change in Standard Deviation			-12.3967				-8.2192	

Panel B: 12ADRs as Benchmark (Period from 2000/01 to 2005/12)

	Equally-Weighted				Value-Weighted			
Democracy Portfolio(G<=5)	before	after	before	after	before	after	before	after
Tangency Portfolio								
Mean Return	0.0569	0.1024			0.6341	NaN		
Standard Deviation	0.0963	0.1642			1.0398	NaN		
Sharpe Ratio	0.5679	0.6102			0.6077	NaN		
% change in Sharp Ratio	7.4485				NaN			
GMV Portfolio								
Mean Return			0.0113	0.0072			0.0029	0.0004
Standard Deviation			0.0392	0.0366			0.0357	0.0321
% change in Standard Deviation			-6.6327				-10.0840	
Dictatorship Portfolio(G>=14)	before	after	before	after	before	after	before	after
Tangency Portfolio								
Mean Return	0.0569	0.0744			0.6341	0.3435		
Standard Deviation	0.0963	0.1253			1.0398	0.5610		
Sharpe Ratio	0.5679	0.5762			0.6077	0.6084		
% change in Sharp Ratio	1.4615				0.1152			
GMV Portfolio								
Mean Return			0.0113	0.0077			0.0029	0.0032
Standard Deviation			0.0392	0.0347			0.0357	0.0308
% change in Standard Deviati			-11.4796				-13.7255	

Appendix

Results for Mean–Variance Spanning Tests under Non-Normality and Heteroskedasticity

12ADRs as Benchmark

Panel A	Equally-Weighted			Value-Weighted		
		Step-Down Tests			Step-Down Tests	
	Wa	Wa1	Wa2	Wa	Wa1	Wa2
All G-index Firms						
Test Statistics	115.2659	0.2243	115.6325	57.1443	0.0235	56.1757
P Value	(0.0000)**	(0.6358)	(0.0000)**	(0.0000)**	(0.8783)	(0.0000)**
Democracy Portfolio(G<=5)						
Test Statistics	51.6710	0.2304	51.2955	41.8416	0.1341	42.0207
P Value	(0.0000)**	(0.6312)	(0.0000)**	(0.0000)**	(0.7143)	(0.0000)**
Dictatorship Portfolio(G>=14)						
Test Statistics	84.6711	0.3959	79.0823	36.3266	0.2161	34.6368
P Value	(0.0000)**	(0.5295)	(0.0000)**	(0.0000)**	(0.6420)	(0.0000)**

13ADRs as Benchmark

Panel B	Equally-Weighted			Value-Weighted		
		Step-Down Tests			Step-Down Tests	
	Wa	Wa1	Wa2	Wa	Wa1	Wa2
All G-index Firms						
Test Statistics	71.8231	0.0001	71.8360	49.3025	0.0069	48.9071
P Value	(0.0000)**	(0.9935)	(0.0000)**	(0.0000)**	(0.9339)	(0.0000)**
Democracy Portfolio(G<=5)						
Test Statistics	21.6526	0.1131	21.5875	28.3180	0.1416	28.5356
P Value	(0.0000)**	(0.7366)	(0.0000)**	(0.0000)**	(0.7067)	(0.0000)**
Dictatorship Portfolio(G>=14)						
Test Statistics	88.6012	0.0276	77.3338	37.7434	0.0422	37.2584
P Value	(0.0000)**	(0.8680)	(0.0000)**	(0.0000)**	(0.8373)	(0.0000)**

*and ** denote the significance levels at 5% and 1% respectively

Optimal Portfolio Weights

Panel A: Full-Sample Period (1990/09-2005/12)

	12ADRs as Benchmark		13ADRs as Benchmark	
	EW	VW	EW	VW
Democracy Portfolio(G<=5)	-0.5196	0.6088	-0.7203	0.6122
Australia	0.9895	0.2508	-1.2924	-2.3074
Chile	-0.7223	-1.5430	-0.3976	-1.3416
Japen	0.2035	1.5836	-0.3806	1.3683
Mexico	2.6076	0.9419	3.4448	2.7806
U.K.	1.1574	0.1852	1.2579	-0.0211
South Africa	0.4680	0.7759	-0.5442	0.0253
Italy	2.9957	2.5087	2.7932	2.1429
Denmark	-0.4912	0.1829	0.5961	0.7478
Spain	0.2537	0.1224	-0.0459	0.0020
Irland	0.3775	0.0357	1.2225	0.6709
Netherland	-0.9847	-0.3073	0.1691	0.5410
Norway	-0.0491	-0.1893	0.2645	0.3889
China			-0.0081	-0.0589
Dictatorship Portfolio(G>=14)	-0.5189	0.6197	-0.6919	0.6337
Australia	0.9980	0.2595	-1.3070	-2.2303
Chile	-0.7272	-1.5599	-0.3575	-1.331
Japen	0.2082	1.5762	-0.3539	1.3845
Mexico	2.6187	0.9621	3.6094	2.9739
U.K.	1.1562	0.1858	1.1972	-0.0467
South Africa	0.4795	0.7601	-0.238	0.0621
Italy	2.9996	2.5119	2.8385	2.2105
Denmark	-0.4915	0.1789	0.5674	0.7388
Spain	0.2591	0.1183	-0.0427	0.0104
Irland	0.3791	0.0288	1.2235	0.6859
Netherland	-0.9671	-0.3005	0.274	0.5967
Norway	-0.1868	-0.1964	0.387	0.4638
China			-1.4578	-1.1074

Panel B: Sub-Sample Period				
	1990/09-1999/12		2000/01-2005/12	
	EW	VW	EW	VW
Democracy Portfolio(G<=5)	0.3765	0.226	-2.5891	2.9283
Australia	1.3749	1.0655	-0.8519	-1.9806
Chile	-1.3785	-0.6905	1.3838	-6.1236
Japen	-0.5511	0.4786	5.2823	9.9261
Mexico	2.23	3.3355	4.1128	-9.5474
U.K.	0.8712	0.0256	0.1016	-1.1407
South Africa	1.7823	1.7089	-1.1403	1.6288
Italy	3.6012	3.0358	3.2718	3.3953
Denmark	-0.28	0.0328	-5.2862	2.1156
Spain	0.0375	0.5975	0.8771	-0.9475
Irland	0.48	0.0098	-2.8311	-3.0184
Netherland	-2.9386	-3.1745	7.66	7.0777
Norway	6.8353	4.523	-6.2739	-4.3136
Dictatorship Portfolio(G>=14)	0.0858	0.0714	-2.1986	2.9031
Australia	1.5108	1.2662	-0.5413	-2.5173
Chile	-1.3529	-0.4804	0.7501	-7.0071
Japen	-0.4089	0.6382	4.2761	8.8146
Mexico	3.5485	4.6554	3.6071	-10.5561
U.K.	0.7576	0.029	0.5533	-0.7436
South Africa	1.7673	1.8628	-1.5165	0.9832
Italy	3.2661	2.8166	3.3298	2.8071
Denmark	0.175	0.4529	-4.7241	2.5121
Spain	0.7137	0.9122	0.2157	-1.0229
Irland	0.8478	0.2476	-3.8709	-3.1078
Netherland	-2.2413	-2.9594	8.2431	7.0342
Norway	0.6915	-0.3837	-3.5254	0.985