Does Institutional Ownership Matter for International Stock Return Comovement?*

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Abstract

We study the link between international stock return comovements and institutional investment. We test whether the rise of institutional ownership has increased cross-country correlations and decreased cross-industry correlations. Using stock-level institutional holdings across 45 countries during the 2001-2010 period, we find that industry and global factors are relatively more important than country factors in explaining stock return variation among stocks with higher institutional ownership. Industry diversification strategies are more beneficial than country diversification strategies for stocks with high institutional ownership. We show that cross-border portfolio investment is a powerful force of international capital market integration and convergence of asset prices.

JEL classification: F36, G11, G15

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1. Introduction

How has globalization affected the convergence of asset prices across countries? An avenue to answer this question is the debate about the importance of country versus industry effects in explaining international stock return comovements. In this paper, we contribute to this debate by examining the role of institutional investors in promoting the convergence of asset prices across countries.

The study of the determinants of international stock return comovements is central to the international finance literature. In a classical contribution, Heston and Rouwenhorst (1994) argue that country-specific factors are more important drivers of volatility than cross-country industry factors. Many other studies confirm that country factors play a bigger role in explaining stock return variation than industry factors (e.g., Griffin and Karolyi, 1998; Sonney, 2009). These findings have been challenged by Baca, Garbe, and Weiss (2000) and Cavaglia, Brightman, and Aked (2000), among others, who find a rise in industry effects in the late 1990s. However, Baele and Inghelbrecht (2009) and Bekaert, Hodrick, and Zhang (2009) attribute this apparent rise in industry effects as a temporary phenomenon stemming from the information technology bubble in the 1990s, rather than a structural change.

Research also shows that globalization has had limited effects on the convergence of asset prices across countries (e.g., Karolyi and Stulz, 2003; Bekaert and Wang, 2009). The European economic and monetary integration in the 1990s (Rouwenhorst, 1999) and the euro adoption in the 2000s (Berkaert et al., 2013) also had minimal effects on the relative importance of country and industry effects and on integration in the European capital markets. These results are surprising in light of the disappearance of formal barriers to international trade and capital flows over the last several decades. Stulz (2005, pp 1633) states that “Although barriers to international

investment have fallen sharply over the last 50 years, the impact of financial globalization has been limited — countries still matter a great deal."

In this paper, we examine the role of institutional investors who invest worldwide as agents of financial globalization. Institutional portfolio managers, such as mutual funds, insurance companies, bank trusts, pension funds, and hedge funds, are playing an increasing role in capital markets around the world. According to the International Monetary Fund (2011) (IMF), institutional investors managed financial assets exceeding $60 trillion (including $25 trillion in equities) as of 2009, three times more than in 1995. As these investors pursue more industry- and global-focused portfolio strategies, asset prices should converge across countries. Thus, we expect that global and industry factors matter more for firms with higher institutional ownership, and conversely country factors should matter less. Of course, institutional investors could alternatively exhibit "home bias" (French and Poterba, 1991; Chan, Covrig, and Ng, 2005) and constrain these cross-border integration effects.

We use a comprehensive data set of institutional equity holdings to examine whether global and industry factors become more important relative to country factors in explaining stock return variation for firms in which institutional investors have a larger stake. The data covers institutional stock holdings of over 20,000 stocks from 45 countries, which exceed $18 trillion as of December 2010. Institutional ownership is about 40% at the end of 2010. Institutional ownership is highest in the U.S. market (where it represents over 70%), although institutional ownership increased at a fast pace in other countries during the 2001-2010 sample period.

As a first piece of evidence, we show that mutual funds are increasingly following global, regional and foreign portfolio strategies (i.e., benchmarks) rather than domestic strategies. In addition, the degree of international diversification of institutional investors' portfolios has

increased over time.

We then estimate global, country, and industry factors using Heston and Rouwenhorst's (1994) dummy variable model. These authors employ country and industry dummies to explain stock returns. This model has been criticized since the authors apply constant and unit betas to country and industry specific factors. We use a factor model to overcome this issue where country and industry returns are used as factors, as in Marsh and Pfleiderer (1997) and Brooks and Del Negro (2006). The factor model we use is a parsimonious way to tackle the limitations of the Heston and Rouwenhorst (1994) model, although it is not the only possible alternative. Bekaert, Hodrick, and Zhang (2009) suggest a range of different risk-based models and find that a Fama and French and APT risk-based model fits the data covariance structure the best when regional factors are incorporated in addition to global factors, and when a time-varying beta model is used. We employ both the dummy variable and factor models and decompose returns into global, country, industry, and idiosyncratic components for all stocks and then for portfolios of stocks sorted by levels of institutional ownership. In both models, we use stock as the unit of measurement following Heston and Rouwenhorst (1994).

We confirm previous findings (e.g., Heston and Rouwenhorst, 1994; Griffin and Karolyi, 1998; Bekaert, Hodrick, and Zhang, 2009) that country effects dominate industry factors when we decompose the international variation of stock returns based on both the dummy variable and factor models. The average absolute country effect for the full sample is 9.3% per year, whereas the average absolute industry effect is 5.5% per year, which implies that the average ratio of the absolute country-to-industry effects is 1.8 based on the dummy variable model. Furthermore, we find that the average absolute of the global effect for the full sample (15.9% per year) is of a greater magnitude than that of the country and industry factors. As expected from previous

studies, the idiosyncratic component is much larger than the three other sources of variation (global, country and industry), with an average absolute deviation of nearly 50% per year. We find that the relative magnitude of country effects versus industry factors became even more important over our sample period (2001-2010). The average ratio of the absolute country-to-industry effects tripled from about one in 2001 to three in 2010. The estimates based on the factor model are of similar magnitude but country effects are more dominant relative to industry effects (the average ratio of the absolute country-to-industry effects is 2.8).

We also examine the relative importance of country and industry factors in explaining global stock return variation in portfolios of stocks formed according to levels of institutional ownership. We find that global and industry effects dominate country effects for stocks with high levels of institutional ownership, while country effects dominate industry effects for stocks with low levels of institutional ownership. Furthermore, the increased importance of industry effects versus country effects is more pronounced in the case of stocks where the relative importance of foreign institutional investors is higher. These findings are consistent for both the dummy variable and factor models. Overall, our findings show that stock return comovements are different for stocks with high institutional ownership where the marginal investors setting asset prices are more likely to be institutional investors.

We perform several robustness checks of our main findings. A concern is that our findings are exclusively driven by U.S. stocks. It is important to note that the average institutional ownership is significantly higher in U.S. stocks than elsewhere. We obtain similar findings if we restrict the analysis to the sample of non-U.S. stocks. Another concern is that our findings are driven by firm size as institutional investors tend to overweight large stocks. We show that our primary findings persist if we control by firm size by taking the component of institutional

ownership that is orthogonal to firm size. Furthermore, we do not find that market capitalization, by itself, has a similar effect on the relative importance of country and industry effects in explaining global stock market return variation. We also find similar patterns on the relative importance of country and industry effects in stocks with different levels of institutional ownership in several subsamples of countries and stocks.

We examine the implications of our results for portfolio diversification. We present a non-parametric visualization of the benefits of portfolio diversification among alternative geographical versus industrial allocation strategies. We show that *industrial* allocation is more beneficial for risk reduction in stocks with high institutional ownership, while *country* allocation is more beneficial for risk reduction in stocks with low institutional ownership. These findings support the notion that stocks with high institutional ownership offer fewer benefits in terms of cross-country diversification.

Finally, we run a natural experiment using the stocks' additions to the Morgan Stanley Capital International (MSCI) All Country World Index (ACWI). This exploits the exogenous increase in foreign institutional ownership (and insignificant change in domestic institutional ownership) that follows the addition of a stock to the MSCI ACWI index. We find that higher foreign institutional ownership leads to a subsequent increase in the comovement between the stock returns and the global index returns relative to the comovement between the stock returns and the local index returns.

We contribute to the literature on the effects of financial globalization on asset prices. There are several recent studies that examine the impact of institutional investor investing on cross-market stock comovement patterns. Broner, Gelos, and Reinhart (2006) and Hau and Rey (2008) examine the role of cross-border institutional investors in "contagion" effects. Bartram et al.

(2015) show that international ownership linkages (i.e., common ownership) are of similar economic significance as country and industry factors in explaining international stock returns. We also contribute to the country-industry debate by showing that institutional investment increases the relative importance of industry factors (and global factor) and decreases the relative importance of country factors. Overall, we show that the presence of institutional investors contributes to the convergence of asset prices across countries.

2. Data

The initial sample includes all publicly traded firms from January 2000 through December 2010 (132 months) included in the Worldscope database. We draw monthly U.S. dollar and local currency-denominated returns from Datastream. We apply several screening procedures for monthly returns, as suggested by Ince and Porter (2003). First, any return above 300% that is reversed within one month is treated as missing. Second, in order to exclude remaining outliers in returns, we treat the monthly returns that fall outside the 0.1% to 99.9% range in each country as missing. In order to minimize potential biases arising from illiquid and low-priced stocks, we also exclude stocks with market capitalization below $10 million and stock price below $1 at the end of the previous month. Finally, we require that a country has at least 20 stocks at all times to be included in the analysis.

