Sources of Industry and Country Effects in Firm Level Returns

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Abstract

Based on the firm level returns from MSCI global index from 1990 to 2002, this paper examines the cross sectional links of firms' global, country and industry effects with the firms' foreign sale ratios, ADRs, TMTs to explore whether the dynamics of the global, country and industry effects is embedded in the ongoing business and financial globalization process, and whether such globalization has extended to the emerging markets. Our main results are: first, as expected, the dynamics of firms' factor effects is connected to the extent to which firms operate globally: a rise in a firm's foreign sales relative to its total sales increases the firm's global and industry effects and decreases its country effects. Second, firms' factor effects are also linked to the increasing financial market integration, as can be seen from the positive relations between firms' global and industry effects and ADRs. However, the country effects are also positively related to ADRs, hinting the mixed role of ADRs: while facilitating the increasing market integration, ADRs may also hurt their domestic markets as evidenced in Karolyi (2003). Third, the relationship between firms' factor effects and TMTs are volatile over time, and especially the negative links between industry effects and TMTs in recent years have minimized the chance of IT bubbles being responsible for the increase of industry effects. Fourth, the globalization process has extended to the emerging markets, yet the magnitude is smaller as emerging markets are found to have higher country effects and lower global and industry effects than the developed markets. Finally, the importance of the global, country and industry effects are time-varying, and so are the links of those effects with the globalization process. Our findings above have important implications for international portfolio diversification.

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1. Introduction

A recently revived topic in the international finance literature is the study on the relative importance of country versus industry effects in explaining the equity market movement. Traditionally, the country effects have dominated the industry effects. This is evidenced in Lessard (1974), Solnik (1974), Heston and Rouwenhorst (1994, 1995), Griffin and Karolyi (1998) and many others[1]. However, more recent papers such as Baca et al (2000), Cavaglia, Brightman and Aked (2000), L'Her et al (2002), Brooks and Del Negro (2002), and Phylaktis and Xia (2003) have shown that the industry effects have levelled or even surpassed the country effects in recent years, suggesting that international diversification across industries may now provide greater risk reductions than the traditional diversification across countries.

The recent change of the country and industry effects has left us an open question to ask: what are the forces driving such a shift? Understanding the sources leading to this shift is not only helpful for the relevant studies on the global capital market integration and international diversification, but also crucial for the international portfolio allocation and management on the practitioner's frontiers. Intuitively, the answer to the above question would be connected to the ongoing globalization. On the one hand, the worldwide businesses had forged through an increasing process of globalization during the last decade. Firms had sought to consolidate and rationalize business activities globally through the expansion of existing affiliates as well as a wave of mergers and acquisitions[2]. As a result, firms had become more diversified across counties in their revenues and operations so that country-specific economic shocks now matter less for domestic equity markets than ever before, and the industry shocks, which are more pertinent to global economic activities, had gained a greater importance in explaining the equity returns. On the other hand, the financial markets had been increasingly integrated with each other during the last decade. Empirical evidence shows that market co-movement is currently higher than ever before[3]. The increasing level of market integration blurs the national borders, diminishes the country effects and increases the industry effects, other things being equal.

[1] A detailed literature review can be found in Phylaktis and Xia (2003).

[2] For example, as quoted in Cavaglia, Cho and Singer (2001), cross-border mergers and acquisitions rose from an average of $40 billion per year over the 1989-1993 period to an average of $400 billion per year over the 1994-2000 period.

Though theoretically sound and reasonable, the relationship between the dynamics of country and industry effects and the globalization activities is still subject to empirical evidence, as the increase of industry effects might also be due to other reasons such as IT bubbles boom and bust during the years at the turn of the century. Brooks and Del Negro (2002) point out that the increase of industry effects is only confined to a narrow set of industry sectors – Technology, Telecommunication and Media (TMT), while for the rest of the industries, the industry effects are still dominated by the country effects. They further conclude that the recent rise of industry effects is not an indication of global market integration, rather it is a temporary phenomenon associated with the equity market technology bubbles in the late 1990s.

However, the empirical studies in this regard are limited. Two relevant papers by Cavaglia, Cho and Singer (2001) and Brooks and Del Negro (2003) have documented the evidence on the connection of the dynamics of country and industry effects with firms' foreign activities, proxy for the business globalization. In order to better understand the far-reaching impact of business globalization on the pricing of securities, Cavaglia, Cho and Singer (2001) develop a risk model which decomposes the security returns into components of global, domestic and regional sector factors. A two-stage methodology similar to the iterative approach of Marsh and Pfleiderer (1997) is applied to obtain all the factor loadings. Those factor loadings are regressed on the firms' foreign sale ratios, a variable as an indication of firms' global activities. Application of the model to the data of FT World Index constituents from 22 developed countries from 1990 to 1999 reveals that while the non-domestic factors (the global and regional sector factors) are positively associated with the extent of firms' foreign sales, the domestic factors are negatively associated with the extent of firms' foreign sales. All the signs of coefficients are consistent with the theoretical predications. However, only the coefficients on the regional sector factors are statistically significant. The coefficients on the global factors are marginally significant and those on the domestic factors are generally insignificant over time.

[3] See, for example, Freimann (1998) and Goetzmann, Li and Rouwenhorst (2001)

Brooks and Del Negro (2003), on the other hand, estimate a factor model that decomposes the equity returns into global, country-specific and industry specific factors to investigate the links between factor betas and the extent to which firms operate globally. One of the differences of their methodology from that of Cavaglia, Cho and Singer (2001) is that the former estimates the factor betas using the maximum likelihood procedure whereas the latter uses the iterative approach of Marsh and Pfleiderer (1997). Another difference between the two papers is that Brooks and Del Negro apply different measures to quantify the extent to which the firms operate globally. Brooks and Del Negro not only use firms' foreign sale ratios, which is employed by Cavaglia, Cho and Singer, but also employ other alternatives such as firms' international income ratios, international assets ratios, or whether firms belong to traded or non-traded goods industries. Using data for 9,679 companies from January 1985 to February 2002, they find that the global factors are positively related and the country factors negatively related to those global proxies. All the relations identified are statistically and economically significant. They also report that the link between global factors and firms' international sale ratios is increasing, whereas the link between country factors and firms' international sale ratios is decreasing over time. However, contrary to Cavaglia, Cho and Singer (2001), they have not detected any significant link between the industry factors and the extent to which firms operate internationally.

Clearly, the two papers above have only dealt with the proxy of business globalization in relation to the country and industry effects in the equity returns. However, there are other equally important questions which need to be further explored and identified. Such questions include: does the financial market integration also facilitates in driving the evolving process of country and industry effects? Do the TMT sectors have significant impacts on those country and industry effects? Do those links and impacts hold in the emerging markets? The purpose of the current paper is to provide answers to those questions. Namely, this paper is aimed to extend the works of Cavaglia, Cho and Singer (2001) and Brooks and Del Negro (2003), and examine in multiple facets the sources of the dynamics of country and industry effect in international equity returns. To put it in more details, we intend to tackle the following issues, which also constitute our main contributions to the relevant literatures:

First, as did in Cavaglia, Cho and Singer (2001) and Brooks and Del Negro (2003), we explore the connections of the firms' global, country and industry factors with the firms' foreign sale ratios, which is proxied for the business globalization. Our hypothesis is as follows:

Hypothesis 1: firm level global and industry effects are positively related to the firm's foreign sale ratios and firm level country effects are negatively related to the firm's foreign sale ratios.

Apart from finding empirical support for this hypothesis, we also intend to pin down any nonlinear relationship in the process. Several reasons prompt us to explore this nonlinearity. By employing the regime-switching model to examine the country and industry dynamics, Catao and Timmerman (2003) find strong evidence of nonlinear dynamic dependencies in both industry and country returns, suggesting that the factors driving the industry and country effects may be time-varying. In addition, Hamilton (1989) and many others have pointed out the non-linear characteristics in most of the macroeconomic variables such as GDP and Industrial Productions due to the well-known possible cause of business cycle asymmetries. Likewise, many of the time series of financial data are nonlinear in nature (see Abhyanka et al, 1997, for a summary). Although modelling the sophisticated nonlinear relationship is not our purpose, we apply the simple method (squared term of the foreign sale ratio variable) to capture the existence of any nonlinearity.

Second, we investigate whether the ADR listings have any impact on the process of the global, country and industry effects, an issue which has yet been touched upon in the literature. The last decade had witnessed a sharp surge of firms listed as ADRs. According the Bank of New York[4], worldwide ADRs in the US market was 285 prior to the year 1992. By the year of 2001, it rose to 1726. ADRs and other forms of cross-border listings may overcome many of the regulatory restrictions, cost and information problems that inhibit international investment, thus allowing some indirect market integration. Various papers have focused on studying the effects of ADR listings on the listing firms as well as on the market integration. Among others,

[4] See the bank's ADR website: http://www.adrbny.com

Karolyi (2003) indicates that the increasing number of new ADR programs, their market cap and trading volume in the emerging markets are positively associated with the pace of international capital flows and greater market integration. Therefore, if ADR listings facilitate the acceleration of market integration, one would expect that domestic factors matter less and industry factors matter more for ADR firms than non-ADR firms. Therefore, we test the following hypothesis:

Hypothesis 2: firm level global and industry effects are positively related to the firm's ADR listing status and firm level country effects are negatively related to the firm's ADR listing status.

Third, we investigate whether the TMT sectors have a significant impact on the dynamics of the global, country and industry effects. TMT sectors belong to the so-called "new economy" and they are generally regarded as being more global in nature compared to the other non-TMT sectors in the traditional economy. Therefore the following hypothesis is established:

Hypothesis 3: firms in TMT sectors have higher global and industry effects and lower country effects than firms in non-TMT sectors.

