Sources of Gains from International Portfolio Diversification

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ABSTRACT

This paper looks at the determinants of country and industry specific factors in international portfolio returns using a sample of thirty six countries and thirty nine industries over the last three decades. Country factors have remained relatively stable over the sample period while industry factors have significantly increased during the last decade. The importance of industry and country factors is correlated with measures of economic and financial international integration and development. Country factors are smaller for countries integrated in world financial markets and have declined as the degree of financial integration and the number of countries pursuing financial liberalizations has increased. Higher international financial integration within an industry increases the importance of industry factors in explaining returns. Economic integration of production also helps in explaining returns. Countries with a more specialized production activity have higher country factors.

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1. Introduction

The purpose of this paper is to provide some light in the underlying reasons that drive diversification benefits from international investment. The evolution of country or industry specific returns to investment should reflect the underlying shocks that affect the expected future cash-flows from investment in their corresponding economic activities. Country specific returns should be large relative to the world market portfolio when economic activity in that country is more isolated from world economic activity and more subject to specific shocks to that country economic situation. The same way, industry specific returns will differ from the world market portfolio when investments in that industry are more subject to correlated shocks across countries.

The degree of economic integration of the investment activities arises as the key candidate to explain the evolution of industry and country returns. At the country level, a higher degree of integration of the country's economy with the world implies more exposure to international economic shocks and a higher correlation of national business cycle activity with world business cycle (Backus, Kehoe, and Kydland (1992)). Existing evidence also highlights the role that financial market liberalization and integration into the world market has in making domestic investments more correlated with world market factors in a multi-factor framework (Foerster and Karolyi (1999), Errunza and Miller (2000), Bekaert and Harvey (2000), Fernandes (2003)). On the other hand, a higher degree of international integration of industrial activity implies higher correlation of industrial shocks among countries and an increase in the importance of industry shocks in explaining international investment returns.

In this paper we study the determinants of the evolution of country and industry specific returns in world financial markets over the last three decades. Using a dataset for a broad sample of thirty nine countries and thirty six industries, we decompose investment returns into three determinants: a world portfolio, industry specific factors and country specific factors. Consistent with other work in this area, we document the increasing importance that industry factors have relative to country factors in explaining investment returns, particularly in the last decade.

Country factors are smaller for countries integrated in world financial markets and have declined as the degree of financial integration and the number of countries pursuing financial liberalizations has increased. Country specific returns are large relative to the world market portfolio when economic activity in that country is more isolated from world economic activity and more subject to specific shocks to that country economic situation. Countries with a more specialized production activity have higher country factors.

The benefits of international diversification have been widely documented. Early studies in the seventies documented the relatively low level of correlation among national equity markets (Grubel (1968), Levy and Sarnat (1970)). Since then researchers have widely recognized this fact, but they disagree on the causes of this low correlation. Is it a result of national diversity or industry diversity? One of the early papers that discussed this issue was Lessard (1974). He looks at portfolios of stocks from 16 developed countries, and concludes that national risk factors were more important than industry factors, and that "diversification across countries, even if within a single industry, results in greater risk reduction than diversification across industries". Country specific environments, namely local fiscal and monetary policies and regulations, have traditionally been considered the main determinant of stock returns. Using different samples of countries and industries, several studies have documented the dominance of country factors (Heston and Rouwenhorst (1994) , Beckers, Connor, and Curds (1996), Griffin and Karolyi (1998), Serra (2000)). Even in a more integrated market such as the EU, country factors seem to dominate (Rouwenhorst (1999)).

More recent studies began to cast doubts over this issue. Cavaglia, Brightman, and Aked (2000) extend the analysis outside the EU, to include all the developed countries (OECD). They show that industry effects have been growing in importance, and may now dominate country factors. This evidence is consistent with Diermeier and Solnik (2001), who show that the greater the proportion of international sales, the greater the response of a company to world factors. They suggest that as companies internationalization expands, they become more related through industry factors.

Financial market integration, and globalization of economic activity are impacting the relative balance between country and industry factors. We use measures of economic and financial integration and development as determinants of the likelihood of industry returns. The importance of country factors is higher for poorer countries and decreases with the degree of international financial integration of the country. In other words, as capital market integration proceeds, geography becomes less relevant to finance. Country factors are also more important in countries with a high degree of production specialization and more active financial markets. At the industry level, higher international financial integration increases the importance of industrial factors. Geographic concentration of industrial activity in a few countries implies lower industry factors.

The remainder of the paper is organized as follows. Section 2 describes the methodology used to decompose and explain country and industry effects over time. This section also describes the dataset used. Section 3 presents our empirical evidence on the determinants of country and industry effects. Section 4 summarizes our findings and draws conclusions.

2. Methodology and Data Description

The stock market data used in this paper is from Datastream. Datastream provides the widest coverage of developed and emerging market equities. Indices are calculated based on all stocks covered in the market. For each market an overall index is available. In addition, after stocks from each country have been identified, Datastream uses FTSE Actuaries classifications to allocate them industries/sectors, and the Datastream Global Industrial Indices are calculated. For each country there are several industrial indices calculated, each of them including every stock that belongs to that industry/sector.

We use industrial indices of 36 sectors computed by Datastream. The indices are based on FTSE Level 4 classification. Table I provides a list of the sectors used. Columns 1 and 2 present the relative weight of the sector on the world market portfolio. Columns 3 and 4 report the number of countries where the sector exists.

The data set covers 39 countries. The sample covers 17 emerging markets and 22 developed countries. One of the main advantages of this dataset is the extensive coverage of emerging market equities. Table II contains a list of the countries covered. The first column has the year in which coverage begins for each country. Columns 2 and 3 present the weight of each country in the market portfolio. Columns 4 and 5 report the number of industries that exists in each country.

Datastream provides several variables for each industry / country index. Specifically we use U.S. dollar returns, market capitalization, value traded and number of equities. All data is monthly and in US dollars. Our sample goes from January 1973 to December 2002.

In section 2.1 we explain the methodology used to decompose returns into industry and country components. In section 2.2 we develop the methodology used to explain what drives the evolution of industry and country effects. In sections 2.3 and 2.4 we describe the data and variables used as determinants of pure effects.

2.1. Decomposing Returns

In this paper we focus on the evolution and determinants of industry and country effects over time. In order to separate these two influences of stock returns, we need to isolate them. The return of each index is assumed to depend on a common factor, a global industry factor, a country factor and a residual index-specific disturbance. We use a dummy variable approach

(Heston and Rouwenhorst (1994) that assumes that the return of an index j that belongs to industry i and country k is given by:

$$R_j = \alpha + \beta_i + \gamma_k + \varepsilon_i \tag{1}$$

where α is a common factor, β_j is the global industry j factor, γ_k is country k factor and ε_i is the idiosyncratic disturbance of index i.

We estimate for each month t the common factor (α), global industry factors (β) and country factors (γ) using a cross-sectional regression of all the indices on country and industry dummies:

$$R_{ic} = \alpha + \beta_1 I_1 + \beta_2 I_2 + \ldots + \beta_{36} I_{36} + \gamma_1 C_1 + \gamma_2 C_2 + \ldots + \gamma_{39} C_{39} + \varepsilon_{ic} \tag{2}$$

where R_{ic} is the return on the value-weighted index of industry i in country c. I and C are the industry and country dummies. $I_{i1} = 1$ if index *ic* is from industry 1, and zero otherwise. Similarly C_{c1} equals 1 if index *ic* is from country 1, and zero otherwise.

Two issues arise when estimating this equation using industrial indices as dependent variables. First, each index belongs to one industry and one country. This creates an identification problem if we use dummies for all C countries and I industries. To allow identification, the model is estimated with I-1 industries and C-1 countries, via an appropriate transformation relative to a benchmark - world portfolio. Second, the indices used have different market capitalizations. We estimate equation (2) using weighted least squares, where the weights are the respective market capitalizations of the indices. In the Appendix we provide a detailed explanation of the estimation procedure.

The estimated pure country return γ_c can be interpreted as the return (in excess of the world market) of country c, free of incremental industrial effects. It is the return that country c would have, if its industrial structure was the same as the world market. Similarly, the pure industry return β_i can be interpreted as the return on a industry i, excluding all geographically influences from consideration. It is the return that industry i would have, if it were present in all countries, with weights similar to the country composition of the world market portfolio.

We have a maximum of 36 different industries and 39 countries. Fitting this equation to each period provides us a monthly time-series of the realizations of the pure country and industry factors. The time-series of the β_i and γ_c allows us to analyze the evolution of industry and country effects over time.

