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Full Length Research Paper

Bank international diversification on home bias, profitability and risk: Evidence from emerging and industrial countries

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In the study of the effects of international diversification, many researches focused on the benefits of industrial countries. This study aimed to further this work by seeking to determine whether a consolidated group of international banks with extensive global exposures would be able to diversify away from firm-specific risks for both emerging and industrial countries. This paper examined the effects of international diversification in banking of 195 consolidated groups from six emerging and nine industrial countries from 2001 to 2006, using the generalized method of moments. The results showed that the risk-adjusted profitability of eight countries was rising significantly, and the systematic risks of the six countries were decreasing. However, home bias phenomenon was notably indicated. The findings of this study contributed to the international diversification assessment.

Key words: International diversification, home bias, risk-adjusted profitability, systematic risk, consolidated group of international banks.

INTRODUCTION

Since the 1990's, the trend of financial globalization has led to widespread banking activities overseas. The banking industry in emerging markets is liberalized, and multinational mergers and acquisitions have developed rapidly. The segmentation principle in finance infers that banks could maximize the profits of shareholders by focusing on portfolio diversification in a frictionless market, as indicated by Diamond (1984). The banks with high global risk would be more likely to disperse country-specific risks when the asset returns between countries present an incomplete dependent. Identifying the effects of portfolio diversification through empirical research therefore is a vital issue for consolidated groups of international banks.

Studies on diversification effects were initiated extensively after Markowitz (1952; 1959), who firstly proposed the theory of portfolio optimization. Grubel (1968); Levy and Sarnat (1970); Lessard (1973) extended portfolio optimization into an international context and discussed the gains of international diversification on portfolios. International diversification is shown from their studies to be capable of obtaining more benefits, and is an interesting research subject. However, the benefit of international diversification has not been fully acquired by investors due to 'home bias' or 'excessive investment in domestic securities'. The benefit of international diversification, as indicated by Bailey and Stulz (1990), may be overestimated excessively due to errors in measurement. Research related to the benefit of regional diversification in the banking industry is quite limited, with most of it focusing on the native regional diversification of specific countries and discussion of the home diversification effect. Evidence from international banks with extensive global exposures would be able to promote country-specific returns. Hargis and Mei (2006); Garcia-Herrero and Vazquez (2007) focused on country-level datasets. However, validation of bank-level datasets has been seldom studied. Most empirical studies have demonstrated the gains of international diversification for industrial countries (Guy, 1978; García-Herrero and Vazquez, 2007; Buch et al., 2005; Griffin and Karolyi, 1998; Heston and Rouwenhorst, 1994), but few empirical results have been presented for emerging markets. A consolidated group of international

banks with extensive global exposures would theoretically be able to diversify away from country-specific risks. The effects on systematic risk remain to be empirically evidenced. This paper empirically measured the degree of international diversification, risk-adjusted profitability and systematic risk based on bank-level datasets. The current work assembled the operations of 195 international banks from nine industrial countries (including Japan, Denmark, France, Germany, Greece, Italy, Switzerland, Canada and the US), and six countries with emerging markets (including Taiwan, Israel, India, Malaysia, Thailand, and Egypt) from 2001 to 2006. The effects of international diversification on risk-adjusted profitability and systematic risk were studied for a consolidated group of international banks. The home bias phenomenon was also investigated in the international diversification asset allocation.

Literature review

In the past decades, many countries have deregulated the controls on investment, and overseas transactions in asset allocation have been promoted. Overseas operations and international diversification are likely more beneficial than domestic ones, as concluded from previous literature. The efficient frontier of Markowitz (1952) was generated by Grubel (1968); Levy and Sarnat (1970); Grubel and Fadner (1971), using the historical value of the stock market index. Grubel (1968); Levy and Sarnat (1970); Lessard (1973) showed that the relevancy of stock returns among industrial countries is low, and deduced that the gains of international diversification should be high. Lessard (1973; 1974) found that international diversification has potential benefits, using multivariate analysis to review the benefits of diversification. International diversification, as observed from an American viewpoint, has post-gains. Investors with risk aversion, as indicated by Hadar et al. (1977), should follow the strategy of diversification before investing in the current changeable environment. Fatemi (1984) indicated that overseas operations are more profitable than domestic ones, and various factors have induced companies to develop overseas operations. Johansen (1988) used the maximum likelihood estimation to measure long-term diversification and found that the diversification benefits are likely to be achieved if the assets are not integrated. Bekaert and Urias (1996); Khanna and Palepu (1997; 2000) concluded that diversification in emerging markets is valuable, as a diversified enterprise could obtain the same diversified benefits as numerous organizations do in a developed market. Errunza et al. (1999) found that the correlation between domestic stock indexes and overseas indexes is low, and overseas investments could reduce the volatility of securities in domestic markets. Lins and Servaes(1999; 2002) concluded that diversification would not cut down shareholders' wealth. More information asymmetry and market imperfection in emerging markets could increase the net gains of diversification of the enterprise. Rowland and Tesar (2004) used the mean-variance model for inter -period verification and found that investors could not obtain diversification benefits before entering the international market. Ruiz-Mallorqui et al. (2006) confirmed the hypotheses that the decision to hold equity in other firms is related to the evolution of the bank's other businesses. Driessen and Laeven (2007) indicated that the overseas investments of investors in developing countries have generated the maximum profits. Macas et al. (2009) concluded that the diversification of activities and motivations contributes positively to increased profitability in Portuguese service industries. Howcroft et al. (2010) concluded that internationalization can occur and be favorable to the development of firm-specific advantages, although, bank regulations can lead to a conflict situation.

Despite the benefits of international diversification, some literature has inferred that international diversification has not been well implemented yet. Solink (1974) advocated developing the international financial market to urge investors to obtain a profit from portfolio diversification. The measurement of this profit would be determined by the change in the nominal efficient frontier, therefore all investments that are mainly holding domestic securities are called the 'home bias puzzle.' However, French and Poterba (1991a); Lewis (1996); Baxter and Jermann (1997); Coval and Moskowitz (1999); Li (2004) found that in an environment of financial deregulation, investors are still inclined to heavily invest in their own country's financial markets, which can result in the 'home bias' of financial assets. Succeeding researches therefore attempt to investigate the home bias against international diversification benefits. Gehrig (1993) indicated that information beneficial to domestic assets would result in home bias. Lewis (1999) provided exceptional discussions on home bias in equities, and suggested that domestic investors' holdings of foreign assets are too small relative to the number of portfolio shares that would optimally hedge risk. In addition, Coval and Moskowitz (1999) found that fund managers strongly preferred local management companies. French and Poterba (1991b), Tesar and Werner (1995) found that although, global diversification is beneficial, the home bias implies that investors from industrial countries are unwilling to hold excessive overseas assets. Even if the investors have increased their overseas assets during recent years, their investment proportions in overseas assets are still less than that suggested by the portfolio optimization model. French and Poterba (1991a) measured the top five stock markets in the world in 1990 for the proportions of stock ownership at home, and found the U.S. account for 92.2%, Japan 95.7%, Britain 92%, Germany 79%, and France 89.4%. Tesar and Werner (1995) indicated that only11.2% of the overseas stocks

of domestic securities portfolios are allocated to Canada, 5.3% to Japan, 18.2% to Germany, 22.5% to Britain, and 10% to the U.S. The results showed that home bias in bond portfolios is higher than that in stock portfolios. Garcia-Herrero and Vazquez (2007); Buch et al. (2005) found that the actual asset allocation of multinational international banks has a large home bias based on the mean-variance portfolio model.

On the other hand, the cost of international diversification may be greater than the benefits. Roll (1977) found that the domestic stock weighted index should reflect all the gains derived from investments in the home country, and there should be enough evidence that portfolios apart from the home market could make more risk-adjusted returns. However, the empirical results showed that multinational enterprises (MNEs) have failed to make diversified gains. For example, Senchack and Beedles (1980) compared the risks, returns and $Beta$ in MNE portfolios with home bias and found that MNEs do not make diversified gains. Jacquillat and Solnik (1978) obtained the returns of MNEs from the market indexes of the nine countries and found that these returns are most synchronous to the home markets of the enterprises. Madura and Reiff (1985) indicated when the currency fluctuations are avoided, international asset portfolios could have fixed returns and 50% of the risks could be reduced. Lang and Stulz (1994); Berger and Ofek (1995); Servaes (1996); Lins and Servaes (1999) stated that the cost of diversification of operations in a developed capital market, on average, is greater than the profitability. García-Herrero and Vazquez (2007) suggested that the risk-adjusted profits of financial groups could be increased when the overseas subsidiary is allocated with preferable assets, but these profits will be cut down, as they are concentrated in specific geographic areas by the overseas subsidiary.

METHODOLOGY

Hypothesis and empirical model

This paper discussed whether the international diversification of consolidated groups of international banks could achieve international diversification gains. The degree of international geographical diversification for an international bank was defined by the proportion of the overseas subsidiaries' assets related to those of their parent bank. The research hypotheses are proposed as follows:

H_1^1 : The risk-adjusted profitability increases when the international diversification of the consolidated group of international banks is increased.

H_1^2 : The systematic risk decreases when the international diversification of the consolidated group of international banks is increased.