Additionally, Brooks and Del Negro (2002) claim that the recent increase of industry effects is only confined to TMT sectors and such increase is due to IT bubbles. Our findings would shed some light and add new empirical contents on this issue.

Finally, we explore whether the links of global, country and industry effects with business globalization, ADR listings as well as TMT sectors have extended to the emerging markets. It is a common belief that emerging markets' returns tend to be relatively uncorrelated with each other and their correlation with the mature markets is low. Studies on the importance of country and industry effects are almost exclusively focused on the developed markets. Given the higher growth rates of economy and liberalization of capital markets in the developing world, the subject of

emerging markets is now becoming more important in the international diversification arena.

Few papers in the literature have been devoted to examining the importance of country and industry effects in emerging markets. Using the EMDB (Emerging Market Data Base) data from 1990 to 1996, Serra (2000) finds that emerging markets' returns are mainly driven by country factors, and the industry factors play little role in the cross-market correlations. Applying Dow Jones Global Indexes data during the period of 1992-2001, Phylaktis and Xia (2003) show that the industry effects are still dominated by the country effects in the domain of emerging markets, although the situation is reversed in the developed markets.

Given the different behaviour of developed and emerging markets, one would expect that the globalization process may have a different impact on the equity returns of the latter. It may be that the globalization process does not extend to the emerging markets, and therefore there is no significant links between this globalization process and the firms' country and industry effects in those markets. Or it may be that globalization process does have an impact, but of a lesser degree compared to that in the developed markets. The answers to those issues are vital to the studies on emerging markets. One of our major contributions to the literatures is our focus on the emerging markets. Our purpose is to capture the major differences between emerging markets and developed markets in the sources behind the interactions of country and industry effects with the globalization process. Our findings would have important implications for the international diversification into the domain of emerging markets.

The following sections are structured as follows: Section 2 introduces our model and estimation procedures, and Section 3 provides details on our sample data. While Section 4 presents our analysis and key empirical results, Section 5 points out the implications of our findings on the international diversification. The final section concludes our paper.

2 Modelling and Methodology

2.1 Firm Level Country and Industry Effects

The majority of papers that examine the industry and country effects concentrate on explaining the behaviour of the aggregate market indexes (for example, Heston and Rouwenhorst, 1994; Grinffin and karolyi, 1998; etc). In this paper, we focus on the firm level evidence (as in Cavaglia, Cho and Singer, 2001, and Brooks and Del Negro, 2003). We ask how much of the movement of Honda equity return is due to the fact that Honda is in the automobile industry and how much is due to the fact that Honda is a Japanese firm. The focus on the firm level returns not only provides new empirical contents to the study of the importance of country vs. industry effects, but also has the advantage of allowing us to employ individual firm's accounting data to examine the cross sectional links between firms' country and industry effects and the extent to which firms operate globally.

Our starting point is the standard factor model which decomposes returns into global, country, industry and firm-specific factors. Let us denote by R_{nt} the return on equity *n* in period *t*, where *n* goes from 1 to *N* and *t* goes from 1 to *T*.

$$R_{nt} = \beta_n^G f_t^G + \beta_{nc}^C f_t^C + \beta_{ni}^I f_t^I + e_{nt} \qquad (1)$$

Where f_t^G is the return on the global factor, f_t^C and f_t^I are the returns on the country factor *c* and industry factor *i*, respectively, and e_{nt} represents the idiosyncratic shock to the return on equity *n*, all in period *t*. β_n^G, β_n^C and β_n^I represent loadings on the global, country and industry factors respectively.

In estimation of model (1), most of the papers such as Heston and Rouwenhorst (1994), Griffin and Karolyi (1998) and many others have imposed restrictions that β_n^G =1 and β_n^C =1 if equity *n* belongs to country *c* and 0 otherwise, and β_n^I =1 if equity *n* belongs to industry *i* and 0 otherwise. Implicitly, their estimation is the fixed effects model in econometric terms. However, constraining the factor loadings as above, as argued in Marsh and Pfleiderer (1997), may result in an unnecessary loss of information. For example, if two firms are identical in every aspect except that one

has higher leverage than the other, then the two must have different sensitivities to the country and industry factors. It is also hardly convincing to assume that firms like Nokia which has accounted for about 60% of the total market capitalization of Finland has the same loadings as other smaller firms in the country on the country and industry factor returns. In addition, Harvey, Solnik, and Zhou (1994) demonstrate that differences in risk loadings are important in accounting for the cross-sectional variation in industry and country equity returns.

In view of this, we relax the constraints that all β s are unity in our estimation. In econometric terms, we move from a fixed effects model to a random effects one. There are two papers which have applied this random effects model into their analysis. One is Brooks and Del Negro (2003), which uses the Lehman and Modest (1985) EM algorithm to obtain the maximum likelihood estimates of the factor loadings in model (1). The other one, Cavaglia, Cho and Singer (2001), employs an iterative estimation approach suggested in Marsh and Pfleiderer (1997). However, the problem with the maximum likelihood method in Brooks and Del Negro (2003), as pointed out by themselves, is that it only applies to balanced panel data. Estimation based on this method might lose much essential information as many firms would be excluded from the model due to their lack of full coverage.

Therefore, we follow the methodology in the spirit of the iterative approach of Cavaglia, Cho and Singer (2001) and Marsh and Pfleiderer (1997). Specifically, a two-step approach is adopted: the first step is to obtain the global, country and industry factors which are orthogonal with each other. The estimation is similar to the fixed effects model of Heston and Rouwenhorst (1994) and Grinffin and Karolyi (1998)[5]. Namely, the values for the factor loadings are initially assumed as either unity or zero, and a cross-sectional regression yielding the pure global, country and industry factor returns is estimated at each time point. In the second step, the time series of the pure factor returns are standardized (unity variance) and used in ordinary

[5] The detailed estimation procedure is outlined in Heston and Rouwenhorst (1994) and Griffin and Karolyi (1998). As there are 36 countries and 24 industries in the sample, our model is in the following form:

$$R_{nt} = \beta_n^G f_t^G + \sum_{c=1}^{36} \beta_{nc}^C f_t^C + \sum_{i=1}^{24} \beta_{ni}^I f_t^I + \varepsilon_{nt} \qquad (2)$$

least squares (OLS) estimates of Model (1) to obtain the new factor loadings (unconstrained betas) for each firm. The unconstrained betas indicate the sensitivities of a firm's returns to the respective pure global, country and industry factors.

Comparing to the others, our approach has several advantages. By allowing for the large amount of unbalanced panel data, we can extract as much information as possible from the data which would be lost otherwise. Furthermore, the unconstrained betas in our model are extracted from the pure global, country and industry factor returns. Since the pure global, country and industry returns are orthogonal by construction, our estimation of betas would expect to be little biased by the interactions among the factor returns[6].

Having obtained the unconstrained betas of global, industry and country factors for each firm, we can decompose the firm's total variance into the sum of the variances attributed to those factors and the idiosyncratic components:

$$Var\ (\ R_{nt\ }\ ) = (\ \hat{\beta}_n^{G}\ )^2 + (\ \hat{\beta}_n^{C}\ )^2 + (\ \hat{\beta}_n^{I}\ )^2 + \sigma_n^{2} \qquad (3)$$

where $\hat{\beta}_n^{G}$, $\hat{\beta}_n^{C}$ and $\hat{\beta}_n^{I}$ are the unconstrained betas for the global, country and industry factors. From model (3), we can gauge the relative importance of those factors by determining how much of a firm's total variance can be explained by the respective global, country, industry and firm-specific factors.

2.2 Estimation of Cross-sectional Links

The ultimate purpose of this paper is to explore whether the dynamics of global, country and industry effects in firms' returns is related to the globalization process. So our next step is to estimate their systematic links. We run cross sectional

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[6] The country and industry factor returns are orthogonal ex ante by construction, but they may be interacted with each other ex post. However, we find that the average ex post correlations among them are very small. The similar results are also reported in Brooks and Del Negro (2003)

regressions of firms' factor betas on each individual globalization variable. The models are in the following forms:

$$P_n = \alpha_{10} + \alpha_{11} FS_n + \alpha_{12} FS_n^2 + \eta_{1n} \quad (4)$$

$$P_n = \alpha_{20} + \alpha_{21} ADR + \eta_{2n} \quad (5)$$

$$P_n = \alpha_{30} + \alpha_{31} TMT + \eta_{3n} \quad (6)$$

where P_n represents the respective global, country and industry effects obtained from model (3). FS denotes the variable of the firms' foreign sale ratios. To explore whether there exists any non-linearity, we include a squared term of this variable (FS^2) into the equation in model (4). ADR is the dummy variable which equals 1 if the firm is listed as ADR and 0 otherwise. TMT is also the dummy variable with a value of 1 for the firm which belongs to TMT sector and 0 otherwise. α_{10}, α_{20}, α_{30} are the intercepts and η_{1n}, η_{2n}, and η_{3n} are the error terms.

The reasons that we choose separate equation for the estimation of each globalization variable instead of putting them into a single equation are two-folds: first, those globalization variables may be correlated. For example, it is often observed that firms with higher ratios of foreign sales tend to be the ones which tend to list as ADRs. Combining the two variables into a single equation might distort or bias our estimation results. Second, samples and coverage vary among those variables. An example is that the US firms have to be excluded from our sample when we analyze the effects for ADR vs. non-ADR firms.

To model the relations of the factor betas with globalization in the emerging markets, we add a dummy variable (EM) into the right hand side of the above three equations. So the models become:

$$P_n = \alpha_{10} + \alpha_{11} FS_n + \alpha_{12} FS_n^2 + \alpha_{13} EM + \eta_{1n} \quad (7)$$

$$P_n = \alpha_{20} + \alpha_{21} ADR + \alpha_{22} EM + \eta_{2n} \quad (8)$$

$$P_n = \alpha_{30} + \alpha_{31} TMT + \alpha_{32} EM + \eta_{3n} \quad (9)$$

where *EM* is the dummy variable, which takes the value of 1 if the firm belongs to an emerging country and 0 otherwise.