The sample includes an average of 18,348 firms from 45 countries that include both developed and developing nations. At the end of the sample period, December 2010, the sample is comprised of 22,889 firms. A few countries represent a large fraction of the world total market capitalization and number of firms. U.S. firms account for about 40% of total market capitalization on average over the sample period, whereas the six other G7 countries (Canada, France, Germany, Italy, Japan, and United Kingdom) account for an additional 30% of the

market capitalization. The number of industries is not uniform across countries, although many countries include firms from across all industries (17 industries). We use the Fama-French 17 industries classification in order to get a good partition of the universe of firms when we split the sample into deciles. However, using only 17 industries may create a bias against finding industry effects, as Beckers, Connor, and Curds (1996) and Griffin and Karolyi (1998) show that industry effects grow with a finer definition of industrial sectors.[2] There are some more global industries than others. Financials, food, and construction exist in more countries. The industry with greatest weight is financials, as it accounts for 24% of total market capitalization. Almost all countries and industries exhibit positive average stock returns in the full sample period (with the exception of Greece).[3]

Institutional investors' portfolio holdings are from the FactSet/LionShares database. Institutional investors are defined as delegated portfolio managers that have discretionary mandates, such as mutual funds, bank trusts, insurance companies, investment managers and advisors, pension funds, and others including endowments or hedge funds. FactSet/LionShares collects ownership data directly from public sources including national regulatory agencies, stock exchanges, industry directories, and company proxies, as described in Ferreira and Matos (2008). In calculating institutional ownership, we include ordinary shares, preferred shares, American Depositary Receipts (ADRs), Global Depositary Receipts (GDRs), and dual listings. We handle the issue of different reporting frequencies by institutions in different countries by using the latest holdings update at each quarter-end. We then assume institutional holdings are held constant within each quarter for each firm. FactSet/LionShares provides holdings data for more than 5,700 institutions, with positions exceeding a total of $18 trillion as of December

[2] In Section 5, we provide several robustness checks using alternative industry definitions.
[3] Table A1 of the Online Appendix reports descriptive statistics by country and industry.

2010.

The main variable in this study is total institutional ownership (*IO*), which corresponds to the sum of all holdings by institutions in a firm's stock divided by the market capitalization at the end of each quarter. We break down institutional ownership based on the institution's nationality (i.e., a domestic institution is a money manager that is domiciled in the same country where the firm is incorporated). Domestic (foreign) institutional ownership corresponds to the sum of holdings by domestic (foreign) institutions divided by the stock market capitalization at the end of each quarter. Countries differ markedly in terms of institutional ownership. Over the 2001-2010 sample period, institutional ownership is highest for U.S. firms, with institutions holding 70% of outstanding shares. Institutional ownership is lower for firms domiciled in other countries, where it represents, on average, 20%. There are other countries with high institutional ownership levels such as Canada (48%) and Sweden (31%). Shares are predominantly held by domestic institutions in the case of U.S. stocks but, elsewhere in the world, domestic and foreign institutional holdings are more balanced with averages, respectively, of 6% and 14% over the sample period.

Figure 1 shows the evolution of institutional ownership for the 2001-2010 sample period. Panel A shows that total institutional ownership remained constant at about 40% during the 2000s. However, domestic and foreign institutional ownership present strikingly different evolutions over the 2000s, with domestic ownership increasing and foreign ownership decreasing. This is a result of a shift in weight into non-U.S. markets.[4] Panel B shows the rise of institutional ownership in the sample of non-U.S. stocks. We can see that most holdings are from foreign-based institutions, although domestic holdings have also grown.

[4] IMF (2011) survey data also shows that investors domiciled in the United States still account for almost half of all assets under management in the 17 OECD countries, although their share is declining.

We use mutual funds' benchmarks to provide preliminary evidence that institutional investors pursue more global-focused portfolio strategies. The benchmarks are assigned by Lipper according to its assessment of a fund's investment strategy. We classify benchmarks into four categories: global (funds that invest worldwide), regional (funds that invest in a specific geographic region), foreign (funds that invest in a foreign country) and domestic (funds that invest in a specific country). We then track the relative importance of these four categories of funds' benchmarks over time. Figure 2 presents the ratio of the total net assets (TNA) in domestic benchmarks to the TNA in foreign, regional or global benchmarks. There is a substantial decrease in all the three ratios from 2000 to 2010, i.e., the relative proportion of funds with domestic-focused strategies has decreased substantially during the sample period. The ratio of domestic to foreign benchmarks has decreased from 35 in the early 2000s to approximately 10 in 2010. The same pattern is observed for the ratios of domestic to regional and domestic to global benchmarks although the magnitudes are smaller. We conclude that there is a trend for mutual funds to follow more foreign-, regional- and global-focused portfolio strategies.

We also study whether institutional investors are increasing the level of international diversification of their portfolios by investing in more countries. For each month, we compute a proxy of the country concentration of the institutional investor's portfolios. We then compute a value weighted-average measure of concentration using as weight the TNA of each institutional investor. We impose the criteria that a country/institutional investor pair is considered only if there are at least five stocks in the pair. We use three proxies for the country concentration of the institutional investor's portfolios. The first proxy is the number of countries where they invest in. Figure 3 shows that the average number of countries increases from about 15 in 2000 to about 25 in 2010, indicating that institutional investors are investing in a significantly higher number of

countries in 2010 as compared to 2000. The two other proxies consider the portfolio Herfindahl index, defined as:

$$HHI_{i,t} = \sum_{j=1}^{N_{i,t}} w_{i,t}^2 \quad (1)$$

where $N_{i,t}$ is the number of countries where the institutional investor *i* in month *t* is invested in and $w_{i,t}$ is the relative market value invested in each country or the relative number of stocks invested in each country. Figure 3 presents a clear decreasing pattern in concentration measures over the period 2000-2010.

This preliminary evidence shows that institutional investors have become more global and regional and less country-specific oriented in their investments. In the next sections, we investigate the relation between stock return comovement and institutional investments.

3. Decomposing Stock Return Variation

We use the Heston and Rouwenhorst (1994) dummy variable model and a factor model to study the importance of global, country, and industry factors in explaining global stock return variation.

3.1 Heston and Rouwenhorst Model

The Heston and Rouwenhorst (1994) approach is one of the most commonly-used models in the international finance literature.[5] In the model, it is assumed that each individual stock return can be decomposed into four components: a global common factor, a country factor, a global industry factor, and a firm-specific factor. The return of stock *i* traded in country *k* and that belongs to industry *j* is:

[5] This model has been used in Heston and Rouwenhorst (1995), Griffin and Karolyi (1998), Campa and Fernandes (2006), Bekaert, Hodrick, and Zhang (2009), Bai and Green (2010), among others.

$$r_{it} = \alpha_t + \delta_{kt} + \gamma_{jt} + \varepsilon_{it}, \quad (2)$$

where r_{it} is the return at time t, α_t is a global factor that is a term common to every stock in period t, δ_{kt} and γ_{jt} are the country and industry components of the stock return, respectively, and ε_{it} is an idiosyncratic component encompassing all unexplained variation (with mean zero, finite variance, and uncorrelated across stocks).

To estimate the realizations of the global factor, country factors, and industry factors, we estimate for each month t the following cross-sectional regression of individual stock returns on a set of country and industry dummy variables:

$$r_{it} = \alpha_t + \sum_{k=1}^{45} \delta_{kt} C_{kt} + \sum_{j=1}^{17} \gamma_{jt} S_{jt} + \varepsilon_{it}, \quad (3)$$

where C_{kt} is a dummy variable that equals one if stock i is traded in country k and S_{jt} is a dummy variable that equals one if stock i belongs to industry j. The 45 country dummies as well as the 17 (Fama-French) industry dummies add up to the unit vector across firms. It is not possible to estimate the regression in equation (2) directly because of perfect multicollinearity between the regressors. Following Heston and Rouwenhorst (1994) and others, we impose the constraints that the weighted sum of the country coefficients and the weighted sum of the industry coefficients equal zero, where the weights are the market capitalization of the stocks. Under these restrictions, the weighted least-squares estimate of the regression intercept is the value-weighted average world stock market index return. We obtain 45+17 time series of pure country (δ_{kt}) and industry (γ_{jt}) effects. For example, the estimated pure country effect can be interpreted as the return (in excess of the world market index return) of a portfolio of stocks in country k that has the same industry composition as the world value-weighted index (i.e., return of a "pure country tilt"). Similarly, the estimated pure industry effect can be interpreted as the return (in excess of the world market index return) of a portfolio of stocks in industry j that has the same country

composition as the world value-weighted index (i.e., return of a "pure industry tilt").

We then use the time series of estimated δ_{kt} and γ_{jt} to determine the relative importance of the country and industry factors. We use the mean absolute deviation (*MAD*) metric proposed by Rouwenhorst (1999):

$$MAD_t^C = \sum_{k=1}^{45} w_k |\delta_{kt}| \tag{4a}$$

$$MAD_t^I = \sum_{j=1}^{17} w_j |\gamma_{jt}|, \tag{4b}$$

where w_k and w_j are the value weights of country *k* and industry *j*, respectively, in the world value-weighted market. The country (industry) *MAD* can be interpreted as the capitalization weighted average tracking error of the returns on industry-neutral (country-neutral) country (industry-neutral) portfolios. The higher the country (industry) *MAD*, the more disperse are the country (industry) returns in that period. We compute the 12-month rolling window mean of *MAD*s to reduce estimation error. Finally, we compute the ratio of the country *MAD* relative to industry (global) *MAD*s to gauge the relative importance of country factors versus industry (global) factors. A ratio that is greater than one implies that country factors are more relevant than industry (global) factors in explaining the variance of international stock market returns.

3.2 Factor Model

One of the drawbacks of the Heston and Rouwenhorst (1994) model is the assumption that all stocks have the same (unit) loadings on the country and industry factors. Another drawback is that it restricts all companies to be a member of one country and one industry, and this assumption is not applicable to conglomerates or multinational firms.