To gauge the importance of each factor (national or industrial), we use the mean absolute deviation (MAD) metric proposed by Rouwenhorst (1999):

$$MAD_{\beta}(t) = \sum_j w_j \cdot |\beta_j(t)| \tag{3}$$

$$MAD_{\gamma}(t) = \sum_k w_k \cdot |\gamma_k(t)| \tag{4}$$

where w_j (w_k) are the weights of the industries (countries), and $|\beta_j(t)|$ ($|\gamma_k(t)|$) are the absolute industry (country) effects in month t. The $MAD_{\gamma}(t)$ measures the (weighted) mean absolute deviation of country effects. For each month, we weight all absolute values of country effects by their market capitalization. This measure can be interpreted as the average cross-sectional variance indicator in each period. The higher it is, the more disperse are the country returns around the world in that period. Similarly, the $MAD_{\beta}(t)$ measures the (weighted) mean absolute deviation of industry effects. On each date, we weight all absolute values of industry effects by their market capitalization. The higher the $MAD_{\beta}(t)$ value, the more disperse are the industry returns in that period.

Figure 1 plots a 24-month moving average of the monthly industry and country MAD estimates. We can see that traditionally country factors seemed to be much stronger than industry factors. However, since the end of the 1990's, industry effects seem to dominate. In the end of the sample, the return of a portfolio that is not diversified across industries will on average deviate more from the benchmark, than a portfolio that is not diversified across countries. These results are similar to those reported by Cavaglia, Brightman, and Aked (2000) and Baca, Garbe, and Weiss (2000). They look at OECD and G7 countries and conclude that industry effects have been growing in importance, and may now dominate country factors. We compute averages of country and industry effects in different subperiods. Comparing the first half of the 80's, with the second half of the 90's, we see that 86% of the industries had increased pure effects. Country effects increased for only 33% of the countries in the same period.

2.2. Explaining the evolution over time

In the previous section, we decomposed investment returns into three determinants: a world factor, an industry specific factor and a country specific factor. Consistent with other work in this area, we find the increasing importance that industry factors have relative to country factors in explaining investment returns, particularly in the last decade.

In this section we describe the methodology used to study the determinants of the evolution of country and industry specific returns in world financial markets. We use measures of economic and financial integration and development as determinants of the likelihood of country and industry returns. The methodology allows us to understand why some countries have such high deviations from the world market (strong country effects), as well as why some industries deviate so much from the average industry (strong industry effects). These variables are described in this section.

To evaluate the relative magnitude of industry and country effects, we perform a pooled time-series cross-sectional estimation, where country (industry) factors vary over time, and so do the country (industry) characteristics.

We now describe the estimation procedure that seeks to explain what drives the time-series and cross-sectional variation of country effects. We examine what drives pure country effects, by modelling pure country effects as a function of country characteristics:

$$\gamma_t^k = \delta + \theta Z_t^k \tag{5}$$

where γ_t^k is the pure effect of country k in year t and Z_t^k is the vector of country characteristics. δ and θ_{OLS} are the parameters to be estimated.

We present results for a pooled time-series cross-sectional estimation (OLS). Taking advantage of the availability of a panel dataset, we introduce a fixed-effect estimator in equation (5).

$$\gamma_t^k = \delta_k + \theta Z_t^k \tag{6}$$

where γ_t^k is the pure effect of country k in year t and Z_t^k is the vector of country characteristics. δ_k is the fixed-effect of country k, and θ_{FE} are the parameters to be estimated. This fixed-effect equation estimates a country specific coefficient δ_k. This coefficient might be interpreted as the average absolute country effect over the sample. It is a constant parameter, that captures the fixed part of the pure effect of that country. Since a panel estimation treats all variables as deviations from their mean, the rest of the variation can be attributed to time-series variation in the explanatory variables.

The panel estimation, with country fixed effects, may be more appropriate if there are unobservable country characteristics that might explain variability in the pure country effects. This procedure assumes that the unobserved heterogeneity is constant over time. Intuitively, the fixed-effect estimation might be more appropriate if we believe that the main driving force in the evolution of country effects is time-series variation of independent variables and that significant unobserved differences might exist between the levels of country effects across countries.

In order to understand the determinants of pure industry returns, we follow a similar procedure. We examine what drives pure industry effects, by modelling pure industry effects as a function of industry characteristics:

$$\beta_t^i = \delta + \theta Z_t^i \tag{7}$$

where β_t^i is the pure effect of industry i in year t and Z_t^i is the vector of industry characteristics. Also taking advantage of the availability of a panel data-set, we introduce a fixed-effect estimator in equation (7) to estimate:

$$\beta_t^i = \delta_i + \theta Z_t^i \tag{8}$$

where β_t^i is the pure effect of industry i in year t and Z_t^i is the vector of industry characteristics. δ_i is the fixed-effect of industry i, and θ_{FE} are the parameters to be estimated.

Our explanatory variables Z_t^k and Z_t^i, include not only stock market data, but also several structural characteristics of industries and countries. These variables are described in the next sections (sections 2.3 and 2.4).

All relevant variables we use are yearly. Therefore, we use the estimates of the monthly industry (β) and country (γ) factors from the previous section, and aggregate them to obtain yearly values for the country and industry factors. An alternative procedure would estimate equation (2) with yearly returns. However, this would have the effect of smoothing all variability in the country and industry series, which is exactly what we are trying to capture. We thus decided to follow previous literature (e.g. Heston and Rouwenhorst (1994) , Beckers, Connor, and Curds (1996), Griffin and Karolyi (1998), Rouwenhorst (1999)), and use monthly returns in that decomposition.

For each country/year, we take the average of the absolute country factor during that year:

$$\gamma_y^k = \frac{1}{12} \sum_{t=ym1}^{ym2} |\gamma_k^t| \tag{9}$$

where γ_y^k is the average absolute factor for country k in year y, $ym1$ and $ym2$ are the start and end months of year y, γ_k^t is the month t pure country k factor. It is this yearly aggregate measure that will be used in the cross-sectional analysis (equations (5) and (6)). The last three columns of table II presents some summary statistics on the estimated yearly factors for the 39 countries. Column 6 shows the average absolute value of the country factor in 2000. Column 7 reports the average absolute country factor over the sample, and column 8 presents the standard deviation of the yearly factor for each country. Emerging markets have higher country effects, and are also more volatile. According to these results, the average over the whole sample period (second column) of country effects for emerging markets is 9.1%, whereas for developed markets it is 4.6%.

Similarly, for each industry, we take the average of the absolute industry factor during a year:

$$\beta_y^i = \frac{1}{12} \sum_{t=ym1}^{ym2} |\beta_i^t| \tag{10}$$

where β_y^i is the average absolute factor for industry i in year y, $ym1$ and $ym2$ are the start and end months of year y, β_i^t is the month t global industry i factor.

Table I presents some summary statistics on the estimated factors for the 36 industries. Column 5 shows the average absolute value of the industry factor in 2000. Column 6 reports the average absolute industry factor over the sample, and the last column presents the standard deviation of the yearly factor for each industry. The values in the first column, pure industry effects for the year 2000, are generally larger than those in the second column (average of industry effects over the whole sample). This reflects the fact that towards the end of the sample, industry factors become more important. Also, comparing tables I and II, one notices that country effects are larger and more volatile than industry effects, but the difference is less pronounced in the end of the sample.

2.3. Country Level Variables

In the second stage analysis, we relate the evolution of pure country effects with several fundamental country characteristics. In particular, we focus on measures of economic and financial integration and development as determinants of the magnitude of country effects. In addition, we also investigate the role of trading activity of the country's equities, as well as the industrial concentration within the country. We now define each of these variables.

Country Openness

Country specific returns should be large relative to the world market portfolio when economic activity in that country is more isolated from world economic activity and more subject to specific shocks to that country economic situation. Economic integration, measured by openness, is thus one potential determinant of country effects.

We use openness data from the Penn World Table 6.1 (PWT). The measure of openness is total trade as a percentage of GDP. The export and import figures are in national currencies from the World Bank and United Nations data archives. The dataset goes from 1973 to 2000.

For each year, the openness of country k is calculated as:

$$OPEN_t^k = \frac{Exp_t^k + Imp_t^k}{GDP_t^k} \tag{11}$$

where Exp_t^k and Imp_t^k are the year t exports and imports in country k. GDP_t^k is the GDP of country k in year t.