3. Data

The individual firm constituents of MSCI global index at the end of year 2002 define our universe of data sample. There are altogether 2179 firms from 23 developed markets and 27 emerging markets, covering the period from Jan 1990 – Dec 2002. Firms with fewer than 3 years of data and countries with fewer than 5 firms are excluded in order to minimize any estimation bias induced otherwise. After the data screening, there are a total of 1893 firms included in our analysis representing 37 countries (out of which there are 14 emerging markets). The firms' weekly price and market cap data in US dollar term are extracted from Datastream. Each firm's industry affiliation is based on the GICS (General Industry Classification Standard) provided by MSCI. We focus on the broad classification which includes 24 industry groups (See appendix 1 for detailed countries included and the GICS classifications).

It should be pointed out that our data sample may be deficient in coverage: it is subject to survivorship bias as we examine only those firms which are included in the MSCI global index at the end of our sample period. This means that only firms surviving through the full sample period are covered. However, this problem may be partly offset by the fact that not only some large firms but also many small firms are omitted from our sample. Nevertheless, in terms of the total capitalization, our sample covers roughly 85% percent of the total market capitalization in all the countries included in the analysis. Because the data comprises the largest and most actively traded firms in both developed and emerging markets, it can be reasonably deemed as quite representative from the point view of the global investors.

Table 1 presents the coverage of firms both across countries and industries. Generally, firms are not evenly distributed. Panel A shows that smaller countries have fewer representations, with Argentina and Austria having only 9 firms. On the other hand, large countries are better represented. There are 380 firms in the US and 309 firms in Japan. In Panel B, while Capital goods and Material industries include nearly 200 firms, industries like Food & Staple Retail and Household & Personal Products are composed of only 31 and 19 firms.

The information of firms' foreign sales and ADR listings are also needed in our analysis. Firms' annual foreign sale ratios (foreign sales over total sales) are collected from the following sources: Thompsons Financial, Bloomberg and the individual firm's websites. Out of the total sample examined, there are 1262 firms which have reported their foreign sale ratios. Due to data availability, we only have data of foreign sale ratios for the last five years (1998-2002). The simple five-year average is used into our final analysis. To keep our result robust, we check with different alternatives. Firm's ADR information is singled out from the website of Bank of New York. The total number of ADR firms in our sample is 532. As the listing years are different across firms, we have to choose one of the years in the sample as the cutting point to differentiate ADR from non ADR firms. The year of 1996 is thus selected: firms listed as ADRs before and in 1996 are counted as ADR firms and firms listed after 1996 are counted as non ADR firms. Due to the sensitivity of our results to the cutting point selected, we check the robustness of our results by anchoring on different cutting points.

4. Empirical Results

This sector reports our major estimation results. It is divided into three sub-sections. Section 4.1 presents the analysis for our full sample period, whereas Section 4.2 reports the result for the sub-periods accounting for the evolving dynamics of the global, country and industry effects over time. The last sub-section, Section 4.3, deals with the underlying issues in the emerging markets. In each sub-section, we focus first on the variance decomposition of firms' global, country and industry factor betas to gauge and compare their relative importance, then we move on to the quantitative

links between those factor betas and the globalization variables to confirm their expected signs and statistical significance.

4.1 Cross sectional links: full sample period

4.11 Variance Decomposition

As said earlier, most of the past studies on the industry vs. country effects focus on the aggregate market returns. Our analysis, however, concentrates on the firm level evidence. We are primarily concerned with the issue of how much of a firms' total variance is explained by the respective global, country and industry factors. So we decompose the firm's total variance into proportions accounted for by the global, country and industry effects to gauge their respective importance. The results of the decomposition based on Model (2) are displayed in Figure 1.

Figure 1 reports the value weighted averages of the global, country and industry effects across all the firms in our full sample period. On average, the global effects explained 15.69% of firms' total variance, the highest out of the three factor effects. This suggests that during our 1992-2002 sample period, the global effects had played a more important role than the country effects in explaining the variation of international equity returns. The last decade had witnessed an increasing integration of the global capital markets. As the capital markets co-moved to a higher degree, equity returns would be expected to be more influenced by the global risk shocks than the domestic ones. This is why we find that the global effects are higher than the country effects.

This finding of higher global betas is also evidenced in other papers. In their modelling of the global, country and industry effects, L'Her et al (2002) explicitly identify the global factors as the global market, size, book-to-market and price momentum. What they have found is that the global effects increased during their sample period (1992-2000) and are currently more significant than the country and industry effects. It is this significance that has led the authors to suggest that global managers have to consider the exposure to these global risk factors when constructing their portfolios.

As far as the country and industry effects are concerned, the former had a value of 12.86%, whereas the latter a value of 11.54%. Clearly the country effects had dominated the industry effects in our sample period. Yet the gap between the two is not far away. The two effects have a ratio of 1.11:1, indicating that the industry effects is drawing near and levelling the country effects. Anyway, the higher level of global effects and the catching-up industry effects point favourably to our intuition that the ever increasing globalization and market integration have systematic impacts on the dynamics of those factor effects.

On the whole, the total proportion of variance explained by the three factor effects is 40.09%, and the rest of 59.91% goes to the firm specific factors, indicating that firm's specific shocks are the most important determinants of the international equity movements. Similar results are found in L'Her et al (2002), where they report that firm specific effects are as high as over 70%, overwhelmingly dominating the other three effects (global, country and industry). The dominance of firm specific effects confirms the relevance of investing in a portfolio rather than in a single stock, given that the stock specific component can be significantly reduced by forming a portfolio of non-perfectly correlated securities. In a related research, Campbell et al (2001) decompose the firms' returns into market, industry and firm specific component to study the volatility at the market, industry and firm levels. They have found that the firm level volatility is the most important component of the firm's total volatility.

Our main objective is the analysis of the cross-sectional links between firm factor effects and the globalization variables. But before embarking on that, we take a look at the different performances of those factor effects across different groups of firms: firms with high vs. low foreign sale ratios, ADR firms vs. non-ADR firms, and firms in TMT vs. non TMT sectors. If the relations between factor effects and globalization process do exist, one would expect that firms with higher level of foreign sales (more international) or ADR firms behave differently from firms with low level of foreign sale ratios (less international) or non-ADR firms. Differences may also exist between firms in TMT and non TMT sectors. The comparison, which is shown in Figure 2[7],

[7] The detailed values of those variance decompositions as well as the results for the sub-periods are displayed in tables and attached in the appendix.

can be regarded as a qualitative link analysis and help us to better understand the close bonds between those underlying factors and variables.

We first look at the firms in top quartile (the most international) and bottom quartile (the least international) of foreign sale ratios. For the top quartile firms, the global effects, as well as the industry effects, had surpassed the country effects. On the other hand, for the bottom quartile firms, the global effects were slightly higher than the country effects, but the industry effects were the lowest. When comparing the two groups with each other, one can find that firms in top quartile had higher global and industry effects and lower country effects than the firms in bottom quartile. It is quite clear that the firms between the two quartiles performed differently from each other.

In terms of ADR vs. non ADR firms, as expected, the former had higher global and industry effects than did non-ADR firms. Yet what is unexpected is that the country effects of ADR firms were greater than those of non-ADR firms. This seems odd given the fact that the returns of firms listed abroad as ADRs tend to be more sensitive to the non-domestic factors than the domestic factors compared to the returns of those non-ADR firms.

Firms in TMT sectors are supposed to have higher global and industry effects and lower country effects than firms in non-TMT sectors. The comparison between firms in TMT and non-TMT sectors indicates that firms in TMT sectors did have higher global and industry effects, but their country effects are also higher than those of non MT sectors.

Overall, our analysis shows that the global effects are more important than the country and industry effects, and the industry effects are still dominated by the country effects. Yet, across different groups of firms, those effects vary. Our preliminary comparison indicates that the global, country and industry effects do display discrepancies between more international and less international firms, between ADR and non-ADR firms, and between firms in TMT sectors and non-TMT sectors. Those discrepancies are mostly supportive of our priori expectations.

4.12 The Quantitative links

In order to quantify the links between factor effects with globalization variables, we run a cross-sectional regression of the firms' factor effects on an array of globalization measures: The variables of foreign sale ratios, the ADRs and TMT sectors. The estimation results based on models (4), (5) and (6) are presented in Table 2.

We begin with the relations of firms' factor effects against the variable of foreign sale ratios. Panel A of Table 2 shows that all the linear coefficients had expected signs and conform to our prior hypotheses: an increase in the extent to which firms operate globally raises their global and industry effects but reduces their country effects. Specifically, a 1% increase in the level of firm's foreign sales over its total sales can induce an increase of global betas by 0.06% and industry betas by 0.073% on the one hand, and a decrease of country betas by 0.047% on the other[8]. The directions of the links are consistent with those found in Cavaglia, Cho and Singer (2001) and Brooks and Del Negro (2003)[9]. Our estimation also shows that all the linear coefficients are statistically significant. This is in contrast to the findings of the above two papers. Whereas Cavaglia et al find the significance on the industry betas but not on the other betas, Brooks and Del Negro only report the significant links for the global and country effects.

We also examine the non-linear relations between factor effects and firms' level of global operations. Our purpose is not to model the sophisticated nonlinear process; rather, it is to detect if there exists any nonlinearity. Indeed, for the global and industry effects, the nonlinear coefficients were significant. Those nonlinearities had the opposite signs to those of alternate linear relationships. The existence of non-linearity indicates the sophistication of the links between the global, country and industry effects and the business globalization.