We propose an alternative model to understand the importance of global, country, and industry factors in explaining global stock return variation that overcomes the limitation of the dummy variables model. We use a factor model where country and industry portfolio returns are

used as factors, as in Marsh and Pfleiderer (1997) and Brooks and Del Negro (2006).[6]

We estimate for each month *t* the following cross-sectional regression of individual stock returns on country and industry portfolio returns:

$$r_{it} = \alpha_t + \delta_t r_{ct} + \gamma_t r_{st} + \varepsilon_{it}, \quad (5)$$

where α_t is a global factor, r_{ct} is the value-weighted return of all stocks that belong to country *c* and r_{st} is the value-weighted return of all stocks that belong to industry *s*, and ε_{it} represents the idiosyncratic shock to the return on stock *i* in month *t*. We orthogonalize industry factors for each month using the residuals of the OLS regression of industry factors on country factors.[7] We then estimate for each month *t* the cross-sectional regression (5) of individual stock returns on country and industry factors.

The variance of returns can be decomposed as the sum of country, industry, and idiosyncratic firm variances:

$$Var(r_{it}) = \alpha_t^2 + \delta_t^2 Var(r_{ct}) + \gamma_t^2 Var(r_{st}) + Var(\varepsilon_{it}). \quad (6)$$

The global standard deviation (*SD*) is given by the square root of the first term on the right-hand side of equation (5). Similarly, the country-specific *SD* is given by the square root of the second term, and the industry-specific *SD* is given by the square root of the third term. The last term corresponds to the idiosyncratic *SD* component. We then compute the 12-month rolling window arithmetic mean of the *SD* components estimates. Finally, we measure the importance of country versus industry (global) effects using the ratio of country *SD* to industry (global) *SD*s.

[6] Brooks and Del Negro (2005) alternatively estimate a latent factor model in which loadings are not constrained to unity. There are, however, two critiques to this approach. First, the authors need a balanced sample to be able to estimate the model and, therefore, results suffer from survivorship bias, as each stock would need to be alive over the entire sample period. Second, their conclusions are over averages along the sample period.

[7] It may be argued that this orthogonalization variable order may lead to different results. As a consequence, we run the factor model by taking the industry factors and use the residuals of an OLS regression of country returns on industry returns as the country factor. The results are not substantially affected.

4. Empirical Results

4.1 Heston and Rouwenhorst Model Results

Table 1 presents the results of the return decomposition into global, country, and industry effects using the dummy variable model of Heston and Rouwenhorst (1994). Several studies have documented that comovements within countries are more important drivers of international stock return variation than industry factors. The first objective of our analysis is to revisit these findings for the 2001-2010 period and also for the more extensive sample of countries that we examine. Panel A of Table 1 presents the results. The average absolute country effect for the full sample is 9.3% per year, whereas the average absolute industry effect is 5.5% per year. These results imply that the average ratio of the absolute country-to-industry effects is 1.8 based on the dummy variable model. We also find that the average absolute of the global effect for the full sample (15.9% per year) is of greater magnitude than that of the country and industry factors. Of course, the idiosyncratic component is much larger than the three other sources of variation with an average absolute deviation of about 50% per year. These estimates are in line with previous findings and confirm that country effects dominate industry effects in explaining global stock return variation. In Table 1, Panel B shows the results for the sample of non-U.S. stocks. The estimates are similar to those for the sample of all stocks, although with a higher country effect and a lower industry effect. This implies that the average ratio of the country-to-industry *MAD*s is higher at 2.5 over the full sample period.

Panel A of Figure 4 presents the time series of the country and industry *MAD* estimates from the dummy variable model for the sample of all stocks, while Panel A of Figure 5 presents the time series of the ratio of country-to-industry effects. Over time, we find that the relative magnitude of country effects versus industry factors has become even more important during our

sample period (2001-2010). The average ratio of the absolute country-to-industry effects tripled from about one in 2001 to three in 2010. The findings are consistent with the notion that the increased importance of industry factors relative to country factors in the late 1990s and early 2000s was a short-lived phenomenon, as suggested by Bekaert, Hodrick, and Zhang (2009).

Institutional investors have been gaining in importance as shareholders of corporations worldwide. These investors are increasingly becoming the marginal traders that set asset prices across markets. As these investors pursue more industry or global focused strategies, asset pricing should become integrated across market boundaries. In other words, we expect that global and industry effects should be stronger for firms with higher institutional ownership, and country factors should matter less. We now test this hypothesis.

We study the decomposition of stock return volatility for stocks based on the level of total institutional ownership. Each month, we sort stocks into deciles based on total institutional ownership.[8] We then estimate the dummy factor model separately for the stocks in each decile. We report the value-weighted *MAD* of the global, country, industry, and idiosyncratic factors for each institutional ownership decile.

We find that the relative importance of the country and industry effects in explaining stock return variation differs significantly across institutional ownership deciles.[9] In Panel A (all stocks) of Table 1, we find that the time-series mean *MAD* of the country effect decreases from 16.0% per year going from decile 1 (low institutional ownership) to 0.8% per year for decile 10 (high institutional ownership). In contrast, the time-series mean *MAD* of the industry effect increases from 6.0% per year going from decile 1 to 8.8% per year for decile 10. This implies

[8] Firms without institutional investors are excluded from the analysis, since this group is quite heterogeneous in terms of its characteristics.

[9] The results reported in Table A7 of the Online Appendix are similar when we sort stocks based on quintiles of institutional ownership. We also perform the analysis using deciles of domestic and foreign institutional ownership. These results are reported in Tables A9 and A11 of the Online Appendix.

that the ratio of country-to-industry mean *MAD*s decreases dramatically from 2.7 for decile 1 to 0.1 for decile 10. The difference in the country-to-industry ratio between decile 1 and decile 10 is statistically significant at the 1% level. In addition, we find that the average absolute of the global effect for the full sample is of larger magnitude than that of the country and industry factors across all portfolios. As expected from previous studies, the idiosyncratic component is much larger than the three other sources of variation (global, country and industry) across all portfolios but it declines significantly from decile 1 (57% per year) to decile 10 (39% per year). We also find that the ratio of country to global mean *MAD*s decreases dramatically from decile 1 to decile 10.

Table 1, Panel B shows the results for the sample of non-U.S. stocks. We observe a similar pattern to that in Panel A as country effects become less important and industry effects become more important as institutional ownership increases. The effect is not as pronounced as for the sample of all stocks because the decrease in the country factor is less pronounced. The difference between Panels A and B is due to U.S. stocks that have an average total institutional ownership significantly higher than stocks from other countries. The increase in the industry factor is similar to that in Panel A. In terms of the ratio of country-to-industry mean *MAD*s, we still observe an economical and statistical significant decrease in the ratio with institutional ownership. The ratio of country-to-industry effects decreases from 2.8 for decile 1 to 1.1 for decile 10; the difference between deciles 1 and 10 is statistically significant. Similarly, the mean ratio of country to global *MAD* decreases from 1.2 for decile 1 to 0.5 for decile 10 and this difference is statistically significant.

Panels B and C of Figure 4 present the time series of the country and industry *MAD* estimates from the dummy variable model for decile 1 and decile 10, while Panels B and C of Figure 5

present the corresponding time series of the ratio of country-to-industry effects and to global effects. Country effects are consistently higher in decile 1 than in decile 10 throughout the sample period. Country effects in the portfolio of stocks with high institutional ownership (decile 10) are negligible. Industry effects are higher in decile 10 than in decile 1, especially in the early and late 2000s. The ratio of country-to-industry effects is consistently above 2 in decile 1 throughout the sample period, while it is close to zero for decile 10.[10]

Overall, we conclude that for firms with higher institutional ownership, country effects matter less than global and industry effects. This is explained by a rise in industry effects and a decrease in country effects. This finding is consistent with the idea that institutional investors promote the convergence of asset prices across countries.

4.2 Factor Model Results

Table 2 presents the results of the return decomposition into global, country, and industry effects using the factor model. Panel A shows the mean of the standard deviation of each return component over the full sample period for all stocks. The average standard deviation of the country factor for the full sample is 12.7% per year, whereas the average standard deviation of the industry factor is 4.9% per year. These results imply that the average ratio of the absolute country-to-industry effects is 2.8 based on the factor model. Thus, the relative importance of the country factors versus the industry factors is more pronounced in the factor model than in the dummy variable model. Panel B shows the results for the sample of non-U.S. stocks. The estimates are similar to those using all stocks with a ratio of country-to-industry effects even higher at 3.5. Figures 6 and 7 are comparable to Figures 4 and 5 but for the *SD* estimates of the factor model based on the cross-sectional regressions for each month in the sample. From

[10] Figures A1 and A2 of the Online Appendix report similar results when we exclude U.S. stocks.

Panel A, we find that the time series of the ratio of country-to-industry effects is similar to that from the dummy variable model with an increased importance of country effects relative to industry effects in the 2000s. These results provide support for Heston and Rouwenhorst (1994), Griffin and Karolyi (1998), Rouwenhorst (1999), and Bekaert, Hodrick, and Zhang (2009).

We now examine the relative importance of country and industry effects for stocks with different levels of institutional ownership. In Table 2 we confirm the findings of Table 1 using the Heston and Rouwenhorst (1994) dummy variable model that the relative importance of the country and industry effects in explaining stock return variation differs significantly across institutional ownership deciles. The increase in industry effects relative to country effects is even more pronounced using the factor model. In Panel A (all stocks), we find that the mean *SD* of the country effect decreases from 16.2% per year for decile 1 (low institutional ownership) to 4.1% per year for decile 10 (high institutional ownership). In contrast, the mean *SD* of the industry effect increases from 3.1% per year going from decile 1 to 8.9% per year for decile 10. This implies that the ratio of country-to-industry mean *SD*s decreases dramatically from 5.5 for decile 1 to 0.5 for decile 10 and the difference is strongly significant. We see a similar pattern in Panel B for the sample of non-U.S. stocks with the ratio of country-to-industry *SD*s decreasing from 5.8 for decile 1 to 1.5 for decile 10.[11]

Panels B and C of Figure 6 present the time series of the country and industry *SD* estimates from the factor variable model for deciles 1 and 10 of institutional ownership. Figure 7 presents the corresponding time series of the ratio of country-to-industry effects. These figures confirm the patterns found in Figures 4 and 5 using the dummy variable model, but the effects are even more pronounced. We see that country effects have been consistently higher in decile 1 than in

[11] The results reported in Table A8 of the Online Appendix are similar when we sort stocks based on quintiles of institutional ownership. We also perform the analysis using deciles of domestic and foreign institutional ownership. These results are reported in Tables A10 and A12 of the Online Appendix.

decile 10 throughout the sample period, while industry effects have been consistently higher in decile 10 than in decile 1.[12]

In summary, the estimates from the factor model support the conclusion that for stocks with higher institutional ownership, the idiosyncratic component is lower and, more importantly, global and industry factors dominate country effects. This shows that patterns are different for firms where the marginal investors are institutional money managers. Thus institutional investor presence matters for understanding global stock return comovements.