Financial Integration

Recent research (Miller (1999), Foerster and Karolyi (1999) and Errunza and Miller (2000)) has documented that firms that list abroad can achieve substantial gains from higher integration in world capital markets. However, the gains from an ADR listing are not restricted to its issuer and spillover to other stocks in the country. Fernandes (2003) documents positive spillovers from the cross-listing decision. For a large sample of emerging markets he shows that when a domestic firm cross-lists, it will also increase the integration of other firms in the local market.

Therefore, as a proxy for the degree of financial market integration we use the percentage of stocks cross-listed in the US in each country[1]. We compute the ratio of cross-listed securities to the total number of securities (listed in the home market):

$$ADR_t^k = \frac{\#ADR_t^k}{NS_t^k} \tag{12}$$

where $\#ADR_t^k$ is the number of cross-listed securities from country k at t, and NS_t^k is the total number of stocks listed in their domestic market. Data on the total number of listed stocks is from Datastream, and data on cross-listed securities is from Citibank. The dataset goes from 1973 to 2002.

Higher values for this ratio mean that the country's capital market is more integrated into the world. Greater risk sharing should lead to a reduction in country specific variation.

Trading Activity

[1] By construction this variable takes the value of zero for US and Canada. Neither of these two countries issues any ADR.

Another country characteristic with potential influence on the magnitude of country effects is trading activity. Market microstructure models (e.g. Easley and OHara (1987)) predict a positive relation between trading activity and volatility. Empirical evidence exists to support this prediction (Schwert (1989), Jones, Kaul, and Lipson (1994) and Huang and Masulis (2003)).

We expect trading activity to be positively related to country shocks. In particular, countries with more active financial markets should have higher country effects.

We compute for each country a measure of turnover:

$$TV_t^k = \frac{VA_t^k}{MCAP_t^k} \tag{13}$$

where VA_t^k is the value traded of all securities from country k at month t, and $MCAP_t^k$ is their market capitalization. Monthly data on market capitalization and value traded is from Datastream. The dataset goes from 1973 to 2002.

This measure is interpreted as a proxy for the degree of trading activity in a market. Also, turnover has been shown to be correlated with other measures of trading and liquidity (Stoll (2000)).

Concentration

The industrial concentration of a country might also be related to the magnitude of country shocks. We expect a positive relation between the country effects and concentration. More specialized countries are more likely to have large country shocks. Country specific returns should be large relative to the world market portfolio when economic activity in that country is more isolated from world economic activity and more subject to specific shocks to that country economic situation. Previous research (Roll (1992)) has indeed documented a positive relation between concentration and stock market volatility.

According to this measure, a country is diversified if its industrial structure is the same as the world market portfolio. If there are substantial deviations and the country becomes concentrated in certain industries, it leads to increases in the measure of country concentration. The concentration measures for each country the difference between the weight each industry has domestically ($w_{i,home}$), relative to the world weight of the industry ($w_{i,world}$).

$$
\begin{aligned}
CONC_t^k &= \sum_{i=1}^{I_k} (w_{i,home} - w_{i,world})^2 = \\
&= \sum_{i=1}^{I_k} \left(\frac{MCAP_t^{i,k}}{MCAP_t^k} - \frac{MCAP_t^{i,w}}{MCAP_t^w}\right)^2
\end{aligned}
\tag{14}
$$

where I_k is the number of industries in country k, $MCAP_t^{i,k}$ is the market capitalization of industry i of country k, $MCAP_t^{i,w}$ is the world market capitalization of industry i, $MCAP_t^k$ and $MCAP_t^w$ are the market capitalization of country k and the world market.

We construct an index measure of industrial concentration for each country. Data on market capitalization is from Datastream. The dataset goes from 1973 to 2002.

Development

There is strong evidence that emerging markets have higher country effects than developed ones. The results from table II clearly support this prediction. The average country effect for emerging markets is 9.1% while for developed markets is 4.6%.

We use the GDP per capita (in USD) as a measure of economic development. This measure is from the Penn World Table 6.1 (PWT), and goes from 1973 to 2000.

In addition, we use the ratio of market capitalization to GDP as a proxy for the degree of financial development.

$$FINDEV_t^k = \frac{MCAP_t^k}{GDP_t^k} \tag{15}$$

where $FINDEV_t^k$ is the indicator of financial development in country k at t, $MCAP_t^k$ is the market capitalization (Datastream) and GDP_t^k is the GDP of the country (PWT).

This measure of financial development has been linked to economic growth (Beck, Levine, and Loayza (2000)), and access to external finance (Rajan and Zingales (1998)). It is thus a possible determinant of the magnitude of country effects.

2.4. Industry Level Variables

Similarly to the previous section, we now describe the variables used to explain the evolution of industrial effects. We focus on the industry openness to trade, the financial integration of the industry, the trading activity of the industry equities, the geographical concentration of the industry and financial variables like the size of the industry.

Industry Openness

For each year, we calculate the following openness measure for industry i of country k:

$$OPEN_t^{k,i} = \frac{Exp_t^{k,i} + Imp_t^{k,i}}{Prod_t^{k,i}} \tag{16}$$

where $Exp_t^{k,i}$ and $Imp_t^{k,i}$ are the year t exports and imports in industry i from country k. $Prod_t^{k,i}$ is the value of goods and/or services produced in a year for industry i in country k.

We use industrial characteristics from STAN, an OECD database of industrial performance. The STAN database includes annual measures of output, labor input, investment and international trade for a wide range of sectors. Estimates of exports and imports are derived from detailed trade in commodities statistics using the ISIC Rev. 3 classification system[2]. Stan covers 24 OECD countries over the period 1970-2000.

Financial Integration

As a proxy for the degree of industrial integration in world capital markets of each industry, we use the time-series of the ratio of cross-listed securities to the total number of securities (listed in the home market) for that industry:

$$ADR_t^i = \frac{\#ADR_t^i}{NS_t^i} \tag{17}$$

where $\#ADR_t^i$ is the number of cross-listed securities from industry i at t, and NS_t^i is the total number of stocks from industry i listed in their domestic market.

We expect higher financial integration to increase industrial effects. Industry specific returns will differ from the world market portfolio when investments in that industry are more subject to correlated shocks across countries. A higher degree of international integration of industrial activity implies higher correlation of industrial shocks among countries and an increase in the importance of industry shocks in explaining international investment returns.

Trading activity

[2]See the U.N.'s classification registry at http://esa.un.org/unsd/cr/registry/regrt.asp for more details. In order to relate the STAN measures with stock market data, we map this classification with FTSE classification. Table IX presents the conversions used.

Similar to what was discussed for countries, trading activity may be a determinant of the magnitude of industry effects. We expect industries with more active trading to have larger shocks.

We compute for each industry a measure of turnover:

$$TV_t^i = \frac{VA_t^i}{MCAP_t^i} \tag{18}$$

where VA_t^i is the value traded of all securities from industry i at t, and $MCAP_t^i$ is their market capitalization.

Concentration

We construct an index measure of geographical concentration for each industry. According to this measure, an industry is diversified if it is geographically spread, with country weights similar to the world market portfolio. If there are substantial deviations and the industry becomes concentrated in certain countries, this leads to increases in the measure of country concentration. The concentration measures for each industry the difference between the weight each country has in that global industry ($w_{ik,iw}$) and the country weight in the world market portfolio ($w_{k,world}$).

$$\begin{aligned} CONC_t^k &= \sum_{i=1}^{I_k} (w_{ik,iw} - w_{k,world})^2 = \\ &= \sum_{i=1}^{C_i} \left(\frac{MCAP_t^{i,k}}{MCAP_t^{i,w}} - \frac{MCAP_t^k}{MCAP_t^w}\right)^2 \end{aligned} \tag{19}$$

where C_i is the number of countries where industry i exists, $MCAP_t^{i,k}$ is the market capitalization of industry i of country k, $MCAP_t^{i,w}$ is the world market capitalization of industry i, $MCAP_t^k$ and $MCAP_t^w$ are the market capitalization of country k and the world market.

Size

We use the log of market capitalization as a measure of the size of an industry. Alternatively, we use the weight of that industry in the world market portfolio.

3. Empirical Results

In this section we analyze the cross-sectional (and time-series) dispersion of country and industry effects. Table I shows substantial cross-sectional variation of industry effects. Table II presents similar evidence at the country level. Also, there has been substantial time-series variation of these two effects (Figure 1). We investigate why some countries have such high deviations from the world market (strong country effects), as well as why some industries deviate so much from the average industry.