Next, we move to the variable of ADRs (Panel B of Table 2). ADR had a significant relationship with each of the three factor effects. Both the global and industry effects

[8] Notice that our betas are expressed on weekly basis. Hence the annualized betas are roughly $\sqrt{54}$ times the weekly betas.

[9] Brooks and Del Negro (2003) did not examine the link between industry betas and the variable of foreign sale ratios.

had the right signs and conformed to our hypotheses: firms listed as ADRs increase their global and industry effects. However, the country effects had an unexpected positive sign, which means that firms listed as ADRs exhibit higher country effects than those non ADR firms. This finding seems to be against the notion that ADR listing facilitates market integration. One thing to point out is that returns of ADR firms examined in our paper are the ones on the home markets. As Karolyi (2003) finds out that the ADR listings have adverse impacts on the size, scope and liquidity of home markets, even although the growth of ADRs is positively associated with the pace of greater market integration. So as a result, one might expect that home market returns of ADR firms exhibit higher country effects than those of non-ADR firms.

In Panel C of Table 3 are the regression results of factor effects with the TMT variable. TMT was positively related to all the three factor effects. As TMT sectors belong to the so-called the "new economy" and are relatively more global than those belonging to the "old economy", there is no surprise to find that TMT had a positive link with global and industry effects. However, what is odd is that the TMT sectors had higher country effects than non TMT sectors.

To sum it up, our cross sectional regression estimation reveals that firm's foreign sale ratios, as proxy for the globalization of business, are significantly linked to the firm's global, country and industry effects. If a firm increases its reach of international business, the result would be that its global and industry effects tend to rise and its country effects decrease. This finding is consistent with our ex ante hypotheses. However, the relationship is more complex than just a simple linear relationship as we find the existence of non linear relationship at the same time. Comparing to non ADR firms, ADR firms have higher global and industry effects, but their country effects are higher as well, which points to the fact that ADR listing is linked to the greater market integration, yet it hurts and deepens the segmentation of domestic markets from the global. Our estimation also shows that firms in TMT sectors, compared to the firms in non-TMT sectors, display positive global and industry effects, but their country effects are positive as well.

As said before, our globalization variables such as foreign sale ratios and ADR may be subject to the measurement errors. So we check the robustness of our results

against alternative specifications. For the variable of foreign sales ratios, we replace the 5-year simple average by the latest 3-year average, the latest single annual figures, the average of annual percentage increases. No major changes are found and our results generally hold. As for the ADRs, we have tried different cutting points from the single year of 1995 through the year of 1999, and the results are more or less the same.

4.2 Cross Sectional links over time: Sub Sample Periods.

In the previous sub-section, we have examined the cross sectional links of firms' factor effects with firms' international operations, ADR listings, and TMT sector affiliations for our entire sample period spanning from 1990 to 2002. However, there is no priori thoughts that such links do not change over time. Indeed, studies have found that the industry and country effects have been changing and it is not until recently that industry effects have caught up with or even surpassed the country effects in importance in the international equity markets[10]. In this section, we explore the cross sectional links for the sub-periods to investigate how the links evolve over time on the one hand, and whether our full sample results are robust in different sub-periods on the other.

We divide our sample into 4 sub-periods of roughly the same length. The earliest sub-period covers the time between Jan 1990 and Dec 1993, whereas the second sub-period goes from Jan 1994 to Dec 1996. The latest two sub-periods are from Jan 1997 to Dec 1999 and from Jan 2000 to Dec 2001 respectively. The model and methodology employed in the full sample analysis are applied into our sub sample analysis and in case the data of the independent variables such as foreign sale ratios are not available for a particular sub period, we use the next sub-period information instead.

4.21 Variance Decomposition

We start by looking at the average variance decomposition across all the firms, which is shown in Figure 3. Several points can be made: first, recall that we find the global effects are higher than the country effects for our full sample period. This finding

[10] See papers of L'her et al (2002) and Phylaktis and Xia (2003).

holds true for the first and last two sub-periods, but not for the second sub-period. Second, in terms of the relative importance of country effects and industry effects, the former still dominated the latter in all the sub-periods; however, the two effects were drawing nearer. The ratio of country effects over industry effects dropped from 2.31:1 in the first period down to 1.19:1 in the last period. Third, none of the three effects exhibits any upward or downward trend, but a cyclical pattern. This suggests that the global, country and industry effects are time-varying, as found in L'Her et al (2002) and Phylaktis and Xia (2003). The changing roles of those effects over time may be related to the time-varying financial market integration, as evidenced in Bekaert and Harvey (1995).

Next, we look at the different variance decomposition between high vs. low quartile foreign sale ratios, between ADRs and non-ADRs, and between TMT and non-TMT sectors (Figure 4, 5 and 6). For the most international firms (top quartile of foreign sale ratios), the global effects and industry effects were higher and the country effects were lower than those for the least international firms. For ADR firms, the global and industry effects as well as the country effects were all higher compared with those for non-ADR firms. Comparing TMT with non TMT sectors, the former had smaller global effects, and smaller country effects than did the latter in the first two periods. But the results were reversed in the last two periods: the global and industry effects were greater and the country effects were higher for the former than for the latter. Nevertheless, the industry effects were higher for TMT firms than for non TMT firms in all sub-periods. Generally speaking, the qualitative analysis for the sub-periods of the links between the global, country and industry effects and the foreign sale ratios, ADRs and TMT sectors is supportive of the results of our full sample analysis, except that the TMT sectors display their volatile nature over time.

4.22 The Quantitative Links

The results of the cross sectional regression analysis for the sub-periods are shown in Table 3. First, for the variable of foreign sale ratios, all the signs of the linear coefficients across four sub periods are as expected: the foreign sale ratios were positively related to the global effects and industry effects, but negatively related to the country effects. A graph of those coefficients over time in Figure 7 clearly shows

that the degrees of the links between factor effects and foreign sale ratios were not constant and changed over time. The coefficients were statistically significant in most of the sub-periods. In fact, the significance was more prominent in the last two sub-periods. Second, the significance of the nonlinear relationship was as prominent as that of the linear relationship. But the signs of the non linear coefficients were all opposite to those of the linear coefficients. Generally speaking, the results of the sub-periods support what we have found for the full sample period.

The coefficients for the variable of ADR were all significant across the four sub-periods, and the signs were all positive. This finding further confirms the result for the full sample period: ADR listing increases the firms' global and industry effects, and at the same time, it increases the firms' country effects. Like those for the variable of foreign sale ratios, the degrees of the links between factor effects and ADRs were time-varying as well.

The most volatile across the sub-periods are the results for TMT sectors. While the coefficients on the global and industry effects were negative and those on country effects were positive in the first two periods, their signs were totally reversed in the last two periods: the coefficients on global and industry effects were positive and those on country effects were negative. In addition, the coefficients on the industry effects were insignificant in most of the sub periods. One thing to note is that during the boom and burst of IT bubble which occurred in last two sub-periods, the higher industry effects for TMT sectors would be expected to exist. Our result shows, however, that during the last two periods, the industry effects were lower for the TMT sectors than for the non-TMT sectors. This suggests that the impact of IT bubbles on the recent increase of industry effects identified in the literature is trivial or limited.

Therefore, the sub-period analysis confirms that the coefficients of the foreign sale ratios were significant in most of the sub periods, and the signs of the coefficients were as expected: positive on global and industry effects and negative on country effects. The slopes on the ADRs were significant across all the sub-periods. Their signs on the global and industry effects were positive. However, the signs on the country effects were also positive. All those findings are consistent with those in our full sample analysis. However, the coefficients of TMT sectors were not stable across

the sub-periods, with the signs switching between different sub-periods. IT bubbles had little chance in exercising a significant impact on the dynamics of the country and industry effects. Our sub-period analysis also shows that the links of factor effects with globalization variables are time-varying in magnitude, as captured by the cyclical coefficient values across the four sub-periods. This is consistent with the findings that the industry and country effects are changing over time, and the financial market integration is time-varying as well.

4.3 Globalization and Emerging Markets

One of our objectives in the paper is to investigate whether the impact of globalization has rolled on to the equity returns in emerging markets. We begin with the analysis of the differences between firms from developed and emerging markets in terms of the average variance decompositions over our entire sample period, (see Figure 8). For firms in developed markets, the average global, country and industry effects were 16.94%, 12.27% and 14.71% respectively. Both global and industry effects were greater than the country effects. It also points to the fact that the worldwide globalization drives the co-movement of firms' equity returns, resulting in the global factors including global industry shocks playing a leading role over the domestic factors. The situation is, however, the reverse for firms in emerging markets. The country effects (27.06%) dominate both the global effects (7.65%) and the industry effects (3.49%). Emerging markets tend to be less correlated with the rest of the world and exhibit higher country specific effects compared to the mature markets. As a result, the country effects are the most important determinant of the equity returns variation.

Next, we conduct the cross-sectional regression analysis based on the models (7), (8) and (9), which aim to explore the factor-effects-vs.-globalization relations after controlling for the difference between emerging and developed markets. As revealed in Panel A of Table 4, the signs of the coefficients for the variables of foreign sale ratios (FR) on the respective global, country and industry betas were all the same as in the results which did not control for EMs (see Table 2), i.e., the foreign sale ratios were positively related to the global and industry effects and negatively related to the country effects. At the same time, the nonlinear relationship was also found. Similar results were also identified in the analysis of the links between the factor effects vs.

ADRs (Panel B of Table 4) and the factor effects vs. TMT sectors (Panel C of Table 4). Consistent with our earlier analysis in Table 2, both the ADR and TMT were positively related to the global, country and industry betas.