The panel estimation of the generalized method of moments (GMM) was adopted for the current empirical analysis. The dataset was panel data, which combines time series and cross-sectional structures. However, biased errors and inconsistency might exist in the estimated results if the ordinary least squares (OLS) method were used. Cragg (1983) suggested using GMM even when OLS is consistent, in order to improve efficiency in the presence of heteroscedasticity of unknown forms. Both fixed and random effects were applied respectively in the GMM model to find the coefficients of determination (R^2). The model with a higher R^2 value was then used as the basis of the analysis of panel estimation. The consolidated financial statement of the consolidated group of international banks generally contained both operations of the parent banks in the home country and overseas subsidiaries. The specific asset items in the unconsolidated financial statements of all subsidiaries were deducted from the consolidated financial statement to obtain the data of parent banks. The following empirical models were developed to validate the above hypotheses:

$$R_{i,t} = \alpha_0 \cdot share^{H}_{i,t} + \alpha_1 \cdot share^{I}_{i,t} + \alpha_2 \cdot share^{E}_{i,t} + \lambda_1 \cdot H^{I}_{i,t} + \lambda_2 \cdot H^{E}_{i,t} + \delta \cdot \Delta GDP_t + \varepsilon_{i,t} \quad (1)$$

$$\beta_{i,t} = \omega_0 \cdot share^{H}_{i,t} + \omega_1 \cdot share^{I}_{i,t} + \omega_2 \cdot share^{E}_{i,t} + \phi_1 \cdot H^{I}_{i,t} + \phi_2 \cdot H^{E}_{i,t} + \mu \cdot \Delta GDP_t + \varepsilon_{i,t} \quad (2)$$

Where the dependent variable $R_{i,t}$ evaluates the risk-adjusted profitability on the *i*-th consolidated group of international banks in the *t*-th year. The variable was computed by dividing the annual return on the consolidated return on assets (ROA) of each international bank over its standard deviation. The panel estimation was calculated using data from consolidated financial statements so as to reveal the entire operations of parent banks in their home countries and those of their overseas subsidiaries. The index *i* increased from 1 to 195, which was the total number of sampled international banks. The year *t* was the time dimension during the period 2001 to 2006. The second dependent variable $_{i,t}$ was the systematic risk of the *i*-th international bank in the *t*- th year, which was determined from Sharpe's (1964) market model.

In addition, $share_{i,t}^{H}$ denotes the proportion of assets allocated to home countries, $share_{i,t}^{I}$ denotes the proportion of assets allocated to subsidiaries in industrial countries, and $share_{i,t}^{E}$ denotes the proportion of assets allocated to subsidiaries in emerging markets. GarcIa-Herrero and Vazquez (2007) indicated that the issue of using lagged values of the asset shares as instruments in the regressions may not be serious, as the share of bank assets in a particular subsidiary is fairly stable between two consecutive years. The above assets were taken from unconsolidated financial statements to avoid the double counting of assets.

The sum of the above three explanatory variables should be 100%, so the regression equation does not contain constant terms. $H_{i,t}^{G}$ denotes the Herfindahl index of the *i*- th parent bank within country group *G* (*I* for industrial and *E* for emerging market) to measure the concentration effect of each international bank's assets within industrial and emerging country groups. In this study,

the GMM model include a variable of macroeconomic controls, the control variable ΔGDP_t represents the macroeconomic condition by the growth rate of the GDP. ΔGDP_t is intended to isolate the influence of macroeconomic conditions in the home countries of the international banks on their overall performance or risk. In the specification of this study, the macroeconomic control variable vary along the time dimension and are common to international banks incorporated in the same home country, to control for time-invariant differences in the average profitability or risk-taking of international banks across their countries of incorporation.

Definitions of variables and statistical method

The following operating definitions were proposed to evaluate the financial performance and risk of banks.

(1) $share$: The relative allocation degree of bank assets in three regions. $share_{i,t}^{H}$ denotes the proportion of assets allocated to the home country with respect to the total assets of international banks, and $share_{i,t}^{I}$ and $share_{i,t}^{E}$ denote the proportion of assets allocated to subsidiaries in industrial countries and emerging markets, respectively. The above assets were computed using datasets from unconsolidated financial statements to avoid the double counting of assets.

(2) $H_i^G{}_{,t}$: The Herfindahl index of the *i*-th parent bank in country group G (I for industrial and E for emerging market), which is the square sum of the average share $s_i^2{}_{,j,t}$ of the assets of the *i*-th parent bank in the home country *j* in the *t*-th year. The shares were evaluated related to the assets of the corresponding bank in each group of countries. The Herfindahl index was usually between 0 and 1; a larger *H* means a lower diversification degree (e.g. the higher the concentration in an industrial country or emerging market is, the lower the diversification degree is). The above asset proportion was calculated by the banks corresponding to countries in different groups, therefore, when the Herfindahl index was equal to one, the international bank only allocated the assets to a single country of a specific group.

$$H_i^G{}_{,t} = \sum_{j \in G} s_i^2{}_{,j,t} \quad (3)$$

(3) ΔGDP_t : The control variable ΔGDP_t is measured by GDP growth, which is proposed to separate the influence of macroeconomic conditions on overall performance of the international banks in their home countries.

$$\Delta GDP = \ln \frac{GDP_{i,t}}{GDP_{i,t-1}} \quad (4)$$

(4) $_0$, $_1$, $_2$ and $_0$, $_1$, $_2$: Representing the influence of subsidiaries in the home country, industrial countries and emerging markets on risk-adjusted profitability and risks, respectively. The coefficients of assets allocated to different regions were used to analyze whether international banks with high overseas risk exposure would have different risk-adjusted profitability. In addition, in order to know if there was a home bias, this paper individually tested whether $_1 0$, $_2 0$ or $_1 0$, $_2 0$.

(5) λ_1, λ_2 and ϕ_1, ϕ_2 are the concentration indexes. They were inversely proportional to the gains in terms of the risk-return achieved by international banks. In other words, the benefits brought by international diversification increased when the negative values of these coefficients ($\lambda_1 0, \lambda_2 0$ or $\phi_1 0, \phi_2 0$) decreased.

Samples, period and dataset

This study targeted industrial countries and emerging markets during the years 2001 to 2006. The effective samples included the datasets of 195 consolidated groups of international banks from 15 countries in Asia, Europe, North America and Africa, after deleting some missing values. The emerging markets included Taiwan, Israel, India, Malaysia, Thailand, and Egypt, while the industrial countries included Japan, Denmark, France, Germany, Greece, Italy, Switzerland, Canada and the United States. Yearly datasets were gathered from Bankscope during the period 2001 to 2006. The nationality of the parent banks was based on their country of incorporation, instead of the nationality of its shareholders, so as to match the regulatory criteria of the host supervisors under the Basel Accord. Foreign subsidiaries were restricted to those with at least 50% ownership by their parent banks. Unconsolidated financial statements were gathered for each parent bank and their subsidiaries overseas to capture their profitability on an individual basis. However, consolidated financial statements were applied when measuring the overall profitability of the consolidated group of international banks.

EMPIRICAL RESULTS

Descriptive statistical analysis

The results of the descriptive statistical analysis are shown in Table 1. The average risk -adjusted profitability of the nine industrial countries and regions was 5.5456, in which Greece had the highest (14.9603). The average standard deviation of risk- adjusted profitability was 5.5526, and Greece had the highest value of 27.2634. The average risk-adjusted profitability of the six emerging markets was 1.9548, which were 3.5908 lower than that of the industrial countries. India had the highest (4.4417), and Taiwan had the lowest (-0.2655). The standard deviations of risk-adjusted profitability were as follows: Israel was 1.2719, Taiwan was 1.0971, India was 3.0693, Malaysia was 4.9313, Thailand was 0.8661, and Egypt was 4.2671. Thus, Malaysia had the highest (4.9313) and Thailand the lowest (0.8661). The average standard deviation of risk-adjusted profitability was 2.5838, which was 2.9688 lower than that of the industrial countries. Both the variability and risk-adjusted profitability were lower in emerging countries during 2001 to 2006, as observed from a comparison with the industrial countries. Greece had the highest value of 0.7846 for systematic risk, and the average value of the nine industrial countries was 0.2723. Greece, as shown in the table, is a country of both high profit and risk. The average value of systematic risk for the six emerging markets was 0.1969, which was 0.0754 lower than that of the industrial countries. Thailand had the highest (0.3149) among all countries and Egypt had the lowest (0.03925).

Table 1. Statistics summary by country groups.

Variables	Obs.	Min	Max	Mean	St. Dev	Skewness	St. E.	Kurtosis	St. E.
Panel A: Japan									
Risk-adjusted profitability ($R_{i,t}$)	78	0.2663	4.0446	2.0907	1.1040	0.0957	0.2722	-1.2731	0.5382
Systematic risk($\beta_{i,t}$)	78	-0.3720	0.7080	0.1776	0.2435	-0.0379	0.2722	-0.4711	0.5382
Allocation of assets in home($share_{i,t}^{H}$)	78	92%	99.9%	98.965%	1.6433	-4.0429	0.2722	15.0151	0.5382
Allocation of assets in industrial ($share_{i,t}^{I}$)	78	0%	5.9%	0.7269%	1.2202	4.0378	0.2722	15.0290	0.5382
Allocation of assets in emerging ($share_{i,t}^{E}$)	78	0.1%	2.1%	0.3077%	0.4606	3.4719	0.2722	10.9457	0.5382
Herfindahl index in industrial (H_{iI})	78	0.0100	0.6000	0.0326	0.0661	8.4121	0.2722	73.0123	0.5382
Herfindahl index in emerging (H_{iE})	78	0.0100	1.0000	0.2595	0.3319	1.2352	0.2722	-0.0475	0.5382
GDP Growth (ΔGDP)	78	0.1842%	2.7073%	1.4779%	0.9811	-0.2295	0.2722	-1.5417	0.5382
Panel B: Denmark									
Risk-adjusted profitability ($R_{i,t}$)	30	1.7479	5.6767	3.7862	1.1648	-0.2179	0.4269	-1.0799	0.8327
Systematic risk($\beta_{i,t}$)	30	-0.5060	0.3270	-0.0246	0.2369	-0.7287	0.4269	-0.1525	0.8327
Allocation of assets in home($share_{i,t}^{H}$)	30	95.975%	99.9998%	98.658%	1.2441	-0.4457	0.4269	-0.8638	0.8327
Allocation of assets in emerging ($share_{i,t}^{E}$)	30	0.0001%	3.4825%	1.0524%	1.0336	0.5577	0.4269	-0.7285	0.8327
Herfindahl index in industrial (H_{iI})	30	0.0001%	4.0005%	0.2897%	0.7618	4.3551	0.4269	20.7533	0.8327
Herfindahl index in emerging (H_{iE})	30	0.9280	0.9999	0.9861	0.0221	-1.6067	0.4269	1.0271	0.8327
	30	0.0001	0.0005	0.0002	0.0001	1.4702	0.4269	1.1468	0.8327
	30	0.3830%	3.8289%	1.6798%	1.2894	0.4865	0.4269	-1.2123	0.8327
Panel C: France									
Risk-adjusted profitability ($R_{i,t}$)	12	0.6355	5.2971	3.0567	1.6470	0.1127	0.6373	-1.5478	1.2322
Systematic risk($\beta_{i,t}$)	12	0.1051	0.874	0.5817	0.2863	-0.7338	0.6373	-1.0226	1.2322
Allocation of assets in home($share_{i,t}^{H}$)	12	89.505%	98.00%	93.807%	3.5928	0.0502	0.6373	-2.1413	1.2322
Allocation of assets in emerging ($share_{i,t}^{E}$)	12	0.0044%	7.3034%	3.6535%	2.7654	-0.4262	0.6373	-1.6976	1.2322
	12	1.2661%	4.3484%	2.762%	1.0343	-0.0380	0.6373	-1.3917	1.2322
	12	0.8170	0.9985	0.9073	0.0809	-0.0110	0.6373	-2.3720	1.2322