To evaluate the relative magnitude of industry and country effects, we proceed in two directions. First, we correlate country (industry) effects and several structural characteristics of the country (industry). Second, we perform a pooled time-series cross-sectional estimate (also pure cross-section), where country (industry) factors vary over time, and so do the country (industry) characteristics. The next section (3.1) will present the results for country effects, while section 3.2 performs the analysis for industry effects.

3.1. Variation in Country Effects

In this section we study the determinants of country effects. The analysis excludes the US and Canada, since for both countries a measure of cross-listings is not available.

Table III shows the correlation between country effects and structural characteristics of the country over the sample period. The variables analyzed are: ADRs, financial development, openness, turnover, concentration and GDP per capita.

We see that the absolute value of country effects are positively related to concentration. Countries with more specialized production structures have higher country shocks. On the other hand, country effects are negatively related to ADRs, financial development and GDP per capita. It seems that countries that are more financially integrated, as well as more developed (economically and financially) have lower country shocks. This is consistent with evidence presented before, that emerging markets have higher country shocks than developed ones.

As described in section 2.2 we use pure country returns and characteristics on all available years in the sample. We present results for a pooled time-series cross-sectional estimation (OLS), as well as a panel estimation with country fixed-effects. The OLS specification clearly captures part of the cross-sectional impact of the explanatory variables. On the other hand, the fixed-effect estimation focuses more on the time-series relation. By introducing fixed-effects, we remove the average of every variable from consideration. The estimates are thus based on the time-series variability of the independent (and dependent) variables. In order to fully capture the cross-sectional aspect of the relation, we also present pure cross-sectional regression of all countries, with data from 1990 and 2000.

For the basic specification, we pool all the values of pure country effects, as well as country characteristics and estimate:

$$\begin{aligned}\gamma_t^k = \delta + \theta_1 ADR_t^k + \theta_2 FINDEV_t^k + \theta_3 OPEN_t^k + \theta_4 TV_t^k + \\ \theta_5 CONC_t^k + \theta_6 GDP_t^k \end{aligned} \tag{20}$$

where γ_t^k is the pure country effect of country k in year t, ADR_t^k is the percentage of ADRs of country k, $FINDEV_t^k$ is the ratio of market capitalization to GDP, $OPEN_t^k$ is the openness of the country, TV_t^k is the turnover in t, $CONC_t^k$ is the industrial concentration of the country and

GDP_t^k is the level of GDP per capita. The panel estimation introduces a country fixed-effect δ_k into the estimation. This fixed-effect estimation assumes that there are unobservable country characteristics, that are constant throughout the sample, that have an impact on the magnitude of country effects. These will be captured by the fixed-effects coefficients.

The first Panel in Table IV presents the results for the OLS estimation for the full sample, the fixed-effect estimation, and the purely cross-sectional regression in 1990 and 2000.

From the OLS estimates we see that high percentage of stocks cross-listed abroad significantly reduces the magnitude of country shocks. A coefficient of -0.04 means that as a country moves from zero stocks cross-listed (ADR=0) to all home market being traded abroad (ADR=1), the average absolute country effect is reduced by 4%. This result is consistent with the literature on financial market liberalization and integration. Higher integration makes domestic investments more correlated with world market factors, and less subject to idiosyncratic risk of the country (Foerster and Karolyi (1999), Errunza and Miller (2000), Bekaert and Harvey (2000), Fernandes (2003)).

Higher economic development (GDP per capita) is also associated with lower country effects. On the other hand, concentration and turnover clearly increase country effects. As a country becomes more concentrated in some sectors it has higher country shocks. The evolution of country specific returns should reflect the underlying shocks that affect the expected future cash-flows from investment in their corresponding economic activities. When economic activity is more specialized, it carries an additional idiosyncratic risk that make it more subject to specific shocks to that country economic situation.

The coefficient on turnover is highly significant. When financial markets are active, the magnitude of country shocks is high. This positive relation between trading and country volatility is consistent with previous evidence for the US market (Schwert (1989)) as well as theoretical market microstructure models (e.g. Easley and OHara (1987)).

Country factors are smaller for countries integrated in world financial markets and have declined as the degree of financial integration and the number of countries pursuing financial liberalizations has increased. Country specific returns are large relative to the world market portfolio when economic activity in that country is more isolated from world economic activity and more subject to specific shocks to that country economic situation. Countries with a more specialized production activity have higher country factors.

The fixed-effect estimation shows similar results. ADRs significantly reduce the magnitude of country shocks, while concentration, openness and turnover increase country effects. Nevertheless, these fixed-effects results have a time-series emphasis. Country effects have declined as the degree of financial integration has increased. GDP per capita is no longer significant. This is expected, since this variable has low time series variation, and its cross-sectional impact is now captured by the country fixed-effects. In the OLS estimation, the GDP variable captures differential country effects according to economic development. However, in the panel estimation, this effect is captured by the fixed-effect coefficient.

The purely cross-sectional regressions in 1990 and 2000 (Columns 3 and 4 of Panel A) present similar results. Countries with higher levels of financial integration have lower country shocks.

We perform some robustness tests. First, we use another measure of ADRs, which is the total number of stocks cross-listed abroad. So far we have been using the percentage of stocks cross-listed. Another specification runs the model using weighted least squares (WLS) instead of OLS. In this case, we weight each country/year observation by the square root of the t-statistic of the pure country effects estimated in equation (2)[3]. This weighting scheme gives more weight to country/year observations that are more precisely estimated in the first stage.

[3]As with the dependent variable, we annualize the t-statistic by taking the average of its absolute values over the year.

Table IV also contains the results for these alternative specifications. The first columns use the percentage of cross-listed stocks as an independent variable, while the last ones use the number of ADRs. The first column presents the main results discussed above. The second column reports the WLS estimates using the percentage of stocks cross-listed as measure of ADRs. We can see that the main conclusions remain unchanged. Higher financial integration reduces country effects. Higher concentration, openness and order flow increase the magnitude of country effects. GDP is only significant in the OLS regression. Once fixed effects are introduced (Panel B), it is no longer significant. The results using alternative measures of cross-listings are similar to those presented before.

Financial integration has not been homogeneous across the world during this period. Many developed markets had lower barriers to international capital mobility and also had more developed local financial markets. Emerging markets however experienced a more drastic change in financial openness during this period. We split the sample between developed and emerging markets. As expected the increase in financial integration resulted in significantly reduced country effects primarily for emerging markets (Panel C). This effect was most important during the last decade of the sample. Among developed markets, country effects were significantly more important the higher the industrial specialization of activity in the country.

We estimate the impact that a change of one standard deviation of each independent variable has on the magnitude of pure country effects. We multiply the estimated coefficient from Table IV, by the standard deviation of each independent variable (standardized by the standard deviation of the dependent variable). Table V shows the results of this exercise. The first column contains the estimated coefficients (Table IV). The second column has the standard deviation of each independent variable. The third column reports the change in country effects due to one standard deviation change.

These results from the third column reinforce the conclusions from the regression analysis. A relative one standard deviation change in the level of financial integration can reduce country effects by 13%. On the other hand, the effects of trading activity are positive. A one standard deviation change in turnover leads to a 20% increase in country shocks. The fixed-effects results provide similar insights. In addition, there are strong positive results for concentration and openness. More concentrated industrial structure in a country, as well as more openness to trade, lead to significant increases (10 and 17% respectively) in country effects.

The results presented so far are based on the full specification of equation (20). One could argue that some of these variables are correlated, and should not be introduced all at once into the estimation. Thus, we estimated all possible models where ADR is one of the independent variables. There are 64 of these models that combine all the other six independent variables (turnover, openness, financial development, GDP and concentration). Both the OLS and the fixed-effects estimates are quite robust across models. The OLS coefficient varies between -0.03 and -0.048, and the fixed-effects estimates vary between -0.045 and -0.07. The results are always significant.

3.2. Variation in Industry Effects

In this section we study the determinants of industrial effects.

Table VI shows the correlation between industry effects and structural characteristics of the industry for the whole sample period. The variables analyzed are: ADRs, openness of the industry, geographical concentration of the industry, size and turnover. We see that the absolute value of industry effects are positively related to ADRs and turnover. Industries with higher trading activity and more financially integrated have higher industry shocks.