5. Robustness

We conduct several robustness checks of our primary finding that the relative importance of country effects versus industry effects decreases significantly as institutional ownership increases.

5.1 Alternative Choices in the Analysis

Table 3 presents the estimates of the stock return variance decomposition using the factor model for different industry classifications, returns in local currency, alternative methods of controlling for firm size, changing the orthogonalization method, and different geographical and industry subsamples. The results of the dummy variable model are economically the same and we provide them upon request. Table 3 shows the mean standard deviation of the components (global, country, and industry) for the full sample period for decile 1 (low institutional ownership) and decile 10 (high institutional ownership), as well as the ratios of country-to-industry and country-to-global effects.

The first robustness check deals with alternative industry classification schemes for the Fama-French 17 industries used in our primary findings. Beckers, Connor, and Curds (1996) and

[12] Figures A3 and A4 of the Online Appendix report similar results when we exclude U.S. stocks.

Griffin and Karolyi (1998) show that estimated industry effects are larger if one uses a finer definition of industrial sectors. We analyze this by running the same regressions using three different classification schemes: two-digit SIC codes, Fama-French 49 industries, and Fama-French 10 industries. We present the results under the panel "Industry Classification" in Table 3. Industry effects are more important with a finer industry classification but we confirm previous findings that industry effects dominate country effects for high institutional ownership stocks, while country effects dominate industry for low institutional ownership stocks. For example, in the case of the two-digit SIC code, the ratio of country-to-industry effects is 2.6 for decile 1 and 0.4 for decile 10 and the difference is strongly statistically significant. We next check the robustness of the results to the use of returns denominated in local currency, rather than U.S. dollar returns. The results presented in row "Returns in Local Currency" of Table 3 are similar to before with a ratio of country-to-industry effects of 5.0 for decile 1 and 0.5 for decile 10.

An important concern is whether the effect of institutional ownership on the relative importance of country and industry effects is different from the effect of firm size. Indeed, it is well know that institutional investors overweight large stocks (Gompers and Metrick, 2001; Ferreira and Matos, 2008), therefore there is a strong positive correlation between total institutional ownership and firm size. We use three strategies to address this concern. Following Nagel (2005), we sort stocks based on the residuals of a cross-sectional regression of institutional ownership on firm's market capitalization. Specifically, for each month, we regress the logistic transformed institutional ownership on the logarithm of firm size and its square. We use the residuals of each regression, denoted as residual institutional ownership, to sort stocks into deciles. The row "Residual Institutional Ownership" in Table 3 shows that the ratio of country-to-industry effects is 5.5 for decile 1 and 0.5 for decile 10 and the difference is significant.

The second approach is to simply sort stocks based on market capitalization. If the results were driven exclusively by firm size, then we would expect to find similar patterns for the ratio of country-to-industry effects. The row "Market Capitalization" in Table 3 shows that the ratio of country-to-industry effects is 2.4 for decile 1 and 1.7 for decile 10 and the difference although statistically significant is strongly reduced. Another concern with our findings is that the factor model requires that we orthogonalize industry relative to country returns. We check whether the results are sensitive to the order of orthogonalization by using the residuals of the regression of country returns on industry returns, rather than the reverse. We find, however, that the results are similar.

We also examine the results across samples of countries or industries. We consider the sample of only European stocks and Asia-Pacific stocks. European countries are of particular interest because of the advent of the single market and the euro, but Rouwenhorst (1999) and others fail to find that increasing economic and financial integration within the European Union results in increased cross-industry comovement. If we consider just a sample with European firms, we find that country-specific effects still matter substantially but our main results prevail in that stocks with high institutional ownership have significantly lower country-to-industry effects than stocks with lower institutional ownership. We see the same pattern in Pacific-Asia, although the institutional ownership effect is lower. Thus, the effect of institutional ownership on the importance of country and industry effects is pervasive across different geographic regions.

We also separate countries into developed and emerging markets. In developed markets, we find that the ratio of country-to-industry effects is 2.9 for decile 1 and 0.4 for decile 10. Similar to Griffin and Karolyi (1998), we find that emerging stock markets are less integrated. The effect of institutional ownership in emerging markets is less pronounced. The ratio of country-to-

industry effects only reduces from 3.5 for decile 1 to 2.9 for decile 10 but the difference is still strongly statistically significant. Results are also robust if we exclude the largest countries. In the sample of non-G7 countries, we also find that the ratio of country-to-industry effects drops significantly from decile 1 to decile 10.

The final robustness check is excluding specific sectors from the analysis. Baele and Inghelbrecht (2009) and Bekaert, Hodrick, and Zhang (2009) argue that the increase in global cross-industry comovements was a temporary phenomenon to the TMT sector. We exclude telecommunications, media, and technology (TMT) firms. We also exclude the financial sector due to the the effect of the financial crisis in 2007-2008. The last two rows in Table 3 show that our results are not significantly altered by excluding these two sectors.[13]

5.2 Firm Characteristics

In this section, we examine the heterogeneity of the effect of institutional ownership on the relative importance of country and industry effects for groups of firms based on several firm characteristics: firm size, turnover, analyst coverage, market-to-book, momentum, MSCI membership, foreign sales, and U.S. cross-listing. We present the results in Table 4.

We first sort stocks into monthly terciles of stock market capitalization. The difference in the ratio of country-to-industry effects between decile 1 and decile 10 of institutional ownership is higher in big stocks (high tercile) than in small stocks (low tercile) and is significant in both cases. Even in the case of small stocks, the ratio of country-to-industry effects reduces from 2.6 in decile 1 to 1.1 in decile 10. We find similar results when we sort stocks on terciles of share turnover and analyst coverage. The difference is significant for both high liquidity stocks (high tercile) and low liquidity stocks (low tercile) but the difference is more important for the most

[13] Tables A2 and A4 of the Online Appendix show that the results are robust when we use the MAD measure and we exclude U.S. stocks, respectively.

liquid stocks. Stocks with higher analyst coverage (high tercile) also exhibit a stronger reduction in the relative importance of country versus industry effects with increased institutional ownership than stocks with lower analyst coverage (low tercile).

We then sort stocks into terciles of market-to-book ratio and momentum. We find that the ratio of country-to-industry effects is significantly lower for high institutional ownership stocks than low institutional ownership stocks. The magnitude of the effects is similar between value and growth stocks and between loser and winner stocks.

In Table 4, we also classify stocks based on proxies of firm visibility and investor recognition. We sort stocks on whether they are members of the MSCI All-Country World Index, an index with about 2,000 stocks worldwide that are commonly used by world or global stock index funds. Ferreira and Matos (2008) show that MSCI stocks are more likely to be owned by institutions than non-MSCI stocks because funds are typically benchmarked against the MSCI index or have investment mandates limiting risk relative to the MSCI index. We also classify stocks based on the percentage of foreign sales in total firm's sales. We define a firm as a multinational firm if this percentage is positive and as a non-multinational otherwise. We find that the reduction in the ratio of country-to-industry effects from low to high institutional ownership stocks is equally important and statistically significant across all these groups.

In Table 4, we also split the stocks into those with ADRs and without ADRs. ADRs enable U.S. investors to buy the securities of a foreign company without the accompanying risks or inconveniences of cross-border and cross-currency transactions. The effect of institutional ownership is significant in both groups.[14]

Overall, institutional ownership is an important determinant of the relative importance of

[14] Tables A3 and A5 of the Online Appendix show that the results are robust when we use the MAD measure and we exclude U.S. stocks, respectively.

country and industry effects in explaining global stock return variation. There is an important reduction in the ratio of country-to-industry effects with increased institutional ownership. The findings support the idea that institutional investors play an important role in integrating financial markets worldwide and this role is pervasive across all stocks.

5.3 Domestic versus Foreign Institutional Ownership

We now examine the influence of cross-border holdings in the relative importance of country versus industry effects. We sort stocks into deciles of domestic or foreign institutional investors and then within each decile we sort by total institutional ownership. Table 5 shows the decomposition of stock return variation for the different groups of stocks. We only show results for the low and high institutional ownership deciles for brevity. Panel A presents results for the sample of all stocks and Panel B for the sample of non-U.S. stocks.[15]

Panel A of Table 5 shows that the ratio of country-to-industry effects is significantly lower for decile 10 than for decile 1 of total institutional ownership in both the group of low and high domestic institutional ownership and the magnitude of the effect is similar. In the case of the foreign institutional ownership groups, the reduction in the ratio of country-to- industry effects is more pronounced in the group of stocks with high foreign institutional ownership than in the group of stocks with low institutional ownership. This is consistent with the idea that foreign institutional investors play a particularly important role in increasing cross-industry correlations and decreasing cross-country correlations.

6. Portfolio Diversification Implications

This section provides a different way to examine the results found so far using a non-parametric method. We use the same framework as in Heston and Rouwenhorst (1995) and

[15] Table A6 of the Online Appendix shows that the results are robust when we use the MAD measure.