Table 1. Contd.

Herfindahl index in emerging (H_{iE})	12	0.0004	0.1885	0.0467	0.0587	1.3201	0.6373	1.7717	1.2322
GDP Growth (ΔGDP)	12	1.0213%	2.4403%	1.6745%	0.5186	-0.0124	0.6373	-1.1660	1.2322
Panel D: Germany									
Risk-adjusted profitability ($R_{i,t}$)	18	-1.8380	7.7151	2.4090	3.1727	0.6866	0.5363	-1.2824	1.0378
Systematic risk($\beta_{i,t}$)	18	-0.660	0.4050	-0.0679	0.3575	-0.3842	0.5363	-1.2737	1.0378
Allocation of assets in home($share_{i,t}^{H}$)	18	34.2237%	93.56%	73.462%	26.7202	-0.7728	0.5363	-1.5772	1.0378
Allocation of assets in industrial ($share_{i}^{I}{}_{,t}$)	18	6.3219%	65.329%	26.325%	26.6173	0.7730	0.5363	-1.5766	1.0378
Allocation of assets in emerging ($share_{i,t}^{E}$)	18	0.1182%	0.4677%	0.2135%	0.1219	1.4358	0.5363	0.5424	1.0378
Herfindahl index in industrial (H_{iI})	18	0.4095	0.8781	0.7069	0.2063	-0.7523	0.5363	-1.5837	1.0378
Herfindahl index in emerging (H_{iE})	18	0.0000	0.0005	0.0001	0.0001	2.1595	0.5363	5.8839	1.0378
GDP Growth (ΔGDP)	18	-0.2698%	2.8415%	0.9377%	1.0352	0.7811	0.5363	-0.1068	1.0378
Panel E: Greece									
Risk-adjusted profitability ($R_{i,t}$)	18	0.7196	90.3321	14.9603	27.2634	2.0857	0.5363	3.1683	1.0378
Systematic risk($\beta_{i,t}$)	18	0.4780	0.9800	0.7846	0.1302	-0.4158	0.5363	0.2816	1.0378
Allocation of assets in home($share_{i,t}^{H}$)	18	88.894%	100%	94.761%	3.9509	0.1606	0.5363	-1.5607	1.0378
Allocation of assets in industrial ($share_{i}^{I}{}_{,t}$)	18	0%	6.8624 %	2.53%	3.0178	0.4252	0.5363	-1.8952	1.0378
Allocation of assets in emerging ($share_{i,t}^{E}$)	18	0%	10%	2.7085%	3.2143	1.3629	0.5363	1.0198	1.0378
Herfindahl index in industrial (H_{iI})	18	0.7549%	0.9900	0.9070	0.0791	-0.7051	0.5363	-0.6308	1.0378
Herfindahl index in emerging (H_{iE})	18	0.0003	0.5003	0.1107	0.1669	1.6309	0.5363	1.6607	1.0378
GDP Growth (ΔGDP)	18	3.7622%	4.9131%	4.2472%	0.4086	0.3513	0.5363	-1.0317	1.0378
Panel F: Italy									
Risk-adjusted profitability ($R_{i,t}$)	18	-0.0643	3.4978	1.9469	1.1134	-0.4126	0.5363	-1.0608	1.0378
Systematic risk($\beta_{i,t}$)	18	0.2110	0.8520	0.6902	0.1793	-1.7608	0.5363	2.8203	1.0378
Allocation of assets in home($share_{i,t}^{H}$)	18	88.0398%	100%	96.164%	4.5792	-0.6687	0.5363	-1.4403	1.0378
Allocation of assets in industrial ($share_{i}^{I}{}_{,t}$)	18	0%	4.5657%	1.5112%	1.5913	0.5137	0.5363	-1.1864	1.0378
	18	0%	9.6849%	2.3808%	3.5994	1.0197	0.5363	-0.7238	1.0378

Table 1. Contd.

Herfindahl index in industrial (H_i^I)	18	0.7530	1.0000	0.9247	0.0932	-0.8176	0.5363	-1.1890	1.0378
Herfindahl index in emerging (H_i^E)	18	0.000	0.2000	0.0173	0.0513	3.2412	0.5363	10.5161	1.0378
GDP Growth (ΔGDP)	18	-0.0137%	1.8244%	1.0232%	0.7418	-0.1411	0.5363	-1.8224	1.0378
Panel G: Switzerland									
Risk-adjusted profitability ($R_{i,t}$)	42	0.4804	17.8400	6.4694	4.8136	1.0139	0.3654	0.1260	0.7166
Systematic risk($\beta_{i,t}$)	42	-0.3790	0.6440	0.0961	0.2792	-0.1015	0.3654	-0.9763	0.7166
Allocation of assets in home($share_{i,t}^H$)	42	97.50%	99.999%	99.463%	0.7641	-1.1792	0.3654	-0.0085	0.7166
Allocation of assets in industrial ($share_{i,t}^I$)	42	0.0001%	1.9001%	0.466%	0.6339	0.9871	0.3654	-0.6341	0.7166
Allocation of assets in emerging ($share_{i,t}^E$)	42	0.00%	0.80%	0.0717%	0.2039	2.8708	0.3654	7.0282	0.7166
Herfindahl index in industrial (H_i^I)	42	0.9089	0.9999	0.9888	0.0195	-2.5678	0.3654	7.1440	0.7166
Herfindahl index in emerging (H_i^E)	42	0.0000	0.0043	0.0003	0.0007	5.7008	0.3654	34.8754	0.7166
GDP Growth (ΔGDP)	42	-0.1979%	3.1883%	1.5785%	1.2215	-0.1632	0.3654	-1.4978	0.7166
Panel H: United States of America									
Risk-adjusted profitability ($R_{i,t}$)	708	-0.7231	33.4664	9.0728	6.6005	1.3803	0.0919	1.6392	0.1835
Systematic risk($\beta_{i,t}$)	708	-0.8060	52.0000	0.2036	1.9769	25.5104	0.0919	669.2926	0.1835
Allocation of assets in home($share_{i,t}^H$)	708	68.142%	99.999%	97.312%	6.8228	-2.7869	0.0919	7.0491	0.1835
Allocation of assets in industrial ($share_{i,t}^I$)	708	0.0001%	26.328%	2.044%	5.1886	2.8784	0.0919	7.9187	0.1835
Allocation of assets in emerging ($share_{i,t}^E$)	708	0.0001%	24.815%	0.644%	2.9053	6.5559	0.0919	45.6557	0.1835
Herfindahl index in industrial (H_i^I)	708	0.4564	0.9990	0.9546	0.1236	-2.8345	0.0919	6.7867	0.1835
Herfindahl index in emerging (H_i^E)	708	0.0002	0.6205	0.0117	0.0462	5.9403	0.0919	51.5700	0.1835
GDP Growth (ΔGDP)	708	0.7479%	3.5722%	2.374%	0.9442	-0.5344	0.0919	-0.9684	0.1835
Panel I: Canada									
Risk-adjusted profitability ($R_{i,t}$)	42	0.1577	12.9678	6.1183	3.0944	0.2906	0.3654	-0.4350	0.7166
Systematic risk($\beta_{i,t}$)	42	-0.4940	0.6060	0.0094	0.2970	0.1555	0.3654	-0.9282	0.7166
Allocation of assets in home($share_{i,t}^H$)	42	90.00%	99.80%	97.824%	3.3047	-1.9342	0.3654	2.1553	0.7166
Allocation of assets in industrial ($share_{i,t}^I$)	42	0.00%	0.30%	0.1286%	0.1503	0.2995	0.3654	-2.0084	0.7166

Table 1. Contd.