In order to better understand the determinants of industrial effects, we proceed to the regression analysis. We use pure industry returns and characteristics on all available years in the sample. We present results for a pooled time-series cross-sectional estimation (OLS), as well as a panel estimation with industry fixed-effects. Similarly to what was done for countries, we also present cross-sectional estimations with data from 1990 and 2000.

For the OLS specification, we pool all the values of pure industry effects, as well as industry characteristics and estimate:

$$\beta_t^i = \delta + \theta_1 ADR_t^i + \theta_2 SIZE_t^i + \theta_3 OPEN_t^i + \theta_4 TV_t^i + \theta_5 CONC_t^i \tag{21}$$

where β_t^i is the pure industry effect of industry i, ADR_t^i is the percentage of ADRs of industry i, $SIZE_t^i$ is the log of market capitalization, $OPEN_t^i$ is the openness of the industry, TV_t^i is the turnover and $CONC_t^i$ is the industry concentration. The panel estimation introduces an industry fixed-effect δ_i into the estimation. The industry fixed-effects capture the constant part of industrial effects. Variability in the right-hand side variables should explain how the magnitude of the effects shifts over time

The first Panel in Table VII presents the results for the OLS estimation for the full sample, the fixed-effect estimation, and the purely cross-sectional regression in 1990 and 2000.

The results from table VII clearly demonstrate the role of financial integration in increasing global industrial shocks. The first column shows the OLS estimates, the second column reports the results for the fixed-effect estimation, the third column contains the cross-sectional regression in 1990, and the fourth column in 2000 only. In all cases the dependent variable is the absolute industry effect in each year.

A higher degree of international financial integration implies an increase in the importance of industry shocks in explaining international investment returns. From the OLS estimates we see that a high percentage of stocks cross-listed abroad significantly increases the magnitude of industry shocks. A coefficient of 0.04 means that as an industry moves from zero stocks cross-listed (ADR=0) to all stocks being cross-listed (ADR=1), the average absolute industry effect is increased by 4%.

Similarly to what was found with country effects, turnover clearly increases industry effects. Higher trading in a sector translates into higher deviations of that sector from the benchmark (world market).

Size of the industry appears to be relevant too. This variable has a significantly negative coefficient. This suggests that larger industries tend to have lower industry shocks.

The fixed-effect estimation shows similar results. ADRs significantly increase industry shocks. Industry effects have increased over time, as the level of industry financial integration increases. Turnover also has a strong positive effect. As trading activity increases, the industry effect also increases. Larger size reduces industry effects. In addition, the fixed-effect estimation shows the relevance of concentration. As an industry becomes more concentrated in some countries, its global industry shocks have lower magnitude. This is consistent with the evidence presented for countries. Higher concentration leads to more dependence on idiosyncratic shocks at the country level, and thus less global industrial effects. As industries becomes more geographically spread, the global industry effects become more important.

The purely cross-sectional regressions in 1990 and 2000 (Columns 3 and 4 of Panel A) present similar results. Industries with higher levels of financial integration have higher industry shocks.

We perform the same robustness tests as in section 3.1. In particular, we use another measure of ADRs (total number of stocks from that industry that are cross-listed) and run the model using weighted least squares (WLS) instead of OLS.

Table VII shows the results of alternative specifications of equation (21). Columns 1 and 2 use the percentage of cross-listed stocks as an independent variable, while the last columns use the number of ADRs. The second column shows the WLS estimates using the percentage of stocks cross-listed as measure of ADRs. The main conclusions remain unchanged. Higher financial integration increases industry effects. Higher concentration decreases industry effects, and higher order flow increase the magnitude of industry effects.

The importance of financial integration in explaining industry effects is directly related to the existence of a higher correlation of industry shocks across the world. This correlation is dependent on the degree of economic integration within each industry. We split the sample among tradable and non tradable industries. As expected higher financial integration leads to a larger role for industry effects in tradable industries, and specially in manufacturing. The effect for non-tradable industries has shifted during the sample period. At the beginning of the sample financial integration was very small, non tradable industries shocks were essentially country specific and higher financial integration in these industries lead to the existence of lower industry-specific returns. This effect has changed during the last decade of the sample. Higher financial integration in these industries lead to higher industry returns. In summary, similarly to the results on country returns, the relationship between financial integration and industry returns is most robust during the last decade of the sample.

We estimate the impact that a change of one standard deviation of each independent variable has on the magnitude of pure industry effects. We multiply the estimated coefficient from Table VII, by the standard deviation of each independent variable (standardized by the standard deviation of the dependent variable). Table VIII shows the results of this exercise. The first column contains the estimated coefficients (Table VII). The second column has the standard deviation of each independent variable. The third column reports the change in industry effects due to one standard deviation change.

The results from the third column reinforce the conclusions from the regression analysis. A relative one standard deviation change in the level of financial integration increases industrial effects by 20%. Similarly, a one standard deviation change in turnover leads to more than 30% increase in industry shocks. On the other hand, industry size seems relevant. A one standard deviation in the size of the industry reduces industry shocks. Larger industries tend to be more stable and have lower industry shocks.

The fixed-effect results provide similar insights. In addition to the results from above, there is a negative coefficient for concentration. More concentrated industries, or less geographically spread, have lower industry shocks. Global reach of an industry is an important determinant of industry effects.

The results presented so far are based on the full specification of equation (21). In addition to the full model, we estimated all possible models where ADR is one of the independent variables. There are 16 of these models that combine all the other four independent variables (turnover, openness, size and concentration). Both the OLS and the fixed-effects estimates are quite robust across models. The OLS coefficient varies between 0.036 and 0.048, and the fixed-effects estimates vary between 0.03 and 0.05. These coefficients are always significant.

4. Conclusion

In this paper we study the determinants of the evolution of country and industry specific returns in world financial markets over the last three decades.

Using a dataset for a broad sample of thirty nine countries and thirty six industries, we decompose investment returns into three determinants: a world portfolio, industry specific factors and country specific factors. Consistent with other work in this area, we find the increasing importance that industry factors have relative to country factors in explaining investment returns, particularly in the last decade.

We then explain the evolution of country and industry factors, and investigate the role that economic and financial integration and development have in this evolution. We use measures of economic and financial integration and development as determinants of the different shocks to international returns.

Country factors are smaller for countries integrated in world financial markets and have declined as the degree of financial integration and the number of countries pursuing financial liberalizations has increased. Country specific returns are large relative to the world market portfolio when economic activity in that country is more isolated from world economic activity and more subject to specific shocks to that country economic situation. Countries with a more specialized production activity have higher country factors.

Industry specific returns differ more from the world market portfolio when investments in that industry are more subject to correlated shocks across countries. Financial integration is one possible way to increase the correlation across countries. Indeed, we find that higher international financial integration within an industry increases the importance of industry factors in explaining returns. Geographic concentration of industrial activity in a few countries leads to lower industry factors.

Financial market activity appears also as one main determinant of the magnitude of country and industry effects. Higher trading activity in a country/industry leads to larger country/industry shocks.

Even in a reasonably integrated market as the European Union, country effects are a very important influence of stock returns. However, financial market integration, and globalization of economic activity are impacting the relative balance between country and industry factors. In other words, as capital market integration proceeds, geography becomes less relevant to finance.

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5. Appendix: Estimation Procedure - Return Decomposition

We estimate for each month t α, β and γ using a cross-sectional regression of all the indices on country and industry dummies:

$$R_i = \alpha + \beta_1 I_1 + \beta_2 I_2 + \ldots + \beta_{36} I_{36} + \gamma_1 C_1 + \gamma_2 C_2 + \ldots + \gamma_{39} C_{39} + \varepsilon_i \tag{22}$$

where I and C are the industry and country dummies.

This equation cannot be estimated because there is an identification problem. Each return index belong to one country and one industry. If dummy variables are introduced for every country and industry there is perfect multicollinearity in the equation. The 36 industrial dummies as well as the 39 country dummies add up to a unit vector across firms. In order to solve this problem one needs a benchmark to measure the relative country/industry effects. If we remove one country and one industry from the estimation (eg. Automobile industry, and Germany), every estimate of the remaining I-1 (C-1) industry (country) dummies will be cross-sectional differences relative to the automobile sector (Germany). In order to avoid specifying an arbitrary benchmark, all the effects will be measured relative to the value-weighted index of all industries/countries, which will be referred to as the world market.