What we understand from the above analysis is that the globalization process has extended to the emerging markets: firms' increase of their international sales or listing as ADRs has impacts on the dynamics of the global, country and industry effects in the firms' equity returns. Yet the magnitude of the impacts is less compared to that in the developed markets. This can be seen from the coefficients of the emerging market dummy variable (EM). The emerging market variable in Panels A, B and C has a negative coefficient on the global and industry effects, but a positive coefficient on the country effects, and all those coefficients are statistically significant. This means that other things being equal, both the global and industry effects were smaller in the emerging markets than in the developed markets. On the other hand, the country effects in the emerging markets were higher than those in the developed markets. The gap is large enough as to explain why the country effects dominated the industry effects in the emerging markets, whereas in the developed world, the country effects were dominated by the industry effects. This finding is consistent with what has been found in other studies on emerging markets such as in Serra (2000) and Phylaktis and Xia (2003).

But do those results hold in the sub-periods? The answer is yes. As shown in Table 5, none of the signs of the coefficients had changed from those in the full sample analysis, except that the significance was now less prominent (i.e., fewer significant coefficients). The coefficients of the EM variable in Panels A, B and C have expected signs and all were significant, further confirming that emerging markets are less integrated with the rest of the world, as they have had higher country effects, but lower global and industry effects than do the developed markets.

5. Implications for the International Diversification

Our findings in this paper have important implications for the international diversification. Although papers such as Baca et al (2000), Cavaglia, Brightman and Aked (2000) indicate that the industry effects have risen in recent years, our firm level evidence shows that the country effects, compared to the industry effects are still

more important in explaining the variation of firm level equity return. Therefore, diversification within the domain of individual securities can still be based on the country-oriented approach and thus diversification across countries is still the most efficient and cost effective. Yet the diversification across industries cannot be neglected in the future as the industry effects in firm returns tend to increase and the country effects decrease in most recent years.

We find in this paper that the firm specific factors outweigh the sum of global, country and industry factors in explaining the total variance of firm returns. This implies that a large part of risks embedded in firm returns are unsystematic and can be diversified away by including less-correlated individual securities into the portfolios. On the other hand, globalization has strengthened the role of global factors in accounting for the co-movements in international equity returns. Global effects are found to dominate both the country and industry effects in our full sample as well as in three out of the four sub-periods. Consequently, global managers would have to consider the exposure to these global risk factors when constructing their portfolios.

The business globalization process has significant impacts on the dynamics of country and industry effects in firm level returns. Especially, the country and industry effects are closely related to the extent firms operate globally. As more international firms tend to have higher industry effects and lower country effects than do the less international firms, it would be advantageous for the country-oriented diversification to choose across different countries and include those firms that have lower ratios of international sales. Likewise, more diversification benefit would be achieved for an industry-oriented portfolio if it chooses firms that have a higher level of international business, as those firms tend to be less influenced by domestic factors.

Another domain of investment for the purpose of international diversification is ADRs. Though increasing firms' global and industry effects, ADR is associated with enlarging the firms' country effects as well. So diversification within the domain of ADRs still has its merits.

Our findings in this paper also provide important implications for portfolios diversifying into the domain of emerging markets. As emerging markets have higher

country effects and lower global and industry effects, diversification into the firms in the emerging markets would be more favourable than diversification across firms in mature markets. Moreover, if a portfolio choosing individual securities based on the firms' level of global operations and ADR listing status also takes into account of difference between emerging markets and developed markets, it would surely achieve more diversification outcomes than otherwise.

6. Conclusions

Country and industry effects are important in driving the international equity market movement. Historically, the country effects dominate the industry effects. But researchers have found that the dominance has been shifted in recent years and industry effects have surpassed the country effects. However, is this shift embedded in the process of business globalization and financial market integration? Do such links hold in emerging markets? Those are the questions we attempt to answer in this paper, as understanding the sources leading to this shift is not only helpful for the relevant studies on the global capital market integration and international diversification, but also crucial for the international portfolio allocation and management on the practitioner's frontiers.

Employing a factor model in the spirit of Cavaglia, Cho and Singer (2001) and Marsh and Pfleiderer (1997), we explore how much of a firms' total variance is explained by the respective global, country and industry factors. By regressing those factors cross-sectionally on such globalization variables as firms' foreign sale ratios proxy for the business globalization, ADRs proxy for financial market integration, and TMT sectors, we provide empirical evidence on whether the firms' global, country and industry effects are related to those variables, and whether such relations are consistent with our ex ante predications. Further, we explore whether the relations extend to the emerging markets.

Our main results are summarized as follows: first, as far as the relative importance of global, country and industry effects is concerned, the global effects in the firms' equity returns are greater than the country effects during the time period examined (Jan 1990 – Dec 2002). This is not surprising as the ongoing globalization tends to drive the global markets to co-move with each other more than ever before. On the

other hand, the country effects have dominated the industry effects during the same time period, though the industry effects are catching up in recent years.

Second, we find that the dynamics of firms' global, country and industry effects is connected to the extent of firms' business globalization and firms' listing as ADRs. On the one hand, as expected, a rise in a firm's foreign sales relative to its total sales increases the firm's global and industry effects and decreases the country effects. This finding is consistent with what has been found in Cavaglia, Cho and Singer (2001) and Brooks and Del Negro (2003). However, this connection is more complex than just the linearity as we find the existence of non-linearity at the same time. On the other hand, if a firm is listed as ADR, its global and industry effects tend to increase compared to a non ADR firm. This is consistent with our hypothesis. However, what is inconsistent with our hypothesis is that ADR listing increases, rather than decreases, a firm's country effects. Our tentative explanation is that the role of ADR listings is mixed. As indicated in Karolyi (2003), the growth of ADRs is positively associated with the pace of greater market integration; at the same time, the ADR listings have adverse impacts on the size, scope and liquidity of home markets. Without surprise, we would expect to find that ADR firms on the domestic markets are more sensitive to the domestic factors and thus their country effects tend to be higher than non-ADR firms. Those results are robust across all the four sub-periods.

Third, the link between the firms' factor effects and the TMT sectors is volatile and unstable over time. On the one hand, the coefficient of TMT variable is significant in one period, but insignificant in another period. On the other hand, the signs of the coefficients switch over different sub periods. This volatile and unstable relationship minimizes the possibility that the increase of industry effects is the direct result of IT bubbles. Especially during the third sub period when the IT bubbles were rampant, we find that the relationship between TMT sectors and the industry effects is negative and insignificant. This firm level evidence conforms to the findings in Phylaktis and Xia (2003), where they focus on the market level evidence and conclude that the increase of industry effects are not the consequence of IT bubbles.

Fourth, we find that the globalization process has extended to the domain of emerging markets, i.e., the links between firms' factor effects and firms' foreign sale ratios and

ADR listings are found to hold in those emerging markets. The only difference is that the links are smaller in magnitude in the emerging markets. Compared to the developed markets, emerging markets tend to have higher country effects and lower global and industry effects.

Finally, our sub-period analysis reveals that the relative importance of the global, country and industry effects are time-varying, as identified by the cyclical pattern of those effects across different sub-periods. The cross-sectional links between those factor effects with firms' business globalization, ADRs are also time-varying, as the degrees of such links are cyclical across different sun-periods. The time-varying links between firms' global, country and industry effects and the globalization variables are in accordance with the time-varying nature of capital market integration evidenced in Bekaert and Harvey (1995).

Our findings have important implications for the international diversification. First, for portfolios based on individual securities, diversification across countries is more efficient than diversification across industries. However, diversification across industries should not be neglected in the future as the industry effects are getting more important over time. Second, it would be more efficient if consideration is given to the firms' level of international business and ADR listing status as well as the difference between emerging and developed markets before choosing individual securities to establish global portfolios and diversifying internationally.

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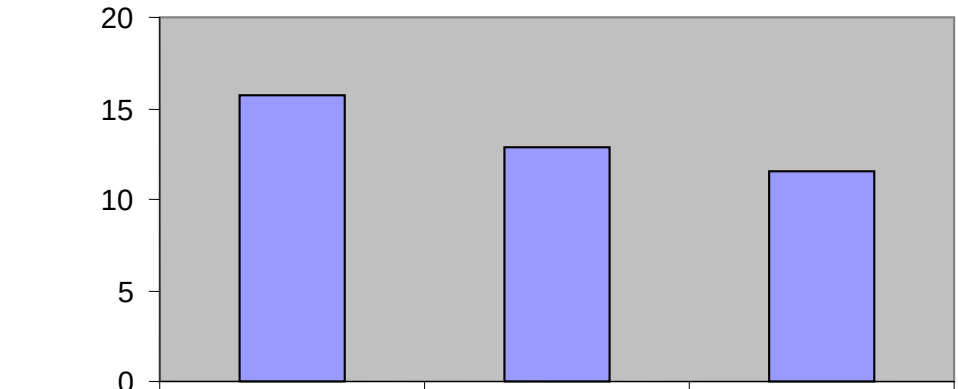
Figure 1 Variance Decomposition Across All firms: Full Period



	glb effects	ctry effects	ind effects
all firms	15.69%	12.86%	11.54%

Figure 2: Variance Decompositions by Foreign Sale Ratios, ADRs and TMTs: Full Period