Allocation of assets in emerging ($share^{E}_{i,t}$)	42	0.20%	9.70%	2.0476%	3.2302	1.9428	0.3654	2.1633	0.7166
Herfindahl index in industrial (H_{iI})	42	0.4000	1.0000	0.6719	0.2547	0.0993	0.3654	-1.8415	0.7166
Herfindahl index in emerging (H_{iE})	42	0.1000	0.3000	0.2167	0.0853	-0.3347	0.3654	-1.5580	0.7166
GDP Growth (ΔGDP)	42	-1.3223%	16.6998%	9.4089%	6.5470	-0.6511	0.3654	-1.2182	0.7166
Panel J: Israel									
Risk-adjusted profitability ($R_{i,t}$)	24	-0.97	4.01	1.328	1.2719	0.1596	0.4723	-0.3225	0.9178
Systematic risk($\beta_{i,t}$)	24	-0.329	0.465	0.1073	0.2385	-0.1829	0.4723	-0.9786	0.9178
Allocation of assets in home($share^{H}_{i,t}$)	24	89.81%	100%	97.7658%	3.984	-1.2878	0.4723	-0.2923	0.9178
Allocation of assets in industrial ($share^{I}_{i,t}$)	24	0%	10.19%	2.2342%	3.984	1.2878	0.4723	-0.2923	0.9178
Allocation of assets in emerging ($share^{E}_{i,t}$)	24	0%	0%	0%	0	.	.	.	.
Herfindahl index in industrial (H_{iI})	24	0	0	0	0				
Herfindahl index in emerging (H_{iE})	24	0.82	1	0.9594	0.0724	-1.2785	0.4723	-0.333	0.9178
GDP Growth (ΔGDP)	24	-8.37%	7.99%	2.7094%	5.9582	-1.0546	0.4723	-0.4590	0.9178
Panel K: Taiwan									
Risk-adjusted profitability ($R_{i,t}$)	36	-3.0481	2.1221	-0.2655	1.0971	-0.5117	0.3925	0.4366	0.768
Systematic risk($\beta_{i,t}$)	36	-1.77	0.771	0.2456	0.5509	-2.0763	0.3925	4.7259	0.768
Allocation of assets in home($share^{H}_{i,t}$)	36	100%	100%	100%	0	.	.	.	.
Allocation of assets in industrial ($share^{I}_{i,t}$)	36	0%	0%	0%	0	.	.	.	.
Allocation of assets in emerging ($share^{E}_{i,t}$)	36	0%	0%	0%	0	.	.	.	.
Herfindahl index in industrial (H_{iI})	36	0	0	0	0	.	.	.	.
Herfindahl index in emerging (H_{iE})	36	1	1	1	0	.	.	.	.
GDP Growth (ΔGDP)	36	-9.6231%	8.0754%	2.1448%	5.8651	-1.1547	0.3925	0.3575	0.768
Panel L: India									
Risk-adjusted profitability ($R_{i,t}$)	42	0.131	12.164	4.4417	3.0693	1.1938	0.3654	0.8145	0.7166
Systematic risk($\beta_{i,t}$)	42	-0.386	0.787	0.2917	0.2606	-0.1667	0.3654	-0.3315	0.7166
Allocation of assets in home($share^{H}_{i,t}$)	42	100%	100%	100%	0	.	.	.	.
	42	0%	0%	0%	0	.	.	.	.

Table 1. Contd.

Allocation of assets in emerging ($share_i^E{}_{,t}$)	42	0%	0%	0%	0	.	.	.	.
Herfindahl index in industrial ($H_i{}^I$)	42	0	0	0	0	.	.	.	.
Herfindahl index in emerging ($H_i{}^E$)	42	1	1	1	0	.	.	.	.
GDP Growth (ΔGDP)	42	3.8123%	9.3002%	6.7542%	2.069	-0.2581	0.3654	-1.4976	0.7166
Panel M: Malaysia									
Risk-adjusted profitability ($R_{i,t}$)	48	-24.624	8.4839	2.3209	4.9313	-3.7367	0.3431	19.2934	0.6744
Systematic risk($\beta_{i,t}$)	48	-0.504	0.665	0.1824	0.2679	-0.515	0.3431	0.1864	0.6744
Allocation of assets in home($share_{i,t}^H$)	48	100%	100%	100%	0	.	.	.	.
Allocation of assets in industrial ($share_i^I{}_{,t}$)	48	0%	0%	0%	0	.	.	.	.
Allocation of assets in emerging ($share_{i,t}^E$)	48	0%	0%	0%	0	.	.	.	.
Herfindahl index in industrial ($H_i{}^I$)	48	0	0	0	0	.	.	.	.
Herfindahl index in emerging ($H_i{}^E$)	48	1	1	1	0	.	.	.	.
GDP Growth (ΔGDP)	48	-1.0773%	12.8766%	8.4899%	4.6553	-1.2857	0.3431	0.4975	0.6744
Panel N: Thailand									
Risk-adjusted profitability ($R_{i,t}$)	36	-1.6741	2.4213	0.906	0.8661	-0.5739	0.3925	1.1619	0.7680
Systematic risk($\beta_{i,t}$)	36	-1.012	0.96	0.3149	0.3837	-1.2771	0.39254	2.9505	0.7680
Allocation of assets in home($share_{i,t}^H$)	36	100%	100%	100%	0	.	.	.	.
Allocation of assets in industrial ($share_i^I{}_{,t}$)	36	0%	0%	0%	0	.	.	.	.
Allocation of assets in emerging ($share_{i,t}^E$)	36	0%	0%	0%	0	.	.	.	.
Herfindahl index in industrial ($H_i{}^I$)	36	0	0	0	0	.	.	.	.
Herfindahl index in emerging ($H_i{}^E$)	36	1	1	1	0	.	.	.	.
GDP Growth (ΔGDP)	36	-6.0363%	15.8415%	8.6889%	7.0607	-1.4186	0.39254	0.8098	0.7680
Risk-adjusted profitability ($R_{i,t}$)	36	-1.6741	2.4213	0.906	0.8661	-0.5739	0.3925	1.1619	0.7680
Panel O: Egypt Risk-adjusted profitability ($R_{i,t}$)	18	-2.4000	9.8877	2.9975	4.2671	0.7074	0.5363	-1.4126	1.0378
Systematic risk($\beta_{i,t}$)	18	-0.4920	0.5760	0.0392	0.2978	-0.2931	0.5363	-0.4653	1.0378

Table 1. Contd.

Systematic risk($\beta_{i,t}$)	18	-0.4920	0.5760	0.0392	0.2978	-0.2931	0.5363	-0.4653	1.0378
Allocation of assets in home($share_{i,t}^{H}$)	18	90.00%	99.98%	98.7378%	2.2733	-3.7025	0.5363	14.7221	1.0378
Allocation of assets in industrial ($share_{i,t}^{I}$)	18	0.01%	0.30%	0.0356%	0.0664	4.1476	0.5363	17.4345	1.0378
Allocation of assets in emerging ($share_{i,t}^{E}$)	18	0.00%	9.98%	1.2267%	2.2773	3.7048	0.5363	14.7229	1.0378
Herfindahl index in industrial (H_{iI})	18	0.0010	0.0990	0.0524	0.0475	-0.2275	0.5363	-2.1800	1.0378
Herfindahl index in emerging (H_{iE})	18	0.9000	0.9900	0.9567	0.0414	-0.7375	0.5363	-1.5938	1.0378
GDP Growth (ΔGDP)	18	3.1357%	6.6198%	4.1246%	1.2376	1.3981	0.5363	0.7656	1.0378

The average asset allocation in the home country ($share_{I}^{H}{}_{,t}$) was 94.4907% for the nine industrial countries. Germany was notably the lowest (73.462%) while other countries were greater than 90%. Asset allocation of the international banks of the nine industrial countries was shown to put most of the assets into the home countries. Home bias was found among the nine industrial countries, which conformed to the findings of García- Herrero and Vazquez (2007) from the dataset of the G8 countries. The average value of home asset allocation of the six emerging countries was 99.4173%, which was 4.9266% higher than that of the industrial countries. Home asset allocation of Taiwan, India, Malaysia and Thailand were all 100%. The asset allocation of emerging countries was nearly all invested in the home country, with less than 1% invested in overseas markets. Home bias was found among the six emerging countries. The results showed that investors may not fully obtain the benefits of international diversification.

The average value of the concentration index of asset allocation of the nine industrial countries was 0.7867. Switzerland had the highest (0.9888), while Japan had the lowest (0.0326) . The subsidiaries of industrial-country banks were located mostly in industrial countries, and were seldom established in emerging markets. The average concentration index of the asset allocation of the six emerging markets concentrated in industrial countries was 0.0087, which was 0.778 lower than that of industrial countries. Egypt had the highest value of 0.0524, while all other emerging countries had the lowest value of 0. The subsidiaries of emerging-country banks were located mostly in emerging countries, and were seldom established in industrial markets. Both groups of industrial and emerging countries apparently still needed to improve the implementation of the investment strategy of international diversification asset allocation. To sum up, the risk-adjusted profitability, systematic risk and the variability of profit were all lower in emerging countries from 2001 to 2006. In addition, the average asset allocation in the home country of international banks of 15 sample countries was 96.46%. The average value of the Herfindahl index for industrial countries investing in industrial countries was 0.7867, while the average value was 0.986 for emerging countries investing in emerging markets. As stated above, home bias was confirmed in 15 sample countries during 2001 to 2006.

Effects of international diversification on profitability and risk

The R^2 generated by both fixed and random effects were applied and compared in the GMM of the panel estimation. The effects of international diversification on risk-adjusted profitability and systematic risk were then analyzed based on the higher R-Square model.

Effects on industrial countries' risk-adjusted profitability

The effects of the concentration index (Herfindahl index) of industrial country asset allocation within both industrial and emerging country groups on risk- adjusted profitability are shown in columns 6 and 7 of Table 2. The effects of the concentration index of Italy, Denmark, and Japan's asset allocation within the industrial country group on risk-adjusted profitability were significantly negative at 1%.