In order to do this we introduce the following restrictions in each month t:

$$\sum_{k=1}^{36} w^i_{k,t} \beta_{k,t} = 0 \tag{23}$$

and

$$\sum_{j=1}^{39} w^c_{j,t} \gamma_{j,t} = 0 \tag{24}$$

where $w^i_{k,t}$ and $w^c_{j,t}$ correspond to the weight of industry k and country j in the world market portfolio at month t. $\beta_{k,t}$ is the pure effect of industry k, and $\gamma_{j,t}$ is the pure effect of country j.

Equations (23) and (24) say that the weighted sum of the pure industry / country effects add up to zero. The resulting estimates that follow from this benchmark compare the pure performance of each country (industry) to the world portfolio. $\gamma_{j,t}$ is the excess return of a portfolio of country j that is free from industrial specificities of each country. It is the relative performance of a portfolio of stocks of country j that has the same industrial weights as the world portfolio.

We can introduce the restrictions directly in the base equation 22. From equations (23) and (24) we have (dropping the time subscript):

$$\beta_1 = -\frac{\sum_{k=2}^{36} w_k^i \beta_k}{w_1^i} \tag{25}$$

and

$$\gamma_1 = -\frac{\sum_{j=2}^{39} w_j^c \gamma_j}{w_1^c} \tag{26}$$

If we introduce these restrictions in equation 22:

$$\begin{aligned} R_i = \alpha + (-\frac{\sum_{k=2}^{36} w_k^i \beta_k}{w_1^i}) I_1 + \beta_2 I_2 + \ldots + \beta_{36} I_{36} + \\ (-\frac{\sum_{j=2}^{39} w_j^c \gamma_j}{w_1^c}) C_1 + \gamma_2 C_2 + \ldots + \gamma_{39} C_{39} + \varepsilon_i \end{aligned} \tag{27}$$

we can rearrange the original independent variables to obtain:

$$\begin{aligned} R_i = \alpha + \beta_2 (I_2 - \frac{w_2^i}{w_1^i} * I_1) + \beta_3 (I_3 - \frac{w_3^i}{w_1^i} * I_1) + \ldots + \beta_{36} (I_{36} - \frac{w_{36}^i}{w_1^i} * I_1) + \\ \gamma_2 (C_2 - \frac{w_2^c}{w_1^c} * C_1) + \gamma_3 (C_3 - \frac{w_3^c}{w_1^c} * C_1) + \ldots + \gamma_{39} (C_{39} - \frac{w_{39}^c}{w_1^c} * C_1) + \varepsilon_i \end{aligned} \tag{28}$$

We estimate this equation (28) in each period t. After the estimation, we can obtain the omitted coefficients β_1 and γ_1 (for the first industry and country) by substituting the estimated $\hat{\beta}_i$ and $\hat{\gamma}_c$ (for industries 2 to 36, and countries 2 to 39) into equations (23) and (24).

The variance of the first industry coefficient (β_1) can be obtained by the Delta method:

$$\sigma^2_{\beta_1} = \frac{\partial R}{\partial \theta'} \Omega_\theta \frac{\partial R}{\partial \theta} \tag{29}$$

where R is the restriction imposed (equation (25)), θ is the vector of estimated betas $[\hat{\beta}_2 \ldots \hat{\beta}_{36}]'$, and Ω_θ is the covariance matrix of the estimated coefficients.

Table I
List of Sectors

	Industries	Weight 1990	Weight 2000	Countries 1990	Countries 2000	Pure Effects 2000	Pure Effects Mean	Pure Effects St. Dev.
Energy and Mining	**Electricity**	5.1%	2.7%	22	31	5.3%	3.1%	1.5%
	Mining	1.4%	0.6%	13	18	6.0%	3.6%	1.4%
	Oil & Gas	6.6%	5.4%	22	31	4.6%	3.0%	1.1%
Manufacturing	**Aerospace & Defence**	0.8%	1.0%	8	14	3.8%	3.2%	1.2%
	Automobiles & Parts	3.7%	2.0%	18	25	4.2%	3.2%	1.2%
	Beverages	2.1%	1.6%	23	31	6.2%	3.3%	1.6%
	Chemicals	3.8%	1.6%	22	28	4.2%	2.3%	0.9%
	Constr. & Building Materials	4.0%	1.1%	30	38	4.1%	2.8%	0.9%
	Diversified Industrials	2.2%	3.8%	26	29	3.0%	1.9%	0.9%
	Electronic & Electrical Equip.	4.4%	2.9%	20	28	3.3%	2.3%	1.1%
	Engineering & Machinery	3.0%	1.3%	23	27	4.0%	2.3%	0.9%
	Food Producers & Processors	3.5%	1.8%	27	38	4.4%	2.2%	1.0%
	Forestry & Paper	1.1%	0.4%	20	29	3.9%	3.4%	1.1%
	Household Goods & Textiles	1.9%	1.2%	22	31	4.6%	3.5%	1.5%
	Information Tech. Hardware	4.2%	10.2%	14	22	6.1%	3.3%	1.6%
	Personal Care & Househ. Products	1.4%	1.3%	9	13	3.8%	2.4%	1.3%
	Pharmaceuticals & Biotech.	4.5%	9.5%	17	25	4.6%	2.8%	1.2%
	Steel & Other Metals	2.1%	0.6%	22	28	5.7%	3.9%	1.5%
	Tobacco	1.2%	0.6%	10	14	10.1%	4.2%	1.9%
Services	**Banks**	11.5%	11.2%	32	38	4.1%	2.8%	1.6%
	Food & Drug Retailers	1.4%	1.4%	16	25	4.5%	2.4%	1.1%
	General Retailers	3.2%	3.0%	20	28	4.2%	3.2%	1.1%
	Health	1.1%	1.7%	13	18	3.4%	2.7%	0.7%
	Insurance	3.5%	4.2%	20	27	3.5%	2.4%	1.1%
	Investment Companies	0.3%	0.3%	15	23	1.9%	2.2%	0.8%
	Investment Entities	0.3%	0.2%	1	1	2.4%	1.9%	0.8%
	Leisure & Hotels	1.5%	1.3%	17	29	2.7%	2.6%	0.8%
	Life Assurance	0.7%	1.4%	12	14	2.9%	2.4%	0.9%
	Media & Entertainment	2.6%	3.7%	21	32	3.4%	2.4%	1.0%
	Real Estate	1.6%	1.1%	21	30	3.8%	3.1%	1.4%
	Software & Computer Services	0.7%	5.0%	12	25	8.1%	4.2%	1.7%
	Speciality & Other Finance	4.1%	3.6%	18	26	3.2%	3.2%	1.6%
	Support Services	0.5%	0.9%	16	21	3.2%	2.6%	1.4%
	Telecommunication Services	5.7%	8.8%	22	38	3.4%	3.2%	1.5%
	Transport	3.4%	1.6%	31	34	4.7%	2.7%	1.3%
	Utilities, Other	1.3%	1.1%	15	23	3.8%	3.3%	1.9%

List of sectors used. The industrial classification is FTSE Level 4. Columns 1 and 2 present the relative weight of the sector on the world market portfolio. Columns 3 and 4 report the number of countries where the sector exists. Column 5 shows the average absolute value of the industry factor in 2000. Column 6 reports the average absolute industry factor over the sample, and column 7 presents the standard deviation of the yearly factor for each industry.