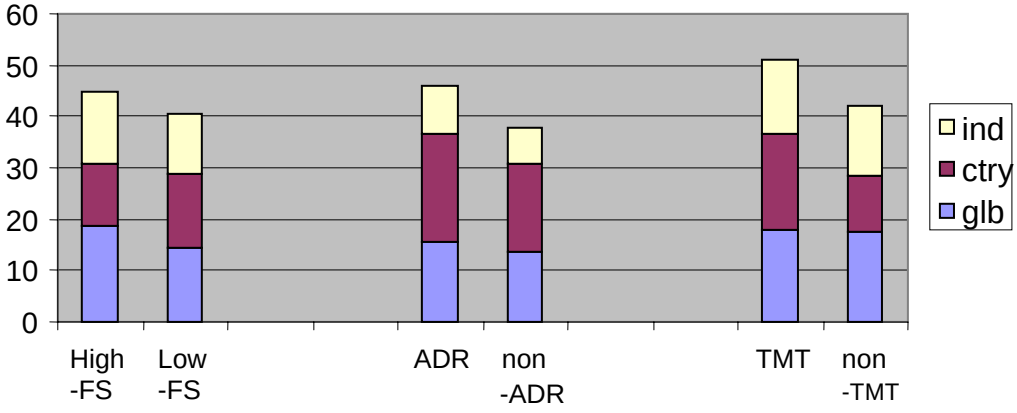
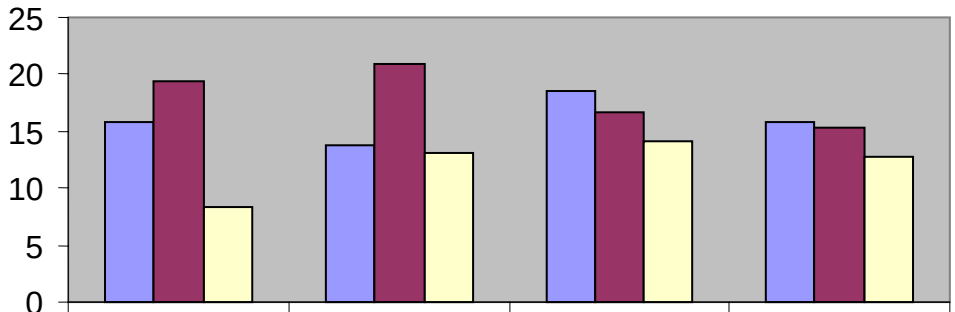


Figure 3 Variance Decomposition Across All Firms: Sub-periods



	sub1	sub2	sub3	sub4
glb effects	15.758	13.819	18.535	15.843
ctry effects	19.369	20.99	16.597	15.321
ind effects	8.383	13.135	14.101	12.77

Figure 4 Variance Decomposition Between Firms with High vs. Low Foreign Sale Ratios: Sub-periods

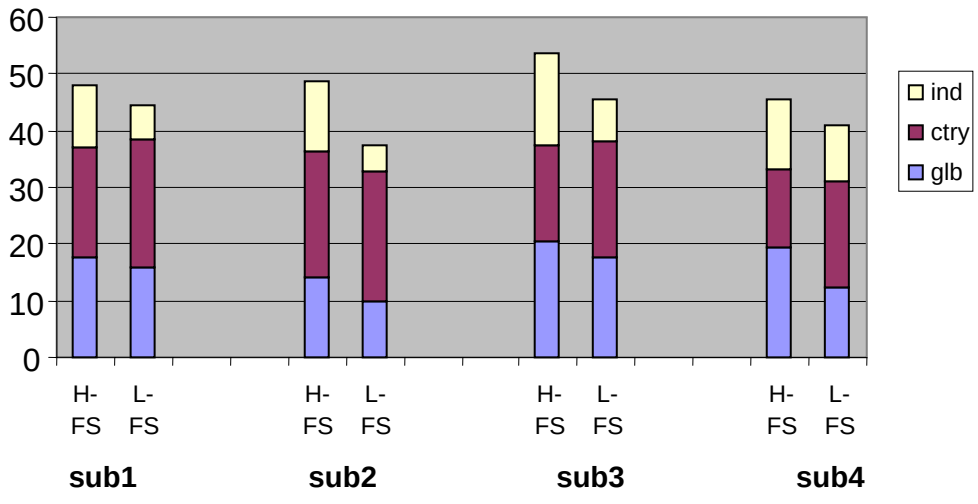


Figure 5 Variance Decomposition Between ADR vs. non-ADR firms: Sub-periods

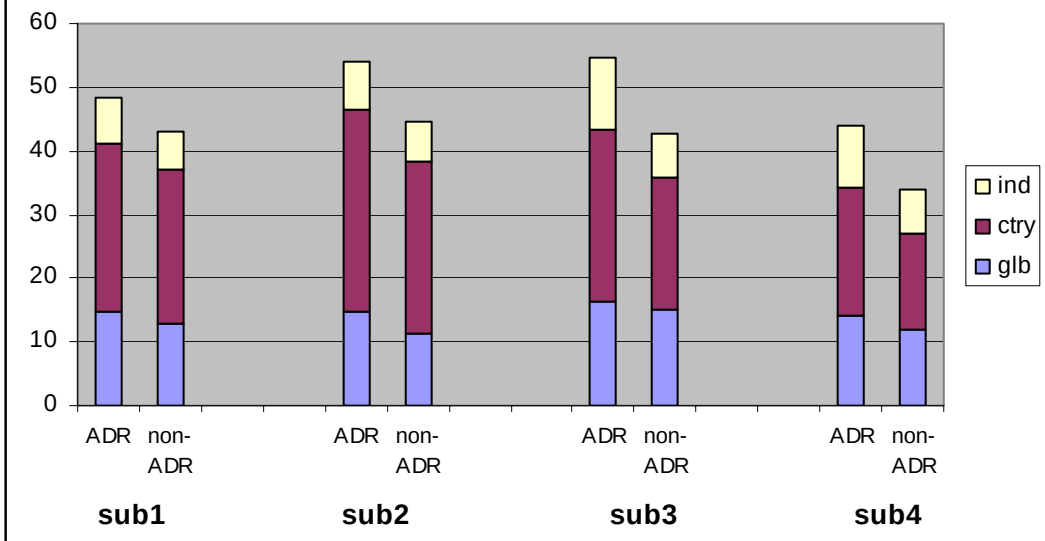


Figure 6 Variance Decomposition Between TMT vs. non-TMT Sectors: Sub-periods

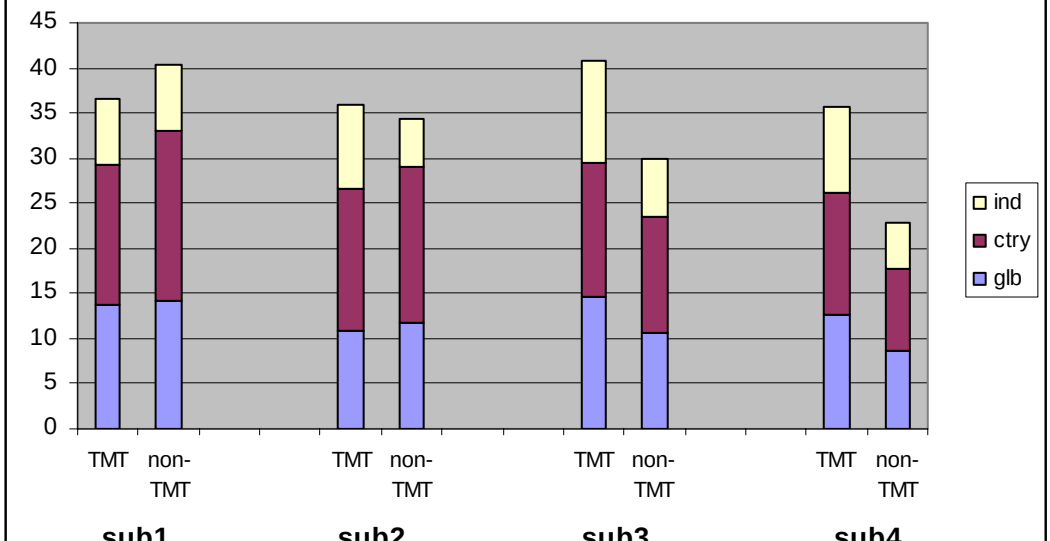


Figure 7 Cross Sectional Links of Factor Betas with Foreign Sale Ratios Over Time

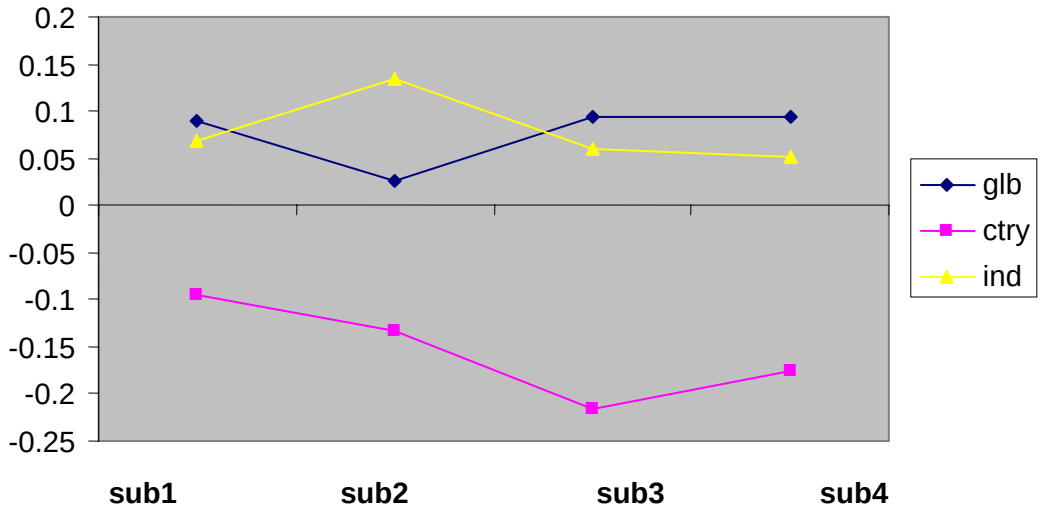
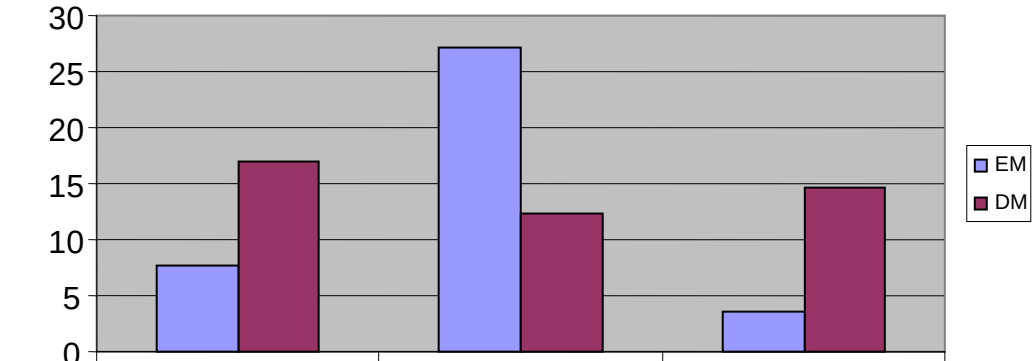