The effect of the concentration index of Germany's asset allocation within the industrial country group on risk -adjusted profitability was significantly negative at 10%. The risk-adjusted

profitability increased when the concentration of the above four countries' asset allocation within the industrial country group was lower, and vice versa. The effects of the concentration index of France's asset allocation within the emerging market group on risk -adjusted profitability were also significantly negative at 1%. The risk-adjusted profitability increased when the concentration of France's asset allocation within the emerging market group was lower, and vice versa. The results of Italy, Denmark, France, Germany and Japan support the H_1^1 hypothesis, which indicated that the international diversification degrees of these countries were helpful to the improvement of risk-adjusted profitability. The effects of the concentration index (Herfindahl index) of Canada and Germany's asset allocation within the emerging markets group on risk-adjusted profitability were positive significantly at 1%. The risk-adjusted profitability decreased when the concentration of asset allocation within the emerging markets group was lower, and vice versa. The result does not support the H_1^1 hypothesis, which indicates that the international diversification degree of Canada and Germany was not helpful to the improvement of risk-adjusted profitability. The results of the concentration indexes for Greece, Switzerland, and the U.S. were not significant.

The positive coefficients associated with the regional distribution of assets representing the increase of risk-adjusted profitability were due to the corresponding asset allocation in three groups of countries: the home countries, other industrial countries, and emerging markets. Japan's home influence (0.0444) on its proportion of diversification asset allocation was greater than that of the other industrial countries (-0.3244) and of emerging markets (-1.4882). Italy's home influence (0.6370) on its proportion of diversification asset allocation was also greater than that of the emerging markets (- 0.7769). The increases in the risk-adjusted profitability of Japan and Italy were mainly derived from the relative asset allocation in the home countries.

Denmark's emerging influence (1.0016) on its proportion of diversification asset allocation was greater than the home country (0.4854). Germany's emerging influence (4.3512) on its proportion of diversification asset allocation was greater than the home country (0.1626). Greece's emerging influence (7.8643) on its proportion of diversification asset allocation was greater than that of the other industrial countries (-3.8228). The U.S. emerging influence (0.91) on its proportion of diversification asset allocation was also greater than the others. The increases in the risk- adjusted profitability of Denmark, German, Greece, and the U.S were mainly derived from the relative asset allocation in emerging markets. France's industrial influence (0.3547) on its proportion of diversification asset allocation was greater than the home country (0.0693). The increase in the risk-adjusted profitability of France was mainly derived from the relative asset allocation in industrial countries. Canada's industrial influence (-739.6012) on its proportion of diversification asset allocation was greater than the home country (-1.5160) and emerging markets (-1.5078). The decrease in the risk-adjusted profitability of Canada was mainly derived from the relative assets allocation in industrial countries.

To sum up, risk -adjusted profitability increased when the concentration of Japan, Denmark, Germany, and Italy's asset allocation within the industrial country group was lower, and vice versa. On the other hand, the risk-adjusted profitability increased when the concentration of France's asset allocation within the emerging market group was lower. The increases in risk- adjusted profitability for Denmark, Germany, Greece, and the U.S. were mainly derived from the relative asset allocation in emerging markets. The increase in the risk-adjusted profitability of France was mainly derived from the relative asset allocation in the industrial country group. The increase in the risk-adjusted profitability of Japan and Italy were mainly derived from the relative asset allocation in their home countries. The results of Italy, Denmark, France, Germany, and Japan supported the H_1^1 hypothesis, which indicates that the international diversification degrees of these countries were helpful to the improvement of risk-adjusted profitability.

Effects on emerging market risk-adjusted profitability

The effects of the concentration index (Herfindahl index) of industrial country asset allocation within both industrial and emerging country groups on risk-adjusted profitability are shown in columns 6 and 7 of Table 3. The effect of the concentration index of Israel, Thailand, and India's asset allocation within the industrial country group on risk-adjusted profitability was significantly negative at 10, 5, and 5%, respectively. The risk -adjusted profitability increased when the concentration of these countries' asset allocation within the industrial country group was lower, and vice versa. The results of Israel, Thailand, and India supported the H_1^1 hypothesis, which indicates that the international diversification degree was helpful to the improvement of risk-adjusted profitability. The effects of the concentration index of Taiwan, Malaysia, and Egypt's asset allocation within the industrial country group on risk-adjusted profitability were significantly positive at 1%. The risk-adjusted profitability decreased when the concentration of asset allocation within the industrial country group was lower, and vice versa. The result did not support the H_1^1 hypothesis, which indicates that the international diversification degree of Taiwan, Malaysia, and Egypt was not helpful to the improvement of risk-adjusted profitability.

Table 2. The effect of bank international diversification on risk-adjusted profitability: 9 industrial countries.

$$R_{i,t} = \alpha_0 \cdot share^{H}_{i,t} + \alpha_1 \cdot share^{I}_{i,t} + \alpha_2 \cdot share^{E}_{i,t} + \lambda_1 \cdot H^{I}_{i,t} + \lambda_2 \cdot H^{E}_{i,t} + \delta \cdot \Delta GDP_{i,t} + \varepsilon_{i,t} \quad (1)$$

Country	Estimation	Allocation of assets in home ($share^{H}$)	Allocation of assets in industrial ($share^{I}$)	Allocation of assets in emerging ($share^{E}$)	Herfindahl index in industrial (H^{I}_{i})	Herfindahl index in emerging (H^{E})	GDP Growth (ΔGDP)	Obs.	GMM Model	R^2
Italy	Coefficien	0.636970	0.422958	-0.77685	-62.6943	-0.69202	0.286804	17	Random	0.097323
	Std. Error	0.108459	0.258956	0.199718	11.06476	5.800689	0.306807			
	t-Statistic	5.872906	1.633319	-3.88974	-5.66612	-0.1193	0.934803			
	Prob.	0.0001***	0.1307	0.0025***	0.0001***	0.9072	0.3700			
Japan	Coefficien	0.044459	-0.324403	-1.488171	-0.0000006	-2.93003	0.676179	77	Random	0.777421
	Std. Error	0.007582	0.110248	0.296883	0.0000002	6.208914	0.119107			
	t-Statistic	5.850426	-2.942502	-5.012647	-3.375321	-0.471907	5.677086			
	Prob.	0.0000***	0.0044***	0.0000***	0.0012***	0.6384	0.0000***			
Denmark	Coefficien	0.485375	0.171347	1.001624	-46.4008	1439.85	0.33477	29	Random	0.151855
	Std. Error	0.073813	0.114283	0.219881	7.593218	1935.708	0.120756			
	t-Statistic	6.57575	1.499326	4.555291	-6.11082	0.743836	2.772279			
	Prob.	0.0000***	0.1474	0.0001***	0.0000***	0.4645	0.0108**			
Germany	Coefficien	0.162634	0.007914	4.351151	-18.8545	19.70894	0.406124	17	Random	0.140480
	Std. Error	0.081387	0.010411	2.100639	9.253589	2.262324	0.170349			
	t-Statistic	1.998288	0.760105	2.071346	-2.03754	8.711811	2.384069			
	Prob.	0.0710*	0.4632	0.0626*	0.0664*	0.0000***	0.0362**			
France	Coefficien	0.069274	0.354698	-0.92185	-3.08631	-15.5044	0.776425	11	Random	0.629325
	Std. Error	0.018829	0.013502	0.057288	1.915976	1.111888	0.042592			
	t-Statistic	3.679096	26.27017	-16.0915	-1.61083	-13.9442	18.22946			
	Prob.	0.0143**	0.0000***	0.0000***	0.1681	0.0000***	0.0000***			
Canada	Coefficien	-1.515976	-739.6012	-1.507827	6.87831	175.4064	0.174887	41	Random	0.847931
	Std. Error	0.084052	42.19056	0.077335	60.5694	5.007003	0.095066			
	t-Statistic	-18.03621	-17.53002	-19.49738	0.113561	35.03221	1.839647			
	Prob.	0.0000***	0.0000***	0.0000***	0.9116	0.0000***	0.0929*			
Greece	Coefficien	-0.41826	-3.82278	7.864315	27.45697	11.94551	5.000932	17	Random	0.044178
	Std. Error	0.454014	1.34018	0.861075	37.27346	13.92331	5.593451			
	t-Statistic	-0.92124	-2.85244	9.133134	0.736636	0.857951	0.894069			
	Prob.	0.3767	0.0157**	0.0000***	0.4768	0.4092	0.3904			
Switzerland	Coefficien	-0.51841	-4.43468	2.348855	62.39715	-832.303	-0.42292	41	Random	0.202814
	Std. Error	2.809325	1.498943	15.41053	284.4873	2403.194	2.485395			
	t-Statistic	-0.18453	-2.95854	0.152419	0.219332	-0.34633	-0.17016			
	Prob.	0.8547	0.0055***	0.8797	0.8277	0.7312	0.8659			
United Stated of America	Coefficien	-0.0139	-0.0974	0.9100	8.2856	1.0083	0.0740	707	Random	0.183606
	Std. Error	0.0884	0.1591	0.5147	8.9763	17.1509	0.1492			
	t-Statistic	-0.1571	-0.6124	1.7678	0.9230	0.0588	0.4961			
	Prob.	0.8752	0.5405	0.0775*	0.3563	0.9531	0.6200			

Considering the coefficients associated with the regional distribution of assets for emerging countries, Israel's industrial influence (0.7784) on its proportion of diversification asset allocation was greater than that for the emerging markets (-0.4404). India's industrial influence on its proportion of diversification asset allocation was more significant than that of other regions. The increases in the risk-adjusted profitability of Israel and India were mainly derived from the relative asset allocation in the industrial countries. On the other hand, Egypt's emerging influence (52.3060) on its proportion of diversification asset allocation was greater than that of the industrial countries (- 44.2937). The negative value explains the reason that the risk-adjusted profitability decreased when Egypt allocated more assets within the industrial country group. To sum up, risk-adjusted profitability increased when the concentration of Israel, Thailand, and India's asset allocation within the industrial country group was lower, and vice versa. The increase in the risk-adjusted profitability of Israel and India was mainly derived from the relative asset allocation in the industrial country group. The results of Israel, Thailand, and India supported the H_1^1 hypothesis, which indicates that the international diversification degrees of these countries were helpful to the improvement of risk-adjusted profitability.