Table II
List of Countries

	Countries	Start Date	Weight		Industries		Pure Effects		
			1990	2000	1990	2000	2000	Mean	St. Dev.
North America	CANADA	Feb-73	2.1%	2.1%	33	34	5.1%	3.6%	1.2%
	UNITED STATES	Feb-73	31.0%	48.0%	35	35	2.0%	2.1%	0.9%
European Union	AUSTRIA	Feb-73	0.2%	0.1%	11	18	3.4%	4.9%	2.6%
	BELGIUM	Feb-73	0.5%	0.6%	17	27	4.8%	3.7%	1.4%
	DENMARK	Feb-73	0.3%	0.4%	16	19	3.1%	4.5%	1.7%
	FINLAND	Apr-88	0.1%	0.9%	13	23	10.9%	7.0%	1.8%
	FRANCE	Feb-73	2.8%	5.0%	28	31	3.5%	4.1%	1.7%
	GERMANY	Feb-73	4.2%	3.9%	30	32	5.0%	3.8%	1.1%
	GREECE	Feb-88	0.1%	0.3%	8	19	10.4%	8.4%	3.7%
	IRELAND	Feb-73	0.1%	0.3%	19	22	4.6%	5.4%	2.0%
	ITALY	Feb-73	1.6%	2.4%	26	27	5.8%	5.3%	1.6%
	NETHERLAND	Feb-73	1.9%	2.4%	24	28	3.0%	2.6%	0.7%
	PORTUGAL	Feb-88	0.1%	0.2%	13	17	7.5%	5.4%	1.5%
	SPAIN	Apr-87	1.3%	1.2%	28	30	5.7%	3.9%	1.2%
	SWEDEN	Feb-82	0.3%	1.0%	20	24	7.0%	4.9%	1.3%
	UNITED KINGDOM	Feb-73	9.3%	9.2%	32	34	2.1%	3.3%	1.7%
Other Developed Markets	AUSTRALIA	Feb-73	1.1%	1.2%	23	30	4.2%	4.9%	1.9%
	HONG KONG	Feb-73	0.9%	2.0%	17	24	5.4%	6.6%	2.7%
	JAPAN	Feb-73	36.8%	11.2%	33	34	4.0%	3.6%	1.1%
	NEW ZEALAND	Feb-88	0.1%	0.1%	18	22	4.8%	4.7%	1.1%
	NORWAY	Feb-80	0.2%	0.2%	14	21	3.3%	5.4%	1.6%
	SINGAPORE	Feb-73	0.4%	0.5%	22	26	7.5%	5.6%	2.5%
	SWITZERLAND	Feb-73	1.1%	2.9%	22	24	3.6%	3.9%	1.1%
Emerging Markets	ARGENTINA	Feb-88	0.0%	0.1%	2	21	8.3%	16.1%	16.9%
	BRAZIL	Aug-94		0.6%		19	6.3%	7.5%	3.7%
	CHILE	Aug-89	0.1%	0.2%	17	20	4.0%	6.5%	2.1%
	CHINA	Sep-91		0.5%		22	7.5%	12.3%	5.5%
	COLOMBIA	Feb-92		0.0%		19	7.7%	7.5%	1.4%
	INDIA	Feb-90	0.3%	0.4%	19	23	12.1%	9.1%	4.1%
	INDONESIA	May-90	0.2%	0.1%	12	21	19.6%	11.2%	6.3%
	KOREA	Aug-84	0.9%	0.5%	25	29	11.1%	9.0%	3.6%
	MALAYSIA	Apr-84	0.5%	0.3%	21	24	7.7%	7.3%	4.2%
	MEXICO	Feb-88	0.2%	0.4%	13	21	5.0%	7.9%	2.4%
	PERU	Apr-92		0.0%		11	7.6%	6.5%	2.1%
	PHILIPPINE	Oct-87	0.1%	0.1%	14	17	8.2%	6.9%	2.2%
	POLAND	Jun-93		0.1%		23	10.2%	10.0%	1.7%
	SOUTH AFRICA	Feb-73	0.9%	0.4%	20	23	4.7%	5.3%	1.4%
	THAILAND	Feb-87	0.2%	0.1%	13	16	10.8%	9.2%	3.6%
	TURKEY	Feb-88	0.2%	0.2%	12	22	14.8%	14.5%	3.4%

Table III
Correlation of Pure Country Effects and other variables - Full sample

	PURE CT	ADR	FINDEV	OPEN	TV	CONC	GDP
PURE CT	1						
ADR	-0.12	1					
FINDEV	-0.19	0.11	1				
OPEN	-0.05	-0.24	0.50	1			
TV	0.05	0.06	0.11	-0.11	1		
CONC	0.15	-0.05	-0.14	-0.01	-0.28	1	
GDP	-0.51	-0.03	0.41	0.19	0.22	-0.19	1

This table presents the cross-country correlation of Pure Country Effects and other country level variables. Pure CT is the pure country effect, ADR is the percentage of ADRs, FINDEV is the ratio of market capitalization to GDP, OPEN is the openness of the country, TV is the turnover, CONC is the country concentration and GDP is the level of GDP per capita.

Table IV

Time-Series Cross-Section Country Regression

Panel A : OLS

	% (1)	% WLS (2)	θ_{OLS}^{1990} (3)	θ_{OLS}^{2000} (4)	Number (5)	Number WLS (6)
ADR	-0.04407**	-0.04912**	-0.15406	-0.10401*	-0.00379**	-0.00025**
FINDEV	0.00225	0.00293	-0.02147	-0.00470	0.00687*	0.00548*
OPEN	0.00001	0.00002	-0.00006	0.00008	-0.00001	0.00001
TV	0.21942**	0.06638*	0.02823	0.17854	0.21717**	0.05328*
CONC	0.05470*	0.10742**	0.12854	0.20307**	0.02617	0.06697**
GDP	-0.00000**	-0.00000**	-0.00000	-0.00000**	-0.00000**	-0.00000**
Obs.	428	428	28	36	428	428
$R^2 OLS$	0.32	0.54	0.37	0.65	0.33	0.81

Panel B : Fixed-effect Estimation

	% (1)	% WLS (2)	Number (3)	Number WLS (4)
ADR	-0.05748**	-0.04922*	-0.00338*	-0.00019*
FINDEV	0.00007	-0.00115	0.00175	-0.00138
OPEN	0.00031**	0.00037**	0.00033**	0.00037**
TV	0.2065**	0.14297**	0.22333**	0.12723**
CONC	0.05419*	0.08016**	0.05342*	0.08869**
GDP	-0.00000	-0.00000	-0.00000	-0.00000
Obs.	428	428	428	428
R^2 FE	0.08	0.76	0.08	0.91

Panel C : Regression by Subsets - Groups of Countries

	Emerging Markets			Developed Markets		
	1973-2000	1981-1990	1991-2000	1973-2000	1981-1990	1991-2000
ADR	-0.05542*	-0.10114	-0.04292*	-0.01255	-0.02628	0.00049
FINDEV	-0.02465*	-0.06775	-0.03393**	0.00132	-0.01492	0.00112
OPEN	0.00003	-0.00035	0.00016*	0.00000	0.00004	-0.00001
TV	0.37124**	-0.72024	0.3748**	-0.04939	-0.03254	-0.03745
CONC	-0.03546	-0.01855	-0.07777	0.09564**	0.04975	0.10659**
GDP	-0.00000	0.00000	-0.00000	-0.00000	0.00000	0.00000
Obs.	177	23	154	255	75	180
$R^2 OLS$	0.25	0.48	0.30	0.20	0.11	0.19

This table shows the results of alternative estimations of equation (20). % shows the results for the base specification, using least squares and the percentage of stocks cross-listed. % WLS shows the WLS estimates using the percentage of stocks cross-listed as measure of ADRs. θ_{OLS}^{1990} contains the cross-sectional regression in 1990, and θ_{OLS}^{2000} the results for 2000 only. Number shows the results using the number of ADRs and Number WLS uses the number of ADRs and WLS. The WLS estimation uses as weights the square root of the t-statistic of the pure country effects estimated in equation (2). Panel A shows the results with variables in levels, and Panel B shows the estimation using country fixed-effects. Panel C presents the results of separate cross-sectional regressions for emerging and developed markets, in different time periods. The dependent variable is the absolute country effect in each year. ADR is the percentage of ADRs or the number of ADRs , FINDEV is the ratio of market capitalization to GDP, OPEN is the openness of the country, TV is the turnover, CONC is the country concentration and GDP is the level of GDP per capita. ** means significance at the 1% level, and * at the 5% level.

Table V
Country Regression - One Standard Deviation

	OLS estimation		Fixed-Effect Estimation	
	St.Dev.	**+ 1 σ**	**St.Dev.**	**+ 1 σ**
ADR	3.0	**-13.4%**	2.4	**-13.8%**
FINDEV	14.3	**3.2%**	14.1	**0.1%**
OPEN	2168.0	**3.0%**	534.0	**16.8%**
TV	1.0	**21.1%**	0.9	**19.0%**
CONC	1.9	**10.5%**	1.9	**10.5%**
GDP	209890.2	**-55.6%**	132305.7	**-11.3%**

This table shows the impact that a change of one standard deviation of each independent variable has on the magnitude of pure country effects. The first two columns contain the results for the OLS estimation, and the last two the results for the estimation using country fixed-effects. Columns 1 and 3 (St. Dev.) have the standard deviation of each independent variable. Columns 2 and 4 (**+ 1** σ) report the change in country effects due to one standard deviation change, normalized by the standard deviation of the dependent variable. ADR is the percentage of ADRs, FINDEV is the ratio of market capitalization to GDP, OPEN is the openness of the country, TV is the turnover, CONC is the country concentration and GDP is the level of GDP per capita.