Goetzmann and Kumar (2008) to compute the risk reduction that can be accomplished through the diversification alternatives relative to the average asset.

The diversification ratio for the alternative strategies (global, country or industry) is given by the variance of an equal-weighted portfolio relative to the average stock variance with equal weights:

$$\frac{Var\left(\frac{1}{N}\sum_{i=1}^{N} R_i\right)}{\frac{1}{N}\sum_{i=1}^{N} Var(R_i)} = \frac{1}{N} + \frac{N-1}{N}\frac{\overline{Cov(R_i,R_j)}}{\overline{Var(R_i)}} = \frac{1}{N} + \frac{N-1}{N}\overline{Corr(R_i,R_j)}, \quad (7)$$

where N denotes the number of stocks and the upper bars denote averages. Equation (7) shows that the risk reduction can come from either increasing the number of stocks, N, or decreasing the average correlation across stocks, $Corr(R_i, R_j)$. For the country diversification strategy, we diversify within an industry across countries. For each month, we randomly draw an industry and then within each industry randomly select N stocks. For the industry diversification strategy, we diversify across industries within a country. For each month, we randomly draw a country and then within each country randomly select N stocks. For the global strategy, we randomly select stocks with no restriction. We perform 1,000 simulations for each month for each strategy. We only use firms with complete observations in the last 60 months of the sample and industries or countries with at least ten stocks.

In Figure 8, we plot the portfolio diversification ratio in equation (7) of each strategy against the number of stocks in the portfolio. Panel A shows the results using the sample of all stocks. The country strategy shows greater portfolio diversification benefits than the industry diversification strategy. As the number of stocks becomes larger, the country (industry) strategy portfolio variance converges to 4% (11%) of the average variance of the stocks in the portfolio.

We next analyze the results for the stocks in deciles 1 and 10 of total institutional ownership. Figure 8, Panel B, shows the results for the sample of stocks in decile 1. The country strategy

(4% of average variance) provides significantly higher diversification benefits than the industry strategy (14%). Panel C for the sample of stocks in decile 10 presents a completely different pattern. The industry strategy (4% of average variance) provides significantly higher diversification benefits than the country strategy (8%).[16]

We conclude that industrial allocation is more beneficial for risk reduction in stocks with high institutional ownership, while country allocation is more beneficial for risk reduction in stocks with low institutional ownership. These findings support the notion that stocks with high institutional ownership offer less benefits in terms of cross-country diversification.

7. Natural Experiment

In this section we provide evidence that there is a causal effect of institutional investments on the convergence of asset prices across countries.

We exploit the fact that foreign institutions are more likely to invest in stocks that are members of the MSCI indexes, because international portfolios are typically benchmarked against these indexes. Specifically, we use stock additions to the MSCI ACWI as an exogenous variation to institutional ownership and study measures of comovement with local and global indexes in the years before and after the addition to the MSCI ACWI. We collect additional data return data at daily and weekly frequency from Datastream for stocks added to the MSCI ACWI over the sample period and indexes.

First, we hypothesize that when a firm is added to the MSCI ACWI, foreign institutional ownership increases. Table 6 shows that foreign institutional ownership increases by 2.3 percentage points in the year after the addition (relative to the year before the addition) and increases by 0.7 percentage points in the year after the addition (relative to the year of the

[16] Figure A5 of the Online Appendix reports similar results when we exclude U.S. stocks.

addition). These increases are both statistically significant at the 5% level. In addition, this increase is about 10 times larger than that in domestic institutional ownership for the latter. Domestic institutional ownership even decreases after the addition to the MSCI ACWI. There is no significant increase in domestic institutional ownership around additions. The results are qualitative the same when we exclude the additions of U.S. stocks. The evidence is consistent with an increase in foreign institutional ownership around stock additions to the MSCI AWCI, but with no increase in domestic institutional ownership. This allows us to rule out alternative explanations for this increase in foreign institutional ownership (Bena, Ferreira, Matos, and Pires 2016).

Second, Claessens and Yafeh (2012) find an increase in stock price comovement for stocks added to major national indexes around the world. We hypothesize that if a firm is added to the MSCI ACWI, there is a greater relative increase in the world beta than in the local beta. The global beta is the beta of the firm's stock returns against the MSCI ACWI returns and the local beta is the beta of the firm's stock returns against the corresponding MSCI country index. We estimate betas at the weekly and daily frequency using the two years before the addition and the two years after the addition.

We require two years of stock returns to initiate the estimation of betas, which excludes stocks added to the index up to 2002 and stocks which entered immediately to the index. At the end we have about 1,400 additions from 44 countries. The countries with more additions include the U.S. (374), Japan (154), Taiwan (89), Canada (77), the U.K. (63), India (60), South Korea (57), and Hong Kong (55). We use two alternative samples. As the U.S. represents a large share of the MSCI World index (54% at the end of 2015) we also run our analysis excluding this country, which gives a sample of about 1,000 additions. We also run the analysis excluding

countries with share greater than 5% in the index (U.S., United Kindgom and Japan), which gives a sample of about 800 additions.

Table 7 presents the results. As expected there is no statistical difference (although the difference is still positive) for the sample of 'all stocks' because U.S. stocks dominate the sample and the correlation between global and local indexes for the U.S. is really close. Using the sample that excludes U.S. stocks, we find that the difference between the global and the local beta in the year after an addition increases by approximately 0.035 relative to the year before the addition, on average. This difference is statistically significant at the 5% significance level, and economically important since it corresponds to one third of the change in betas. The results are even more important when we exclude the U.S., Japan and the U.K. The average relative increase in the global beta versus the local beta around the stock addition is 0.07 for daily betas and 0.04 for weekly betas and these increases are statistically significant at the 5% level. This corresponds to one third of the change in the level for daily betas and three quarters of the change in the level for weekly betas. All this is evidence that there is a significant increase in the comovement between the stock and the global index relative to the comovement between the stock and the local index after a stock is added to the MSCI ACWI.

In short, the evidence suggests that when stocks are added to the MSCI ACWI, foreign institutional ownership increases. We conclude that foreign institutional ownership leads to an increase in degree of comovement of stocks with global factors.

8. Conclusion

We test the hypothesis that stocks with different levels of institutional ownership display different comovement patterns in international stock markets. Industrial effects are relatively more important than country effects in stocks with high institutional ownership. In contrast,

country effects are the major source of stock return variation in stocks with low institutional ownership. Our findings are robust across different groups of countries and stocks. Our findings show that stocks overweighted by institutions have higher cross-industry correlations, while stocks underweighted by institutions have higher cross-country correlations.

These findings have important implications in terms of international portfolio allocation. Overall, we show that the presence of institutional investors contributes to the convergence of asset prices across countries.

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Table 1
Stock Return Variation and Institutional Ownership: Heston-Rouwenhorst Model

This table reports time series averages of total institutional ownership as a percentage of market capitalization, annualized value-weighted mean absolute deviations (*MAD*) of the global, country, industry and idiosyncratic factors, and ratios of the *MAD* of the country factor relative to the *MAD* of the industry factor and global factor for different groups of stocks using the Heston and Rouwenhorst (1994) model. Returns are in percent per month and denominated in U.S. dollars. The sample period is from January 2000 to December 2010. Stocks are divided into deciles by month based on lagged total institutional ownership (IO). *P*-values of the test whether the ratios of country-to-industry and country-to-global factors are equal to one are calculated using Newey-West adjusted standard errors. *,**, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: All Stocks

	Institutional	*MAD*				Country Relative to			
	Ownership	Global	Country	Industry	Idiosyncratic	Industry		Global	
All Stocks	41.0	15.9	9.3	5.5	50.1	1.8	***	0.6	***
Decile 1 (Low *IO*)	0.1	15.3	16.0	6.0	57.2	2.7	***	1.1	*
Decile 2	0.6	15.8	16.0	5.4	47.9	2.9	***	1.1	
Decile 3	1.6	16.2	15.4	5.5	46.3	2.9	***	1.0	
Decile 4	3.5	16.2	14.5	5.9	46.2	2.6	***	0.9	**
Decile 5	6.3	16.3	13.3	6.1	45.8	2.3	***	0.8	***
Decile 6	10.4	15.9	12.6	6.4	46.8	2.2	***	0.8	***
Decile 7	16.7	16.1	10.8	6.9	46.6	1.7	***	0.7	***
Decile 8	27.4	17.0	8.9	8.4	47.2	1.1		0.5	***
Decile 9	53.2	17.5	5.1	9.2	46.8	0.6	***	0.3	***
Decile 10 (High *IO*)	83.5	16.5	0.8	8.8	38.6	0.1	***	0.1	***
Low-High *IO*						2.6	***	1.0	***

Panel B: Non-U.S. Stocks

	Institutional	*MAD*				Country Relative to			
	Ownership	Global	Country	Industry	Idiosyncratic	Industry		Global	
All Stocks (non-U.S.)	19.5	16.0	11.2	4.6	44.9	2.5	***	0.7	**
Decile 1 (Low *IO*)	0.1	15.1	16.4	5.8	49.7	2.8	***	1.2	**
Decile 2	0.4	15.8	16.8	5.5	45.1	3.0	***	1.1	**
Decile 3	1.0	15.7	15.9	5.5	42.5	2.9	***	1.1	
Decile 4	2.0	16.3	15.3	5.2	42.3	3.0	***	1.0	
Decile 5	3.6	16.5	14.8	5.8	41.5	2.6	***	0.9	
Decile 6	5.8	16.0	13.2	5.9	41.9	2.3	***	0.9	***
Decile 7	8.9	16.4	12.6	5.5	40.9	2.4	***	0.8	***
Decile 8	13.4	16.3	12.1	6.1	40.9	2.0	***	0.8	***
Decile 9	21.1	17.2	9.7	6.4	39.5	1.6	***	0.6	***
Decile 10 (High *IO*)	39.1	17.5	8.4	7.6	37.2	1.1	**	0.5	***
Low-High *IO*						1.7	***	0.7	***

Table 2
Stock Return Variation and Institutional Ownership: Variance Decomposition

This table reports time series averages of annualized standard deviations (*SD*) of the global, country, industry and idiosyncratic factors, and ratios of the *SD* of the country factor relative to the *SD* of the industry factor and global factor for different groups of stocks using a variance decomposition of stock returns. Returns are in percent per month and denominated in U.S. dollars. The sample period is from January 2000 to December 2010. Stocks are divided into deciles for each month based on lagged total institutional ownership (*IO*). *P*-values of the test whether the ratios of country-to-industry and country-to-global factors are equal to one are calculated using Newey-West adjusted standard errors. *,**,*** indicate significance at the 10%, 5% and 1% levels, respectively.