Effects on industrial countries' systematic risk

The effects of the concentration index (Herfindahl index) of industrial country asset allocation within other industrial and emerging country groups on systematic risk are shown in columns 6 and 7 of Table 4. The effect of the concentration index of Denmark, France, Germany, and Greece's asset allocation within other industrial countries on systematic risk was significantly negative at 1%. The systematic risk decreased when the concentration of these countries' asset allocation within other industrial countries was higher, and vice versa. The effect of the concentration index of Italy's asset allocation within the emerging market group on systematic risk was significantly negative at 1%. The systematic risk decreased when the concentration of Italy's asset allocation within the emerging market group was higher, and vice versa. The results of Denmark, France, Germany, Greece, and Italy supported the H_1^2 hypothesis, which indicates that the international diversification degree was beneficial to the reduction of systematic risk.

The negative coefficients associated with the regional distribution of assets representing the decrease of systematic risk were due to the corresponding asset allocation in three groups of countries: the home countries, other industrial countries, and emerging markets. Considering the coefficients associated with the regional distribution of assets for industrial countries, France's emerging influence (-0.0843), the U.S. emerging influence (-0.0095) and Canada's emerging influence (-1.9511) on their proportion of diversification asset allocation were smaller than the other influences, which were significant at 1%. In addition, Japan's emerging influence (-1.0362) and Denmark's emerging influence (-0.1534) on its proportion of diversification asset allocation were smaller than that of the home countries, which were significant at 5%. The decreases in the systematic risk of France, U.S.A., Canada, Japan, and Denmark were mainly derived from the relative asset allocation in the emerging markets.

On the other hand, the home influences of Japan, Denmark, France, Germany, and Greece on their proportion of diversification asset allocation were positively greater than the others, which were significant at 1%. The increases in the systematic risk of the above five countries were mainly derived from the relative asset allocation in the home country. The results supported the H_1^2 hypothesis, which indicates that more asset allocation in the home country was not helpful to moderate systematic risk. To sum up, systematic risk decreased when the proportions of Denmark, France, Germany and Greece's asset allocation within the industrial country group increased, and vice versa. The systematic risk decreased when the proportion of Italy's asset allocation within emerging markets rises. The decreases in the systematic risk of Japan, Denmark, France, the U.S. and Canada were derived from the relative asset allocation in the emerging markets. The decrease in the systematic risk of Greece was derived from the relative asset allocation in industrial countries.

The above evidence confirmed that the H_1^2 hypothesis was supported. The increase in the systematic risk of Japan, Denmark, France, Germany and Greece was derived from the relative asset allocation in the home country. Systematic risk increased when the proportion of Italy's asset allocation within industrial countries was higher. Consequently, the home bias phenomenon existed in the international diversification asset allocation of the nine industrial countries.

Effects on emerging market systematic risk

The effects of the concentration index of emerging market asset allocation within both industrial and emerging country groups on systematic risk are shown in columns 6 and 7 of Table 5. The effect of the concentration index of Malaysia and Thailand's asset allocation within the industrial country group on systematic risk was significantly negative at 1%. The systematic risk decreased when the concentration of these countries' asset allocation within the industrial country group was higher, and vice versa. The results of Malaysia and Thailand supported the H_1^2 hypothesis,

Table 3. The effect of bank international diversification on risk-adjusted profitability: 6 emerging countries.

$$R_{i,t} = \alpha_0 \cdot share^{H}_{i,t} + \alpha_1 \cdot share^{I}_{i,t} + \alpha_2 \cdot share^{E}_{i,t} + \lambda_1 \cdot H^{I}_{i,t} + \lambda_2 \cdot H^{E}_{i,t} + \delta \cdot \Delta GDP_t + \varepsilon_{i,t} \quad (1)$$

Country	Estimation	Allocation of assets in home ($share^{H}_{i,t}$)	Allocation of assets in industrial ($share^{I}_{i,t}$)	Allocation of assets in emerging ($share^{E}_{i,t}$)	Herfindahl index in industrial (H^{I}_{i})	Herfindahl index in emerging (H^{E}_{i})	GDP growth (ΔGDP)	Obs.	GMM model	R^2
India	Coefficient	0.490546	0.128375	2.125909	**-1.298554**	165.0812	-10.90872	41	Random	0.537084
	Std. Error	0.199732	0.033504	6.853486	0.497384	302.5621	3.28936			
	t-Statistic	2.456026	3.831645	0.310194	-2.610766	0.545611	-3.316365			
	Prob.	0.0193**	0.0005***	0.7583	0.0133**	0.5889	0.0022***			
Israel	Coefficient	-0.018311	0.778408	-0.440419	-6.248397	2.378768	0.080051	23	Random	0.254679
	Std. Error	0.016009	0.141307	0.238074	3.061933	2.032661	0.013835			
	t-Statistic	-1.143804	5.508648	-1.849925	-2.04067	1.170273	5.786166			
	Prob.	0.2695	0.0000***	0.0829*	0.0581*	0.2590	0.0000***			
Thailand	Coefficient	0.059002	-1.804326	0.128974	-256.1186	-5.192689	-0.034639	35	Random	0.064144
	Std. Error	0.037413	2.450701	0.512238	118.9195	4.164258	0.023679			
	t-Statistic	1.577042	-0.736249	0.251786	-2.153714	-1.246966	-1.462899			
	Prob.	0.1260	0.4677	0.8030	0.0400**	0.2227	0.1546			
Taiwan	Coefficient	0.010421	-4.078846	1.02766	279.2703	-2.411889	-0.052965	35	Random	0.772704
	Std. Error	0.0216	8.885162	1.287497	92.11336	2.570978	0.041794			
	t-Statistic	0.482431	-0.459063	0.798184	3.031811	-0.938121	-1.267272			
	Prob.	0.6332	0.6497	0.4315	0.0052***	0.3562	0.2155			
Malaysia	Coefficient	-0.030301	2.140351	0.025179	10286.01	1.356478	0.053927	47	Fixed	-1.27703
	Std. Error	0.030397	4.416042	0.756635	2770.943	4.022032	0.116027			
	t-Statistic	-0.996827	0.484676	0.033277	3.712096	0.337262	0.46478			
	Prob.	0.3248	0.6305	0.9736	0.0006***	0.7377	0.6446			
Egypt	Coefficient	-0.074413	-44.29369	52.30597	298.7093	15.82334	0.638895	17	Random	0.897476
	Std. Error	0.005874	0.899669	0.831547	19.14759	2.503438	0.062289			
	t-Statistic	-12.66761	-49.23329	62.90198	15.60036	6.320643	10.25699			
	Prob.	0.0000***	0.0000***	0.0000***	0.0000***	0.0001***	0.0000***			

(1) ***Significant at 1%, ** Significant at 5%, * Significant at 10%. (2) According to FTSE Group distinguishes between advanced and secondary emerging markets on the basis of their national income and the development of their market infrastructure. The advanced emerging markets are included: Egypt, India, Israel, Malaysia, Taiwan, and Thailand. As a result, the emerging market includes 6 countries in this study: Israel, Taiwan, India, Malaysia, Thailand, and Egypt. The industrial countries include 9 countries: Japan, Denmark, France, Germany, Greece, Italy, Switzerland, Canada, and United States.

Table 4. The effect of bank international diversification on systematic risk: 9 industrial countries.

$$\beta_{i,t} = \omega_0 \cdot share^{H}_{i,t} + \omega_1 \cdot share^{I}_{i,t} + \omega_2 \cdot share^{E}_{i,t} + \phi_1 \cdot H^{I}_{i,t} + \phi_2 \cdot H^{E}_{i,t} + \mu \cdot \Delta GDP_t + \varepsilon_{i,t} \quad (2).$$

Country	Estimation	Allocation of assets in home ($share^{H}_{i,t}$)	Allocation of assets in industrial ($share^{I}_{i,t}$)	Allocation of assets in emerging ($share^{E}_{i,t}$)	Herfindahl index in industrial (H^{I}_{i})	Herfindahl index in emerging (H^{E}_{i})	GDP Growth (ΔGDP)	Obs.	GMM Model	R^2
Japan	Coefficient	0.095159	0.329035	-1.036176	0.0000022	-13.91227	3.121559	77	Random	0.201509
	Std. Error	0.017662	0.228058	0.515635	0.0000017	10.41052	0.405533			
	t-Statistic	5.38767	1.442768	-2.009515	1.289787	-1.336366	7.697422			
	Prob.	0.0000***	0.1535	0.0483**	0.2013	0.1857	0.0000***			
Denmark	Coefficient	0.03456	-0.00326	-0.15338	-3.58309	44.35315	0.053689	29	Random	0.209651
	Std. Error	0.009411	0.017024	0.072424	0.942281	537.0439	0.017788			
	t-Statistic	3.672276	-0.19167	-2.11781	-3.80257	0.082588	3.018257			
	Prob.	0.0013***	0.8497	0.0452**	0.0009***	0.9349	0.0061***			
France	Coefficient	0.095932	-0.04865	-0.08427	-8.25768	2.038214	-0.39092	11	Random	0.757829
	Std. Error	0.014708	0.013917	0.016583	1.453451	0.929481	0.03146			
	t-Statistic	6.522632	-3.49577	-5.08151	-5.68143	2.192851	-12.4259			
	Prob.	0.0013***	0.0174**	0.0038***	0.0024***	0.0798*	0.0001***			
Germany	Coefficient	0.057937	0.006553	0.802224	-6.54608	0.112931	0.071477	17	Fixed	0.001039
	Std. Error	0.015186	0.003525	0.314383	1.684666	0.628271	0.039782			
	t-Statistic	3.815245	1.85909	2.551742	-3.88568	0.179749	1.796723			
	Prob.	0.0029***	0.0900*	0.0269**	0.0025***	0.8606	0.0999*			
Greece	Coefficient	0.022262	-0.01476	0.003313	-1.3833	-0.03099	-0.00429	17	Fixed	0.042555
	Std. Error	0.002973	0.00775	0.003533	0.283607	0.08447	0.039233			
	t-Statistic	7.488174	-1.90498	0.937821	-4.8775	-0.36683	-0.10921			
	Prob.	0.0000***	0.0832*	0.3685	0.0005***	0.7207	0.9150			
United Stated of America	Coefficient	0.0021	-0.0018	-0.0095	-0.1183	-0.0284	0.0185	707	Random	0.008968
	Std. Error	0.0022	0.0039	0.0027	0.2083	0.3565	0.0145			
	t-Statistic	0.9919	-0.4725	-3.4968	-0.5679	-0.0796	1.2711			
	Prob.	0.3216	0.6367	0.0005***	0.5703	0.9366	0.2041			