Table VI
Correlation of Pure Industry Effects and other variables - Full sample

	Pure IND	*ADR*	*SIZE*	*OPEN*	*TV*	*CONC*
Pure IND	1					
ADR	0.29	1				
SIZE	0.09	0.21	1			
OPEN	0.12	0.08	0.39	1		
TV	0.28	0.26	0.62	0.48	1	
CONC	0.10	0.16	-0.31	0.12	-0.06	1

Pure IND is the pure industry effect, ADR is the percentage of ADRs, Size is the log of market capitalization, OPEN is the openness of the industry, TV is the turnover and CONC is the industry concentration. All variables are measured in 2000.

Table VII
Time-Series Cross-Section Industry Regression

Panel A : OLS

	% (1)	% WLS (2)	θ^{1990}_{OLS} (3)	θ^{2000}_{OLS} (4)	Number (5)	Number WLS (6)
ADR	0.03903**	0.03901**	0.04214*	0.05240**	0.00010	-0.00007
SIZE	-0.00171*	-0.00071	0.00313	-0.00352	-0.00117	-0.00018
OPEN	0.00014	-0.00298*	0.00390	0.00495	-0.00089	-0.00319*
TV	0.16779**	0.21553**	0.08769	0.17159*	0.19427**	0.22393**
CONC	0.00547	0.02423**	0.01991	-0.02409	0.01384*	0.02927**
Obs.	439	439	36	36	439	439
$R^2 OLS$	0.14	0.82	0.18	0.40	0.10	0.61

Panel B : Fixed-effect Estimation

	% (1)	% WLS (2)	Number (3)	Number WLS (4)
ADR	0.0372**	0.01441	-0.00040	0.00283**
SIZE	-0.00277**	-0.00034	-0.00114	0.00240*
OPEN	-0.00482	-0.00623*	-0.00538	-0.00641*
TV	0.2509**	0.26066**	0.24827**	0.25977**
CONC	-0.02518*	-0.04152**	-0.03584**	-0.05639**
Obs.	439	439	439	439
$R^2 FE$	0.16	0.89	0.13	0.71

Panel C : Subsets

	Tradable			**Non-Tradable**		
	1973-2000	1981-1990	1991-2000	1973-2000	1981-1990	1991-2000
ADR	0.05103**	0.01131	0.06551**	-0.01285	-0.2954*	0.09707**
SIZE	-0.00208*	-0.00097	0.00055	0.00360	-0.00984*	0.01448**
OPEN	-0.00285	0.00637	-0.00866*	0.00002	0.00549	-0.00315
TV	0.15742**	-0.05509	0.38701**	0.14787*	0.79075*	0.07866
CONC	0.00189	0.00559	0.01280	0.05787	-0.04197	0.17171
Obs.	361	148	160	78	26	50
$R^2 OLS$	0.16	0.04	0.38	0.29	0.32	0.62

This table shows the results of alternative specifications of equation (21). The first column shows the results for the base specification, using least squares and the percentage of stocks cross-listed. The second column shows the WLS estimates using the percentage of stocks cross-listed as measure of ADRs. θ^{1990}_{OLS} contains the cross-sectional regression in 1990, and θ^{2000}_{OLS} the results for 2000 only. Number shows the results using the number of ADRs and Number WLS uses the number of ADRs and WLS. The WLS estimation uses as weights the square root of the t-statistic of the pure industry effects estimated in equation (2). Panel A shows the results with variables in levels, and Panel B shows the estimation using industry fixed effects. Panel C presents the results of separate cross-sectional regressions for tradable and non-tradable industries, in different time periods.The dependent variable is the absolute industry effect in each year. ADR is the percentage of ADRs or the number of ADRs, Size is the log of market capitalization, OPEN is the openness of the industry, TV is the turnover and CONC is the industry concentration. ** means significance at the 1% level, and * at the 5% level.

Table VIII
Industry Regression - One Standard Deviation

	OLS estimation		**Fixed-Effect Estimation**	
	St.Dev.	**+ 1 σ**	**St.Dev.**	**+ 1 σ**
ADR	6.0	**23.5%**	5.2	**19.4%**
SIZE	80.6	**-13.8%**	72.2	**-20.0%**
OPEN	29.8	**0.4%**	15.3	**-7.4%**
TV	1.8	**30.2%**	1.8	**45.6%**
CONC	6.9	**3.8%**	4.3	**-10.8%**

This table shows the impact that a change of one standard deviation of each independent variable has on the magnitude of pure industry effects. The first two columns contain the results for the OLS estimation, and the last two the results for the estimation using industry fixed-effects. Columns 1 and 3 (St. Dev.) have the standard deviation of each independent variable. Columns 2 and 4 (**+ 1** σ) report the change in industry effects due to one standard deviation change, normalized by the standard deviation of the dependent variable. ADR is the percentage of ADRs, Size is the log of market capitalization, OPEN is the openness of the industry, TV is the turnover and CONC is the industry concentration.

Table IX
Industry conversions: STAN - FTSE

FTSE (DATASTREAM) SECTORS	STAN SECTORS
AEROSPACE & DEFENCE	AIRCRAFT AND SPACECRAFT
AUTOMOBILES & PARTS	MOTOR VEHICLES, TRAILERS AND SEMI-TRAILERS
BANKS	FINANCIAL INTERMEDIATION
BEVERAGES	FOOD PRODUCTS AND BEVERAGES
CHEMICALS	CHEMICALS AND CHEMICAL PRODUCTS
CONSTRUCTION & BUILDING MATERIALS	CONSTRUCTION
DIVERSIFIED INDUSTRIALS	TOTAL MANUFACTURING
ELECTRICITY	ELECTRICITY, GAS AND WATER SUPPLY
ELECTRONIC & ELECTRICAL EQUIPMENT	.ELECTRICAL AND OPTICAL EQUIPMENT
ENGINEERING & MACHINERY	MACHINERY AND EQUIPMENT
FOOD & DRUG RETAILERS	WHOLESALE AND RETAIL TRADE; REPAIRS
FOOD PRODUCERS & PROCESSORS	FOOD PRODUCTS AND BEVERAGES
FORESTRY & PAPER	PULP, PAPER, PRINTING AND PUBLISHING
GENERAL RETAILERS	WHOLESALE AND RETAIL TRADE; REPAIRS
HEALTH	HEALTH AND SOCIAL WORK
HOUSEHOLD GOODS & TEXTILES	TEXTILES
INFORMATION TECHNOLOGY HARDWARE	OFFICE, ACCOUNTING AND COMPUTING MACHINERY
INSURANCE	INSURANCE AND PENSION FUNDING
INVESTMENT COMPANIES	ACTIVITIES RELATED TO FINANCIAL INTERMEDIATION
INVESTMENT ENTITIES	INSURANCE AND PENSION FUNDING
LEISURE & HOTELS	HOTELS AND RESTAURANTS
LIFE ASSURANCE	INSURANCE AND PENSION FUNDING
MEDIA & ENTERTAINMENT	OTHER COMMUNITY, SOCIAL AND PERSONAL SERVICES
MINING	MINING AND QUARRYING EXCEPT ENERGY
OIL & GAS	MINING AND QUARRYING OF ENERGY MATERIALS
PERSONAL CARE & HOUSEHOLD PRODUCTS	TOTAL MANUFACTURING
PHARMACEUTICALS & BIOTECHNOLOGY	PHARMACEUTICALS
REAL ESTATE	REAL ESTATE ACTIVITIES
SOFTWARE & COMPUTER SERVICES	POST AND TELECOMMUNICATIONS
SPECIALITY & OTHER FINANCE	RENTING OF M&EQ AND OTHER BUSINESS ACTIVITIES
STEEL & OTHER METALS	BASIC METALS, MACHINERY AND EQUIPMENT
SUPPORT SERVICES	OTHER COMMUNITY, SOCIAL AND PERSONAL SERVICES
TELECOMMUNICATION SERVICES	POST AND TELECOMMUNICATIONS
TOBACCO	TOBACCO PRODUCTS
TRANSPORT	TRANSPORT AND STORAGE
UTILITIES, OTHER	ELECTRICITY, GAS AND WATER SUPPLY

This table shows the conversions used for the STAN database. The first column contains the industry names from FTSE, used by Datastream. The second column has the STAN industries associated with the ones from FTSE.

Figure 1. Mean Absolute Deviation of Country and Industry Effects