Panel A: All Stocks								
	SD				Country Relative to			
	Global	Country	Industry	Idiosyncratic	Industry		Global	
All Stocks	5.1	12.7	4.9	51.3	2.8	***	2.6	***
Decile 1 (Low *IO*)	6.0	16.2	3.1	58.5	5.5	***	2.9	***
Decile 2	4.0	17.8	3.5	49.3	5.3	***	4.7	***
Decile 3	4.9	16.5	3.7	48.1	4.6	***	3.5	***
Decile 4	5.1	14.6	4.2	48.4	3.8	***	3.0	***
Decile 5	6.2	13.4	4.1	47.7	3.5	***	2.3	***
Decile 6	7.0	12.5	5.0	48.5	2.6	***	2.1	***
Decile 7	6.6	11.3	5.1	48.4	2.4	***	1.9	***
Decile 8	8.6	9.0	5.5	49.0	1.8	***	1.1	*
Decile 9	11.0	6.3	6.5	48.0	1.1		0.7	***
Decile 10 (High *IO*)	7.7	4.1	8.9	40.3	0.5	***	0.6	***
Low-High *IO*					5.0	***	2.3	***

Panel B: Non-U.S. Stocks								
	SD				Country Relative to			
	Global	Country	Industry	Idiosyncratic	Industry		Global	
All Stocks (non-U.S.)	4.4	14.3	4.2	46.2	3.5	***	3.4	***
Decile 1 (Low *IO*)	5.3	18.3	3.3	50.7	5.8	***	3.9	***
Decile 2	4.2	18.8	3.3	46.5	6.1	***	4.7	***
Decile 3	4.5	17.7	3.7	44.0	4.8	***	4.1	***
Decile 4	4.8	16.7	3.8	44.1	4.4	***	3.7	***
Decile 5	5.0	15.7	4.1	43.6	4.0	***	3.4	**
Decile 6	6.6	14.1	4.3	43.6	3.5	***	2.3	***
Decile 7	7.1	13.1	4.7	42.6	2.9	***	2.2	***
Decile 8	6.8	13.0	5.4	42.7	2.5	***	2.1	***
Decile 9	7.5	11.1	5.0	41.4	2.3	***	1.6	***
Decile 10 (High *IO*)	9.1	9.0	6.1	39.6	1.5	***	1.1	
Low-High *IO*					4.3	***	2.8	***

Table 3
Stock Return Variation and Institutional Ownership: Robustness

This table reports time series averages of annualized standard deviations (*SD*) of the global, country and industry factors, and ratios of the *SD* of the country factor relative to the *SD* of the industry factor and global factor for different groups of stocks using a variance decomposition of stock returns. Returns are in percent per month and denominated in U.S. dollars. The sample period is from January 2000 to December 2010. Stocks are divided into deciles for each month based on lagged total institutional ownership (*IO*). The low and high *IO* groups consist of those firms whose total institutional ownership is in the lowest and highest deciles. In the "Industry Classification" item, different industry classifications of stocks are used. In the "Currency" item, returns are in local currency. In the "Controlling for Firm Size" item, stocks are divided into deciles based on the residuals of a cross-sectional regression of institutional ownership on market capitalization and based on market capitalization. In the "Orthogonalization Method" item, industry returns are orthogonalized with respect to country returns using an ordinary least squares regression. The "Subsamples" item uses subsamples of stocks excluding U.S., G7 countries, non-European, emerging markets, developed markets, financial sector, and technology, media and telecommunication sector stocks. *P*-values of the test whether the ratios of country-to-industry and country-to-global factors are equal to one and of the test of the difference in ratios between the lowest and highest deciles are calculated using Newey-West adjusted standard errors. *,**,*** indicate significance at the 10%, 5% and 1% levels, respectively.

	SD						Country Relative to									
	Low *IO*			High *IO*			Industry						Global			
	Global	Country	Industry	Global	Country	Industry	Low *IO*		High *IO*		Low-High *IO*		Low *IO*		High *IO*		Low-High *IO*	
Industry Classification																		
SIC 2-Digit	5.9	16.3	6.2	7.7	4.1	12.0	2.6	***	0.4	***	2.2	***	2.9	***	0.6	***	2.3	***
Fama-French 49 Industries	6.0	16.2	5.5	7.7	4.1	11.4	3.0	***	0.4	***	2.6	***	2.9	***	0.6	***	2.3	***
Fama-French 10 Industries	6.0	16.2	2.9	7.7	4.1	8.8	6.2	***	0.5	***	5.7	***	2.9	***	0.6	***	2.3	***
Currency																		
Returns in Local Currency	5.7	14.6	3.0	7.4	3.9	8.9	5.0	***	0.5	***	4.5	***	2.8	***	0.6	***	2.2	***
Controlling for Firm Size																		
Residual Institutional Ownership	6.0	16.2	3.1	7.7	4.1	8.9	5.5	***	0.5	***	5.0	***	2.9	***	0.6	***	2.3	***
Market Capitalization	0.6	20.3	9.0	2.9	11.7	7.3	2.4	***	1.7	***	0.7	***	34.0	***	4.5	***	29.5	***
Orthogonalization Method																		
Country on Industry	11.0	16.0	4.0	6.4	3.7	9.1	3.9	***	0.4	***	3.5	***	2.6	***	0.7	***	1.9	***
Subsamples																		
Europe	5.3	15.3	4.6	10.5	7.0	5.1	3.3	***	1.4	**	1.9	***	3.0	***	0.7	***	2.3	***
Asia-Pacific	6.6	13.0	7.1	8.2	9.1	6.3	1.9	***	1.5	***	0.4	**	2.2	***	1.2	**	1.0	***
Developed Markets	6.0	12.1	4.2	7.4	3.2	9.2	2.9	***	0.4	***	2.5	***	2.2	***	0.5	***	1.7	***
Emerging Markets	7.4	21.1	6.2	7.1	16.8	5.8	3.5	***	2.9	***	0.6	***	3.0	***	2.7	***	0.3	*
Non-G7	6.9	19.9	4.6	8.1	11.9	4.4	4.4	***	2.8	***	1.6	***	3.2	***	1.5	***	1.7	***
Non-TMT	6.1	16.6	3.1	7.7	4.5	9.6	5.4	***	0.5	***	4.9	***	2.9	***	0.6	***	2.3	***
Non-Financial	6.6	16.8	3.4	8.4	4.3	9.0	5.1	***	0.5	***	4.6	***	2.7	***	0.6	***	2.1	***

Table 4
Stock Return Variation and Institutional Ownership: Groups of Firms

This table reports time series averages of annualized standard deviations (*SD*) of the global, country and industry factors, and ratios of the *SD* of the country factor relative to the *SD* of the industry factor and global factor for different groups of stocks using a variance decomposition of stock returns. Returns are in percent per month and denominated in U.S. dollars. The sample period is from January 2000 to December 2010. For each month, stocks are sorted based on the first characteristics (size, turnover, analyst coverage, market-to-book, momentum, MSCI membership, foreign sales, and U.S. cross-listing) and then, within each group, stocks are divided into deciles based on lagged total institutional ownership (*IO*). The low and high *IO* groups consist of those firms whose total institutional ownership is in the lowest and highest deciles. The small and big groups consist of those firms whose market capitalization is in the lowest and highest terciles. The low and high groups consist of those firms whose turnover or analyst coverage is in the lowest and highest terciles. The value and growth groups consist of those firms whose market-to-book ratio is in the lowest and highest terciles. The loser and winner groups consist of those firms whose annual stock return is in the lowest and highest terciles. The MSCI group consists of those firms whose stock is included in the MSCI All-Country World index. The multinational group consists of those firms whose foreign sales are positive. The ADR group consists of those firms whose stock is listed on a U.S. exchange. *P*-values of the test whether the ratios of country-to-industry and country-to-global factors are equal to one and of the test of the difference in ratios between the lowest and highest deciles are calculated using Newey-West adjusted standard errors. *,**,*** indicate significance at the 10%, 5% and 1% levels, respectively.