Table 4. Contd.

Canada	Coefficient	-0.00207	2.3341	-1.951052	4.254169	2.429272	0.044498	41	Fixed	0.185662
	Std. Error	0.001665	0.293525	0.37293	5.769395	1.996945	0.017346			
	t-Statistic	-1.242907	7.951965	-5.231687	0.737368	1.216494	2.565219			
	Prob.	0.2397	0.0000***	0.0003***	0.4763	0.2493	0.0263**			
Italy	Coefficient	0.017299	0.084836	-0.03562	-0.96617	-1.98364	-0.0393	17	Random	0.280516
	Std. Error	0.04052	0.019839	0.05416	4.047341	0.540382	0.033174			
	t-Statistic	0.426931	4.276128	-0.65759	-0.23872	-3.67081	-1.18475			
	Prob.	0.6777	0.0013***	0.5243	0.8157	0.0037***	0.2611			
Switzerland	Coefficient	-0.00939	0.111416	-0.09241	1.145015	74.6981	-0.06874	41	Fixed	0.016332
	Std. Error	0.028574	0.077122	0.351646	2.894146	73.85282	0.036845			
	t-Statistic	-0.3286	1.444674	-0.26279	0.395632	1.011445	-1.86562			
	Prob.	0.7444	0.1574	0.7943	0.6948	0.3187	0.0705*			

which indicates that the international diversification degree was beneficial to the reduction of systematic risk.

The negative coefficients associated with the regional distribution of assets representing the decrease of systematic risk were due to the corresponding asset allocation in three groups of countries: the home countries, other industrial countries, and emerging markets. Considering the coefficients associated with the regional distribution of assets for emerging market countries, the emerging influences of Israel (-0.1322) and Egypt (-1.9511) on their proportion of diversification asset allocation were both significantly negative at 1%. The result showed that decreases in the systematic risk of Israel and Egypt were derived from the relative asset allocation in emerging markets. On the other hand, Malaysia's home influence on its proportion of diversification asset allocation was significantly positive at 1%. The increases in the systematic risk of Malaysia were mainly derived from the relative asset allocation in the home country. The results supported the $H_1{}^2$ hypothesis, which indicates that more asset allocation in the home country for emerging markets was not helpful for reducing systematic risk. To sum up, systematic risk decreased when the proportions of Malaysia and Thailand's asset allocation within the industrial country group were higher, and vice versa. The systematic risk decreased when the proportion of Israel's asset allocation within emerging markets reduced. The decrease in the systematic risk of Israel and Egypt were mainly derived from the relative asset allocation in emerging markets. The above evidences supported the $H_1{}^2$ hypothesis.

Comparison among countries

Figure 1 plots the values and linear regressions of the risk-adjusted profitability (1a and c) and systematic risk (1b and d) obtained by each industrial country, against the average share of asset allocation in other industrial countries (1a and b), and other emerging markets (1c and d). As shown in Figures 1a and b, risk-adjusted profitability and systematic risk were negatively correlated with the average share of asset allocation in industrial countries. As the asset allocation in industrial countries went higher, both risk-adjusted profitability and systematic risk became lower. However, Figures 1c and 1d show that risk-adjusted profitability and systematic risk were positively correlated with the average share of asset allocation in emerging markets. It implies that consolidated groups of international banks of industrial countries with a large share of their assets abroad, particularly in emerging markets, have been able to attain higher risk-adjusted profitability.

Figure 2 shows the values and linear regressions of the risk-adjusted profitability (2a and c) and systematic risk (2b and d) obtained by each emerging country's international bank, against the average share of asset allocation in industrial countries (2a and b) and other emerging markets (2c and d). Figures 2a and b show that

Table 5. The effect of bank international diversification on systematic risk: 6 emerging countries $\beta_{i,t} = \omega_0 \cdot share^{H}_{i,t} + \omega_1 \cdot share^{I}_{i,t} + \omega_2 \cdot share^{E}_{i,t} + \phi_1 \cdot H^{I}_{i,t} + \phi_2 \cdot H^{E}_{i,t} + \mu \cdot \Delta GDP_t + \varepsilon_{i,t}$ (2).

Country	Estimation	Allocation of assets in home ($share^{H}_{i,t}$)	Allocation of assets in industrial ($share^{I}_{i,t}$)	Allocation of assets in emerging ($share^{E}_{i,t}$)	Herfindahl index in industrial (H^{I}_{i})	Herfindahl index in emerging (H^{E}_{i})	GDP growth (ΔGDP)	Obs.	GMM model	R^2
Malaysia	Coefficient	0.041335	1.891252	-0.065607	-178.4422	-3.682491	-0.04057	47	Random	0.513577
	Std. Error	0.009267	1.771002	0.253061	57.35509	0.897227	0.010431			
	t-Statistic	4.46047	1.0679	-0.259253	-3.111182	-4.1043	-3.889536			
	Prob.	0.0001***	0.2920	0.7968	0.0034***	0.0002***	0.0004***			
Thailand	Coefficient	0.00849	-0.186628	0.036418	-342.4224	-0.492974	0.020772	35	Random	0.334738
	Std. Error	0.006256	0.930741	0.146425	30.6776	0.736948	0.00326			
	t-Statistic	1.357118	-0.200516	0.248711	-11.16197	-0.668941	6.371158			
	Prob.	0.1856	0.8425	0.8054	0.0000***	0.5090	0.0000***			
Israel	Coefficient	-0.027294	0.122887	-0.132161	1.871462	3.142423	0.038353	23	Random	0.574956
	Std. Error	0.008286	0.026368	0.037155	1.001754	0.933195	0.00896			
	t-Statistic	-3.294118	4.660487	-3.55704	1.868185	3.367382	4.280542			
	Prob.	0.0046***	0.0003***	0.0026***	0.0802*	0.0039***	0.0006***			
Egypt	Coefficient	-0.00207	2.33410	-1.951052	4.254162	2.429272	0.044498	17	Random	0.203353
	Std. Error	0.001665	0.293525	0.37293	5.769395	1.996946	0.017346			
	t-Statistic	-1.242907	7.951967	-5.231688	0.737367	1.216494	2.565218			
	Prob.	0.2397	0.0000***	0.0003***	0.4763	0.2493	0.0263**			
Taiwan	Coefficient	0.01241	1.499829	3.089663	33.00468	-1.136855	-0.000639	35	Random	0.181277
	Std. Error	0.01894	3.439691	2.641513	50.00288	2.263361	0.006758			
	t-Statistic	0.655242	0.436036	1.169657	0.660056	-0.502286	-0.094581			
	Prob.	0.5177	0.6662	0.2520	0.5146	0.6194	0.9253			
India	Coefficient	0.082939	0.017861	-4295.622	-8.511923	-8.124461	0.041314	41	Random	0.146479
	Std. Error	0.263867	0.164321	10104.5	25.77972	27.00245	0.007919			
	t-Statistic	0.314321	0.108696	-0.42512	-0.330179	-0.300879	5.216766			
	Prob.	0.7573	0.9148	0.6764	0.7455	0.7674	0.0001***			

(1) ***Significant at 1%, ** Significant at 5%, * Significant at 10%. (2) According to FTSE Group distinguishes between advanced and secondary emerging markets on the basis of their national income and the development of their market infrastructure. The advanced emerging markets are included: Egypt, India, Israel, Malaysia, Taiwan, and Thailand. As a result, the emerging market includes 6 countries in this study: Israel, Taiwan, India, Malaysia, Thailand, and Egypt. The industrial countries include 9 countries: Japan, Denmark, France, Germany, Greece, Italy, Switzerland, Canada, and United States.