Figure 8 Variance Decomposition Between Emerging Markets and Developed Markets: Full Sample



	glb	ctry	ind
EM	7.65	27.06	3.49
DM	16.94	12.27	14.71

Figure 9 Variance Decomposition Between Emerging Markets and Developed Markets: Sub-periods

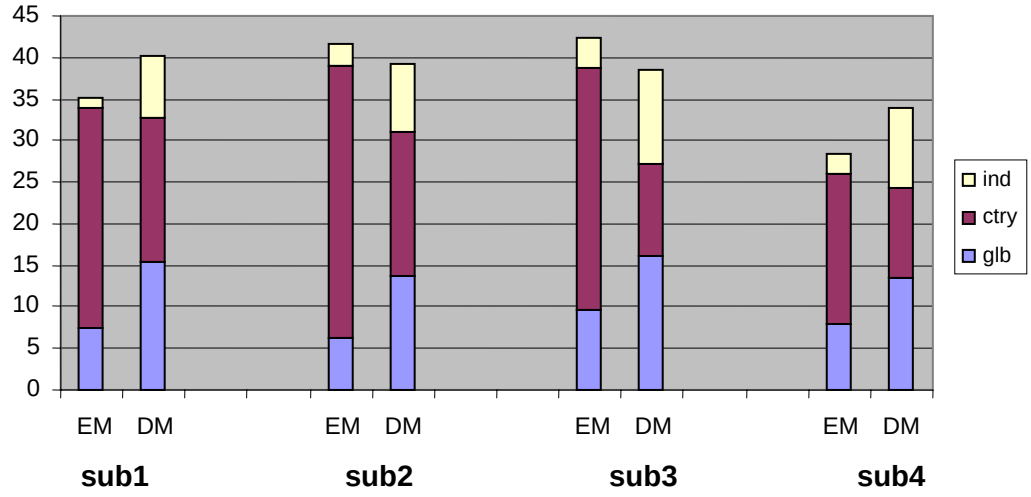


Table 1 Firm distribution across countries and industries

A. by country

Country	No of firms	Country	No of firms
Argentina	9	Ireland	11
Austria	9	Italy	39
Australia	61	Japan	309
Belgium	16	Korea	74
Brazil	36	Mexico	17
Canada	70	Malaysia	62
Switzerland	33	Netherlands	24
Chile	20	Norway	17
China	36	New Zealand	10
Germany	44	Philippines	15
Denmark	21	Portugal	10
Spain	27	Sweden	32
Finland	18	Singapore	33
France	52	Thailand	26
UK	123	Taiwan	83
Greece	21	US	380
HK	26	Israel	26
Indonesia	14	South Africa	36
India	53		
		Total	1893

B. by industry

Industry	No of firms	Industry	No of firms
Energy	65	Househld & Psnl Prod	19
Materials	195	Hlth Care Equip&Svcs	48
Capital Goods	198	Pharm & Biotech	63
Commcial S&S	49	Banks	130
Transportation	78	Diversified Financials	86
Auto&Cmponts	52	Insurance	54
Consumer D&As	74	Real Estate	60
Htl,Rest &Lsure	45	Software & Services	73
Media	77	Tech Hdware&Equip	111
Retailing	84	Semicond & Equip	41
Food& Stpl Retail	31	Telecomm Svcs	66
Food, Bevg& Tobco	104	Utilities	90
		Total	1893

Table 2 Cross sectional links of firm factor effects with different measures: full sample

A. Factor Betas vs. Foreign Sale Ratios

	Dependent Variable: *Global Betas*		Dependent Variable: *Country Betas*		Dependent Variable: *Industry Betas*	
FR	0.101	(**3.591**)	-0.114	(**-2.574**)	0.092	(**2.963**)
FR^2	-0.106	(**-3.667**)	0.062	(1.366)	-0.100	(**-3.142**)
$\overline{R}^2$ (%)	0.903		1.824		0.627	

B. Factor Betas vs. ADRs

	Dependent Variable: *Global Betas*		Dependent Variable: *Country Betas*		Dependent Variable: *Industry Betas*	
ADR	0.05	(**9.076**)	0.036	(**3.121**)	0.018	(**4.502**)
$\overline{R}^2$ (%)	6.872		2.685		3.768	

C. Factor Betas vs. TMT Sectors

	Dependent Variable: *Global Betas*		Dependent Variable: *Country Betas*		Dependent Variable: *Industry Betas*	
TMT	0.006	(1.41)	0.024	(**3.46**)	0.002	(0.49)
$\overline{R}^2$ (%)	0.05		0.06		0.001	

1. The table shows the cross sectional regression results of the firm's factor effects (global, country and industry effects) separately on different measures based on Equation (4), (5) and (6). FR is the firm's foreign sale ratios, FR^2 is the square term of foreign sale ratio variable included in the estimation to capture any non-linearity. ADR is the dummy variable which equals 1 if the firm is listed as ADR and 0 otherwise. TMT is also the dummy variable which is equal to 1 if the firms belong to TMT sectors and 0 otherwise.

2. T statistics is shown in parentheses. The figures highlighted represent the significance at the 5% or 1% level.

3. Each regression includes a constant term.

4. Regression on ADR also includes the year dummy variable to control for the time effects.

Table 3 Cross Sectional Links of Firm Factor Effects with Different Measures: Sub-periods

	Subperiod1 (90.1- 93.12)			*Subperiod2 (94.1- 96.12)*			*Subperiod3 (97.1-99.12)*			*Subperiod4 (00.1- 02.12)*		
	Dependent Variable			Dependent Variable			Dependent Variable			Dependent Variable		
	Global	country	industry	Global	country	Industry	global	country	industry	global	country	industry
A. Factor Betas vs. Foreign Sale Ratios												
FR	0.089	-0.096	0.068	0.027	-0.133	0.135	0.093	-0.215	0.059	0.094	-0.176	0.051
	(2.18)	-1.47	1.84	0.89	**(-2.02)**	**(3.31)**	**(2.39)**	**(-3.77)**	1.49	**(3.35)**	**(-3.70)**	**(2.18)**
FR^2	-0.090	0.120	-0.082	-0.057	0.089	-0.143	-0.083	0.177	-0.070	-0.082	0.142	-0.064
	(-2.15)	1.8	**(-2.16)**	-1.81	1.33	**(-3.42)**	**(-2.07)**	**(3.04)**	-1.73	**(-2.85)**	**(2.94)**	**(-2.67)**
$\overline{R}^2$ (%)	0.276	0.271	0.426	1.279	0.830	1.033	0.465	1.735	0.144	0.924	1.418	0.604
B. Factor Betas vs. ADRs												
ADR	0.045	0.058	0.018	0.024	0.085	0.011	0.020	0.033	0.012	0.021	0.035	0.016
	(6.16)	**(4.71)**	**(4.2)**	**(6.07)**	**(8.25)**	**(3.57)**	**(4.25)**	**(3.77)**	**(3.91)**	**(6.63)**	**(4.37)**	**(7.6)**
$\overline{R}^2$ (%)	3.124	1.808	1.433	2.615	4.774	0.871	1.126	0.869	0.941	2.760	1.182	3.614
C. Factor Betas vs. TMT Sectors												
TMT	-0.022	-0.036	0.003	-0.010	-0.015	0.020	0.018	0.021	-0.003	0.009	0.045	-0.006
	(-3.3)	**(-3.34)**	0.57	(**-2.36**)	(-1.54)	**(3.98)**	**(3.36)**	**(2.39)**	-0.78	**(2.3)**	**(5.71)**	-1.85
$\overline{R}^2$ (%)	0.67	0.68	0.001	0.27	0.08	0.87	0.55	0.25	0.00	0.23	1.64	0.13

Please refer to the explanation in Table 2. The figures in parentheses are the t statistics and those in bold terms represent the significance at the 5% or 1% level.

Table 4 Globalization and Emerging Markets: Full Sample

A. Factor Betas vs. Foreign Sale Ratios

	Dependent Variable: *Global Betas*		Dependent Variable: *Country Betas*		Dependent Variable: *Industry Betas*	
FR	0.060	(**2.26**)	-0.077	(**-**1.76)	0.071	(**2.31**)
FR^2	-0.073	(**-2.68**)	0.032	(0.72)	-0.083	(**-2.64**)
EM	-0.069	(-**13.47**)	0.062	(**7.35**)	-0.035	(-**5.81**)
$\overline{R}^2$ (%)	13.33		5.799		3.152	

B. Factor Betas vs. ADRs

	Dependent Variable: *Global Betas*		Dependent Variable: *Country Betas*		Dependent Variable: *Industry Betas*	
ADR	0.030	(**8.84**)	0.053	(**6.94**)	0.016	(**5.79**)
EM	-0.052	(**-16.94**)	0.045	(**6.57**)	-0.016	(-**6.57**)
$\overline{R}^2$ (%)	20.37		5.215		3.768	

C. Factor Betas vs. TMT Sectors

	Dependent Variable: *Global Betas*		Dependent Variable: *Country Betas*		Dependent Variable: *Industry Betas*	
TMT	0.009	(**2.324**)	0.021	(**3.168**)	0.004	(0.882)
EM	-0.069	(**-20.113**)	0.059	(**9.611**)	-0.037	(**-9.813**)
$\overline{R}^2$ (%)	17.629		5.159		4.759	

1. The table shows the cross sectional regression results of the firm's factor effects (global, country and industry effects) separately on different measures based on Model (7), (8) and (9). FR is the firm's foreign sale ratios, FR^2 is the square term of foreign sale ratio variable included in the estimation to capture any non-linearity. ADR is the dummy variable which equals 1 if the firm is listed as ADR and 0 otherwise. EM is the dummy variable being 1 for firms in emerging markets and 0 otherwise. TMT is also the dummy variable which is equal to 1 if the firms belong to TMT sectors and 0 otherwise.