	SD						Country Relative to											
	Low *IO*			High *IO*			Industry						Global					
	Global	Country	Industry	Global	Country	Industry	Low *IO*		High *IO*		Low-High *IO*		Low *IO*		High *IO*		Low-High *IO*	
Firm Size																		
Small	3.7	23.5	8.9	6.9	12.3	11.9	2.6	***	1.1		1.5	***	6.7	***	2.0	***	4.7	***
Big	2.9	19.1	5.3	5.0	3.9	10.4	3.7	***	0.4	***	3.3	***	7.1	***	0.8	***	6.3	***
Turnover																		
Low	5.2	13.2	3.6	7.0	9.5	4.3	3.8	***	2.4	***	1.3	***	2.7	***	1.4	***	1.3	***
High	6.7	26.7	6.7	6.0	4.5	10.4	4.1	***	0.5	***	3.6	***	4.4	***	0.4		4.0	***
Analyst Coverage																		
Low	5.9	18.4	5.1	7.7	11.1	5.9	3.8	***	2.2	**	1.6	***	3.5	***	1.8	**	1.7	***
High	4.7	18.3	5.3	5.7	3.5	10.5	3.5	***	0.3	***	3.2	***	4.2	***	0.6	***	3.6	***
Market-to-Book																		
Value	4.7	20.4	5.2	9.9	7.3	8.2	4.0	***	1.0		3.0	***	2.9	***	0.7	***	2.2	***
Growth	7.2	19.5	5.2	6.8	4.3	9.4	3.9	***	0.5	***	3.4	***	3.5	***	0.6	***	2.9	***
Momentum																		
Loser	6.5	20.1	5.7	10.8	5.6	9.0	3.7	***	0.6	***	3.1	***	3.5	***	0.6	***	2.9	***
Winner	6.8	17.8	4.9	7.1	6.0	9.9	3.8	***	0.7	***	3.1	***	2.8	***	0.9		1.9	***
MSCI Membership																		
MSCI	3.2	21.7	6.7	4.9	4.7	11.9	3.3	***	0.4	***	2.9	***	7.2	***	1.1		6.1	***
Non-MSCI	6.2	16.4	3.2	6.1	4.9	9.4	5.4	***	0.5	***	4.9	***	2.8	***	0.8	**	2.0	***
Foreign Sales																		
Multinational	5.5	16.7	4.2	7.5	4.0	9.1	4.0	***	0.4	***	3.6	***	3.3	***	0.6	***	2.7	***
Non-Multinational	6.6	16.9	3.7	7.2	5.1	9.7	4.7	***	0.5	***	4.2	***	2.7	***	0.8	***	1.9	***
U.S. Cross-Listing																		
ADR	7.6	24.7	17.3	8.2	11.2	14.7	1.5	***	0.8	**	0.7	***	3.5	***	1.7	***	1.8	***
Non-ADR	5.9	16.3	3.1	7.3	3.5	8.8	5.5	***	0.4	***	5.1	***	3.0	***	0.5	***	2.5	***

Table 5
Stock Return Variation and Domestic and Foreign Institutional Ownership

This table reports time series averages of annualized standard deviations (*SD*) of the global, country and industry factors, and ratios of the *SD* of the country factor relative to the *SD* of the industry factor and global factor for different groups of stocks using a variance decomposition of stock returns. Returns are in percent per month and denominated in U.S. dollars. The sample period is from January 2000 to December 2010. For each month, stocks are divided into terciles based on lagged domestic or foreign institutional ownership and then, within each tercile, stocks are divided into deciles based on lagged total institutional ownership (*IO*). The low and high *IO* groups consist of those firms whose total institutional ownership is in the lowest and highest deciles. The low and high groups of domestic and foreign institutional ownership consist of those firms whose domestic or foreign institutional ownership is in the lowest and highest terciles. *P*-values of the test whether the ratios of country-to-industry and country-to-global factors are equal to one and if the difference between ratios is equal to zero are calculated using Newey-West adjusted standard errors. *,**,and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: All Stocks

	SD						Country Relative to											
	Low *IO*			High *IO*			Industry						Global					
	Global	Country	Industry	Global	Country	Industry	Low *IO*		High *IO*		Low-High *IO*		Low *IO*		High *IO*		Low-High *IO*	
Domestic Institutional Ownership																		
Low	4.9	16.3	4.6	4.7	14.0	4.6	2.9	***	2.3	***	0.6	**	2.8	***	2.6	**	0.2	
High	14.4	2.4	11.7	11.7	2.3	12.4	0.2	**	0.2	***	0.0		0.2	***	0.2	***	0.0	
Foreign Institutional Ownership																		
Low	7.1	15.9	9.6	5.4	9.0	11.1	1.8	***	0.9		0.9	***	2.4	***	1.9	***	0.5	**
High	5.3	21.9	6.6	6.4	13.3	12.0	3.5	***	1.2	**	2.3	***	4.7	***	2.2	***	2.5	***

Panel B: Non-U.S. Stocks

	SD						Country Relative to											
	Low *IO*			High *IO*			Industry						Global					
	Global	Country	Industry	Global	Country	Industry	Low *IO*		High *IO*		Low-High *IO*		Low *IO*		High *IO*		Low-High *IO*	
Domestic Institutional Ownership																		
Low	7.4	11.5	6.9	7.4	11.5	6.9	1.8	***	1.8	***	0.0		1.7	***	1.7	***	0.0	
High	4.6	16.7	6.8	7.6	9.5	8.2	2.5	***	1.2	*	1.3	***	4.4	***	1.3	***	3.1	***
Foreign Institutional Ownership																		
Low	5.3	20.7	4.7	4.7	12.7	7.3	4.4	***	1.9	**	2.5	***	4.4	***	3.4	***	1.0	
High	6.5	17.7	5.4	8.0	10.6	8.2	3.4	***	1.4	***	2.0	***	3.0	***	1.5	***	1.5	***

Table 6
Additions to MSCI All Country World Index: Change in Institutional Ownership

This table reports the foreign and domestic institutional ownership in the years around a stock addition to the MSCI ACWI over the period 2000-2010. The table also presents the changes in foreign and domestic institutional ownership in the year after the addition compared to the year the stock is added, and the changes between the year after the addition and the year before the stock is added to the MSCI ACWI. The difference between foreign and domestic institutional ownership is also presented. *t*-statistics are presented in parentheses.

	Year before addition	Year of addition	Year after addition	Difference		Difference	
	(1)	(2)	(3)	(3)-(2)		(3)-(1)	
	Mean	Mean	Mean	Mean	t-statistic	Mean	t-statistic
Foreign Institutional Ownership	0.084	0.100	0.107	0.007	(6.625)	0.023	(15.866)
Domestic Institutional Ownership	0.221	0.226	0.223	-0.003	(-1.922)	0.002	(1.141)
Difference				0.010		0.021	
t-statistic				(5.112)		(8.376)	

Table 7
Additions to MSCI All Country World Index: Change in Betas

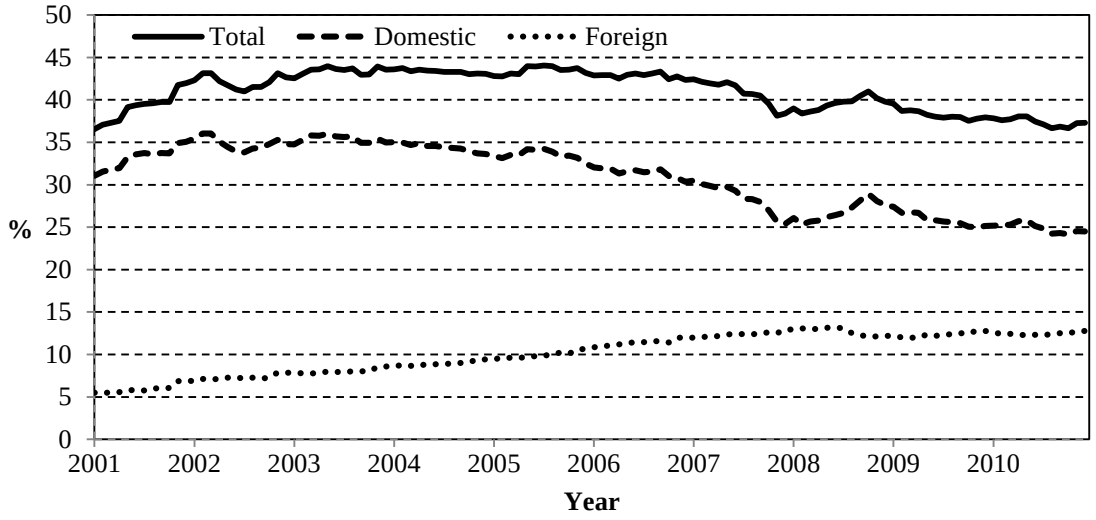
This table reports local and global betas before and after a stock was added to the MSCI ACWI in the period 2000-2010. Local beta is computed against the national MSCI index and global beta is computed against the MSCI SCWI. The beta before (after) is computed using the two years of returns before (after) the year of addition. It is computed the difference between the after and before betas, the difference between global and local betas and the difference-in-difference beta. *t*-statistics are presented in parentheses. Betas are computed either using daily (left) or weekly (right) frequency. The betas are computed for all stocks (Panel A), all stocks excluding U.S. (Panel B) and all stocks excluding U.S, U.K. and Japan (Panel C).

Panel A: All stocks								
	Daily				Weekly			
	Before	After	Difference	t-statistic	Before	After	Difference	t-statistic
Global	0.710	0.785	0.075	(5.714)	0.981	1.025	0.044	(2.592)
Local	0.794	0.857	0.062	(5.410)	0.943	0.983	0.040	(3.093)
Difference	-0.085	-0.072	0.013	(1.157)	0.038	0.042	0.003	(0.294)
t-statistic	(-7.829)	(-6.929)			(3.608)	(4.681)		
Panel B: Excluding U.S.								
	Daily				Weekly			
	Before	After	Difference	t-statistic	Before	After	Difference	t-statistic
Global	0.720	0.842	0.122	(7.591)	0.945	1.052	0.108	(5.458)
Local	0.852	0.937	0.085	(6.046)	0.880	0.954	0.074	(5.792)
Difference	-0.132	-0.095	0.037	(2.474)	0.065	0.099	0.034	(2.151)
t-statistic	(-9.156)	(-6.770)			(4.585)	(8.615)		
Panel C: Excluding U.S, U.K. and Japan								
	Daily				Weekly			
	Before	After	Difference	t-statistic	Before	After	Difference	t-statistic
Global	0.724	0.882	0.158	(9.111)	0.965	1.100	0.134	(5.879)
Local	0.841	0.932	0.091	(5.385)	0.856	0.951	0.096	(6.607)
Difference	-0.117	-0.050	0.067	(4.019)	0.110	0.149	0.039	(2.126)
t-statistic	(-6.760)	(-3.139)			(6.523)	(11.369)		

Figure 1
Evolution of Institutional Ownership

This figure presents the evolution of total, domestic, and foreign institutional ownership as a percentage of stock market capitalization from January 2001 to December 2010.