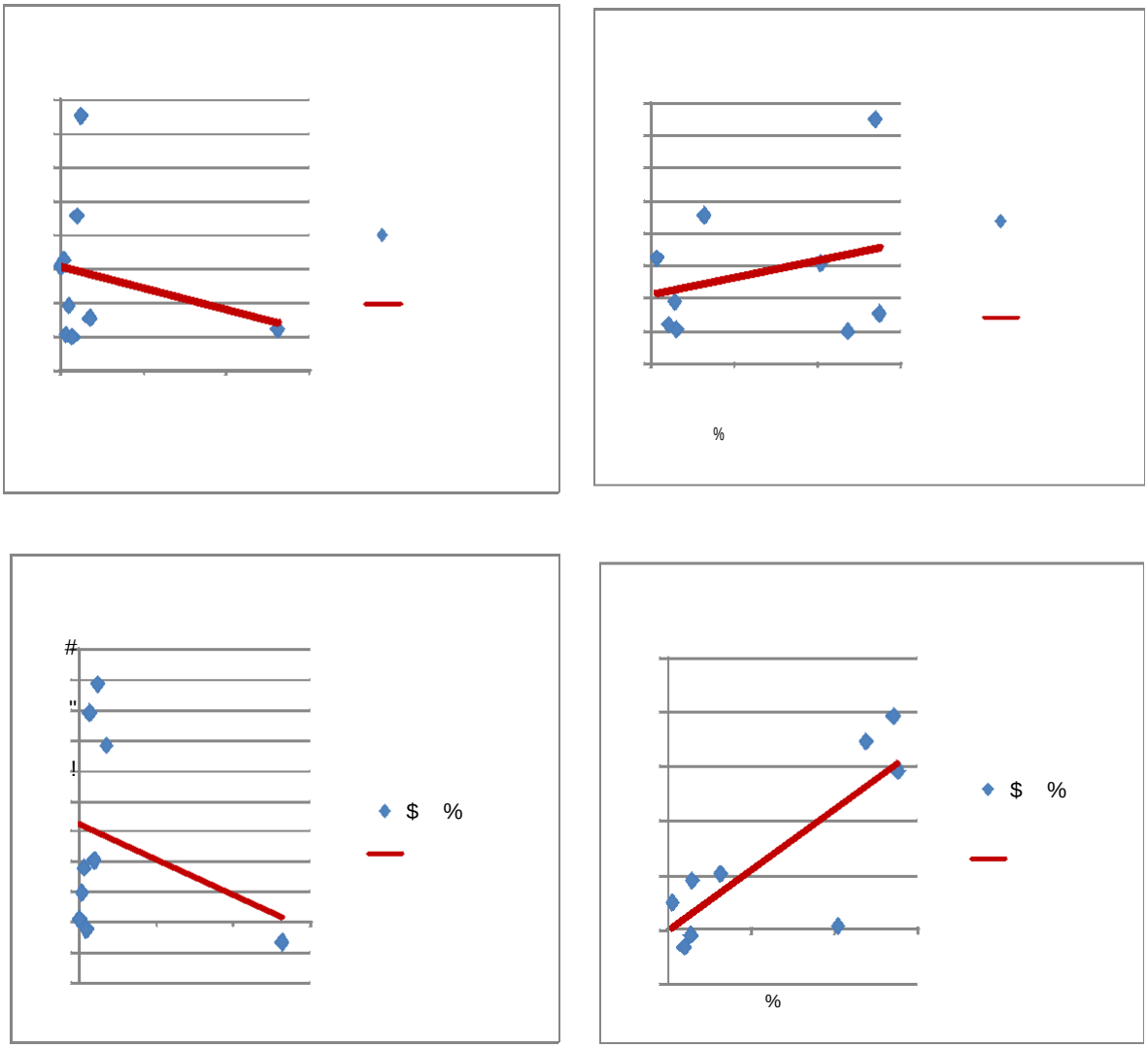

Figure 1. Risk-adjusted profitability and systematic risk of international banks for 9 industrial countries. Figure 1 plots the values and linear regressions of the risk-adjusted profitability and systematic risk obtained by each industrial country international banks, against the average share of their assets allocation in other industrial countries (1a and 1b), and other emerging market (1c and 1d).

risk-adjusted profitability and systematic risk were negatively correlated with the average share of asset allocation in industrial countries. As the allocation of assets in industrial went higher, the risk-adjusted profitability and systematic risk became lower. However, Figure 2c shows that risk-adjusted profitability was positively correlated with the average share of asset allocation in emerging markets. The risk-adjusted profitability went higher as the asset allocation in emerging markets became higher. At the same time, Figure 2d shows that systematic risk was negatively correlated with the average share of asset allocation in emerging markets. The results imply that consolidated groups of international banks of emerging countries with a large share of their assets abroad, particularly in emerging markets, have been able to attain greater risk-adjusted profitability, but smaller systematic risk.

CONCLUDING REMARKS

This paper empirically measured the degree of international diversification, risk-adjusted profitability and systematic risk based on bank-level datasets. A special effort was focused on the comparison of industrial countries and emerging market countries. This paper

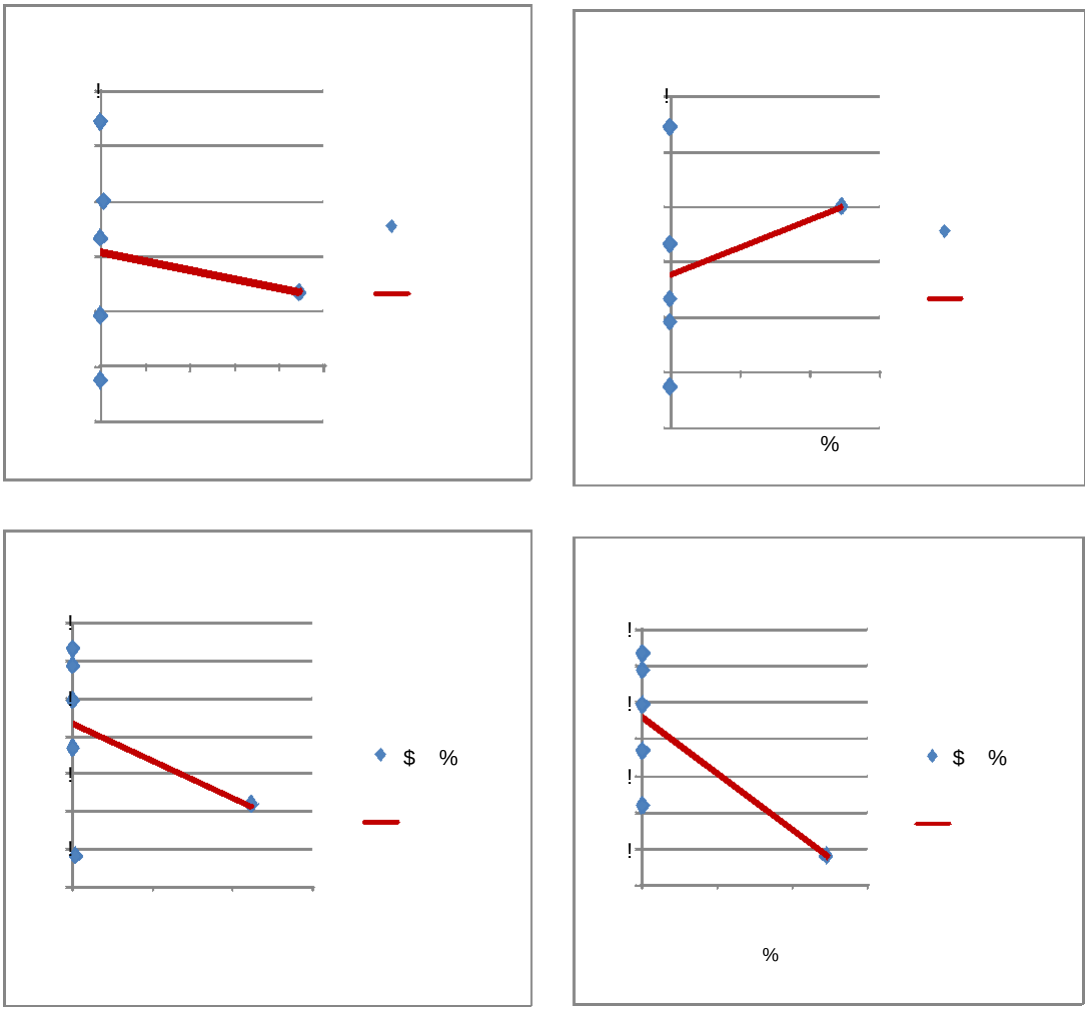

Figure 2. Risk-adjusted profitability and systematic risk of international banks for 6 emerging countries. Figure 2 plots the values and linear regressions of the risk-adjusted profitability and systematic risk obtained by each emerging country international banks, against the average share of their assets allocation in other industrial countries (2a and 2b), and other emerging market (2c and 2d).

assembled the operations of 195 international banks from nine industrial countries (Japan, Denmark, France, Germany, Greece, Italy, Switzerland, Canada and the U.S.) and six countries with emerging markets (Taiwan, Israel, India, Malaysia, Thailand, and Egypt) during 2001 to 2006. The effects of international diversification on risk-adjusted performance and systematic risk were studied for consolidated groups of international banks. The home bias phenomenon was also investigated in international diversification asset allocation.

This paper found that risk- adjusted profitability increased when the concentration of Japan, Denmark, Germany, Italy, Israel, Thailand, and India's asset allocation within the industrial country group was lower, and vice versa. However, the risk-adjusted profitability increased when the concentration of France's asset allocation within the emerging market group was lower. The results of Italy, Denmark, France, Germany, Japan, Israel, Thailand, and India supported the H_1^1 hypothesis, which indicates that the international diversification degrees of these countries were helpful to the improvement of risk-adjusted profitability. The systematic risk decreased when the proportions of Denmark, France, Germany, Greece, Malaysia and Thailand's asset allocation within the industrial country group was higher, and vice versa. The systematic risk decreased when the proportion of Italy and Israel's asset allocation within emerging markets was higher. These evidences supported the H_1^2 hypothesis. This study provided

strong and robust evidence that a larger asset allocation to subsidiaries overseas could increase risk-adjusted profitability and decrease the systematic risk of international banks. However, the international diversification asset allocation of the nine industrial countries and the six emerging market countries did have home bias. The results of this study added to a foundation for international diversification assessment.

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