2. T statistics is shown in parentheses. The figures highlighted represent the significance at the 5% or 1% level.

3. Each regression includes a constant term.

4. Regression on ADR also includes the year dummy variable to control for the time effects.

Table 5 Globalization vs. Emerging Markets: Sub-periods

A. Factor Betas vs. Foreign Sale Ratios

	Subperiod1 (90.1- 93.12)			*Subperiod2 (94.1- 96.12)*			*Subperiod3 (97.1-99.12)*			*Subperiod4 (00.1- 02.12)*		
	Dependent Variable			Dependent Variable			Dependent Variable			Dependent Variable		
	Global	country	industry	Global	country	Industry	global	country	industry	global	country	industry
FR	0.059	-0.079	0.062	0.007	-0.098	0.124	0.073	-0.141	0.044	0.066	-0.126	0.035
	(1.39)	(-1.23)	(1.67)	(0.25)	(-1.52)	**(3.04)**	(1.89)	**(-2.8)**	(1.12)	**(2.4)**	**(-2.71)**	**(1.5)**
FR^2	-0.072	0.106	-0.077	-0.031	0.061	-0.134	-0.066	0.118	-0.058	-0.058	0.101	-0.051
	(-1.65)	(1.6)	**(-2.02)**	(-1.32)	(0.93)	**(-3.21)**	(-1.68)	**(2.29)**	(-1.44)	**(-2.09)**	**(2.15)**	**(-2.13)**
EM	-0.084	0.054	-0.021	-0.054	0.095	-0.029	-0.054	0.193	-0.04	-0.046	0.081	-0.027
	(-8.36)	**(3.47)**	**(-2.4)**	**(-7.88)**	**(6.45)**	**(-3.18)**	**(-6.15)**	**(16.85)**	**(-4.42)**	**(-8.26)**	**(8.69)**	**(-5.68)**
$\overline{R}^2$ (%)	7.83	1.57	1.00	7.38	4.97	1.99	4.04	23.6	1.498	6.09	7.08	3.08

B. Factor Betas vs. ADRs

	Subperiod1 (90.1- 93.12)			*Subperiod2 (94.1- 96.12)*			*Subperiod3 (97.1-99.12)*			*Subperiod4 (00.1- 02.12)*		
	Dependent Variable			Dependent Variable			Dependent Variable			Dependent Variable		
	Global	country	industry	Global	country	Industry	global	country	industry	global	country	industry
ADR	0.032	0.071	0.016	0.021	0.091	0.01	0.017	0.044	0.01	0.019	0.039	0.015
	(4.74)	**(5.79)**	**(3.79)**	**(5.55)**	**(9.04)**	**(3.28)**	**(3.82)**	**(5.52)**	**(3.49)**	**(6.3)**	**(4.96)**	**(7.34)**
EM	-0.084	0.08	-0.011	-0.042	0.079	-0.012	-0.034	0.151	-0.02	-0.032	0.074	-0.014
	(-14.82)	**(7.71)**	**(-2.96)**	**(-11.97)**	**(8.51)**	**(-4.26)**	**(-7.53)**	**(19.74)**	**(-6.98)**	**(-10.21)**	**(9.23)**	**(-6.84)**
$\overline{R}^2$ (%)	18.68	6.56	2.10	2.615	9.60	2.13	1.126	21.24	4.03	8.98	6.4	6.45

C. Factor Betas vs. TMT Sectors

	Subperiod1 (90.1- 93.12)			*Subperiod2 (94.1- 96.12)*			*Subperiod3 (97.1-99.12)*			*Subperiod4 (00.1- 02.12)*		
	Dependent Variable			Dependent Variable			Dependent Variable			Dependent Variable		
	Global	country	industry	Global	country	Industry	global	country	industry	global	country	industry
TMT	-0.023	-0.036	0.003	-0.008	-0.021	0.021	0.020	0.013	-0.002	0.011	0.042	-0.005
	(-3.677)	**(-3.421)**	0.554	-1.884	**(-2.149)**	**(4.337)**	**(3.942)**	1.773	-0.434	**(2.901)**	**(5.461)**	-1.539
EM	-0.094	0.098	-0.022	-0.050	0.105	-0.031	-0.054	0.170	-0.039	-0.046	0.079	-0.028
	(-17.129)	**(10.630)**	**(-4.999)**	**(-14.027)**	**(12.202)**	**(-6.964)**	**(-11.754)**	**(24.718)**	**(-9.160)**	**(-13.130)**	**(11.295)**	**(-9.297)**
$\overline{R}^2$ (%)	17.178	7.700	1.564	10.667	8.135	3.598	7.322	24.688	4.212	8.522	7.817	4.448

Please refer to the explanation in Table 4. The figures in parentheses are the t statistics and those in bold terms represent the significance at the 5% or 1% level.

Appendix 1 Countries covered in the sample and industry classifications

A. Countries covered

Argentina*	France	Norway
Austria	UK	New Zealand
Australia	Greece	Philippines*
Belgium	HK	Portugal
Brazil*	Indonesia*	Sweden
Canada	Ireland	Singapore
Switzerland	India*	Thailand*
Chile*	Italy	Taiwan*
China*	Japan	US
Germany	Korea*	Israel*
Denmark	Mexico*	South Africa*
Spain	Malaysia*	
Finland	Netherlands	

(Note: * denotes emerging markets)

B. Industry classifications (GICS industry groups)

1010	Energy	3030	Household & Personal Products
1510	Materials	3510	Health Care Equipment & Services
2010	Capital Goods	3520	Pharmaceuticals & Biotechnology
2020	Commercial Services & Supplies	4010	Banks
2030	Transportation	4020	Diversified Financials
2510	Automobiles & Components	4030	Insurance
2520	Consumer Durables & Apparel	4040	Real Estate
2530	Hotels, Restaurants & Leisure	4510	Software & Services
2540	Media	4520	Technology Hardware & Equipment
2550	Retailing	4530	Semiconductors & Semiconductor Equipment
3010	Food & Staples Retailing	5010	Telecommunication Services
3020	Food, Beverage & Tobacco	5510	Utilities

Appendix 2 Variance Decompositions by Different Measures: Full Sample

A Average across all firms

	Global betas	Country betas	Industry betas
All firms	15.69	12.86	11.54

B Sorted by foreign sales ratios

	Global betas	Country betas	Industry betas
Top Quartile	18.74	12.00	14.19
Bottom Quartile	14.59	14.37	11.52

C Sorted by ADRs

	Global betas	Country betas	Industry betas
ADRs	15.76	20.83	9.39
Non-ADRs	13.54	17.14	7.12

D Sorted by developed vs. emerging markets

	Global betas	Country betas	Industry betas
Developed markets	16.94	12.27	14.71
Emerging markets	7.65	27.06	3.49

E Sorted by TMTs

	Global betas	Country betas	Industry betas
TMTs	17.78	18.83	14.59
Non-TMTs	17.44	10.86	13.82

1. The table reports the full sample average proportions (in percent) of firms' total variances explained by the global, country and industry betas based on Model (2).

2. The averages are calculated based on the following measures: across all firms in full sample, firms at the top vs. bottom quartiles of foreign sale ratios (20%), across ADR firms vs. non ADR firms (excluding US firms), across firms in developed vs. emerging markets, and across firms in TMT sectors vs. non TMT sectors.

3. The averages are value weighted by the firms' average market capitalization for the full sample period.

Appendix 3 Variance Decompositions by Different Measures: Sub Periods

	Sub1 (90.1-93.12)			*Sub2 (94.1-96.12)*			*Sub3 (97.1-99.12)*			*Sub4 (00.1-03.12)*		
	global	country	industry	global	country	industry	global	Country	industry	global	country	industry
A Across all firms												
All firms	15.758	19.369	8.383	13.819	20.99	13.135	18.535	16.597	14.101	15.843	15.321	12.77
B Sorted by foreign sale ratios												
Top quartile	17.516	19.706	10.751	14.261	22.013	12.55	20.555	16.878	16.243	19.331	13.942	12.237
Bottom quartile	15.823	22.691	5.948	9.792	23.137	4.492	17.472	20.61	7.391	12.218	18.852	9.7
C Sorted by ADRs												
ADRs	14.671	26.575	7.242	14.776	31.817	7.31	16.202	27.281	11.177	14.17	20.155	9.593
Non ADRs	12.752	24.264	6.108	11.324	26.888	6.336	14.986	20.776	7.053	12.052	15.063	6.748
E Sorted by TMT sectors												
TMT	13.792	15.384	7.502	10.781	15.720	9.301	14.606	14.957	11.120	12.636	13.525	9.524
Non TMT	14.113	18.979	7.261	11.834	17.269	5.315	10.644	12.878	6.483	8.726	9.031	5.153
D Sorted by markets												
Emerging markets	7.563	26.446	1.064	6.279	32.597	2.746	9.632	29.176	3.611	7.986	17.934	2.384
Developed markets	15.4	17.214	7.567	13.616	17.465	8.206	16.089	11.053	11.368	13.554	10.864	8.616

Note: The estimation is the same as specified in Table 2 except that the results are for 4 sub periods.