Panel A: All Stocks



Panel B: Non-U.S. Stocks

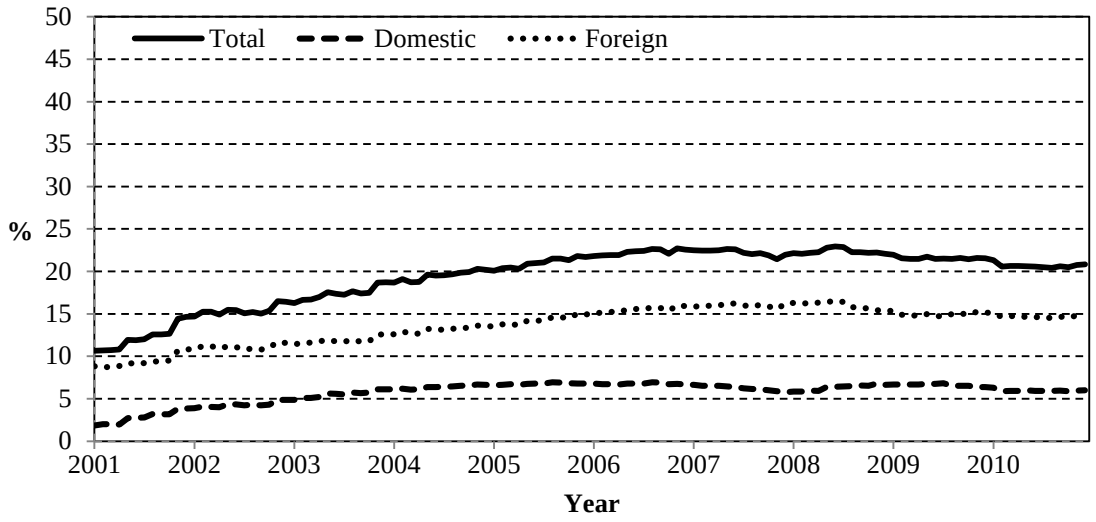


Figure 2
Evolution of Benchmarks of Mutual Funds

This figure presents the evolution of the ratios of the number of domestic benchmarks versus foreign benchmarks followed by mutual funds (left vertical axis) and the number of domestic benchmarks versus regional and the number of domestic versus global benchmarks (right vertical axis) from January 2000 to December 2010.

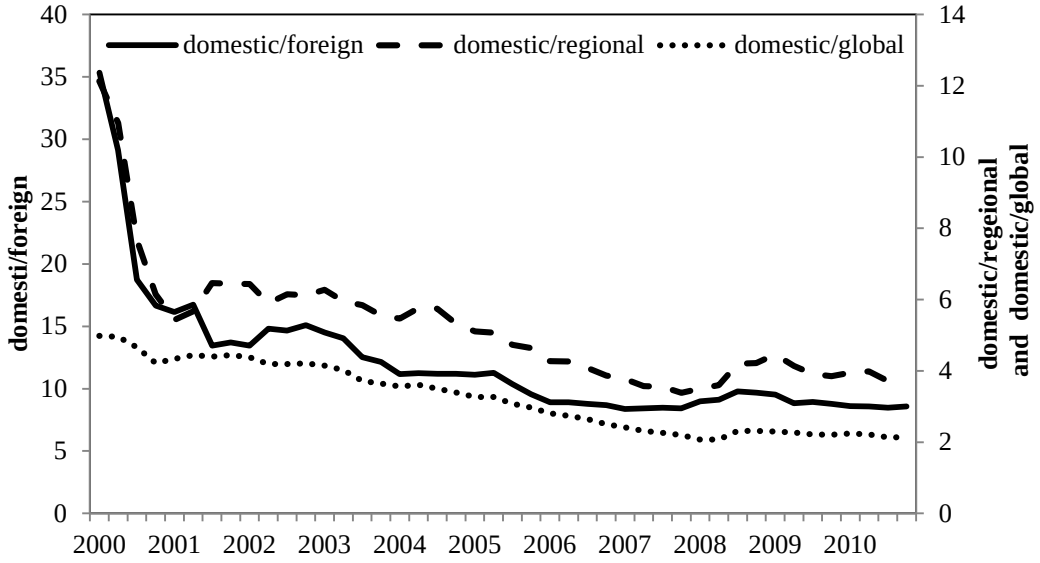


Figure 3
Evolution of International Portfolio Diversification of Institutional Investors

This figure presents the evolution of three measures of concentration of the average institutional investor from January 2000 to December 2010. The measures of concentration are the number of countries an institutional investor invests in (right vertical axis) and the Herfindhal index (HHI) using as weights the number or market value of firms in each country (left vertical axis).

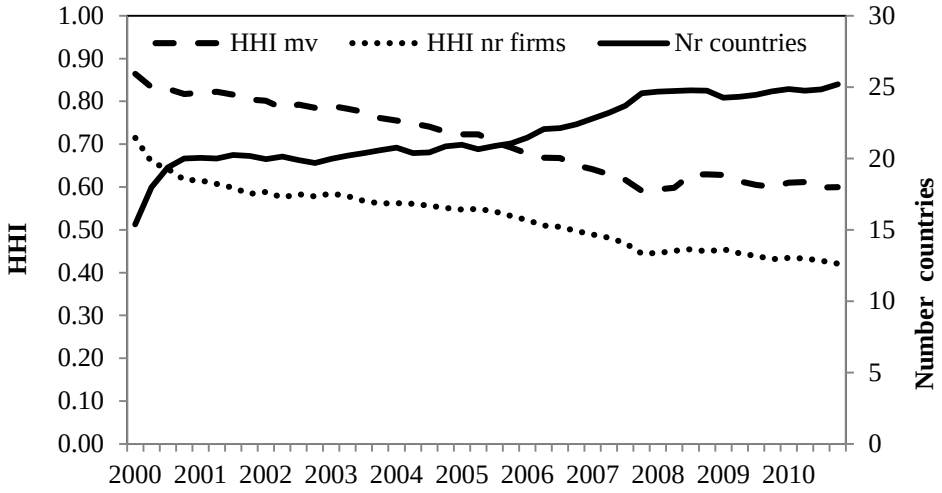
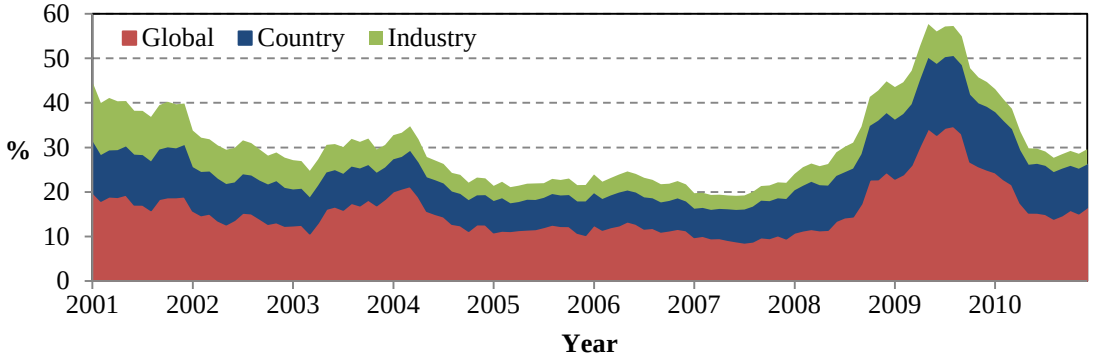


Figure 4

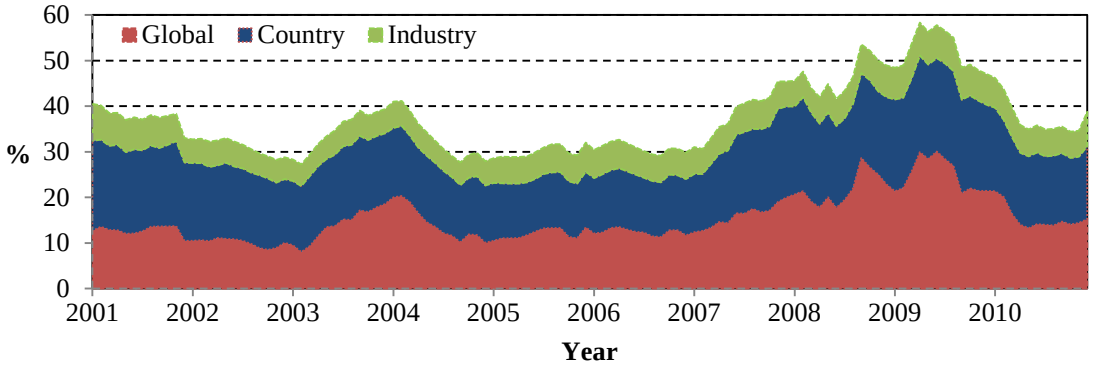
Country and Industry Effects and Institutional Ownership: Heston-Rouwenhorst Model

This figure presents the 12-month moving average of annualized value-weighted mean absolute deviations (*MAD* in percentage) of the global, country and industry factors for different groups of stocks using the Heston and Rouwenhorst (1994) model from January 2001 to December 2010. Stocks are divided into deciles by month based on lagged total institutional ownership (*IO*). The low and high *IO* groups consist of those firms whose total institutional ownership is in the lowest and highest deciles.

Panel A: All Stocks



Panel B: Low Institutional Ownership



Panel C: High Institutional Ownership

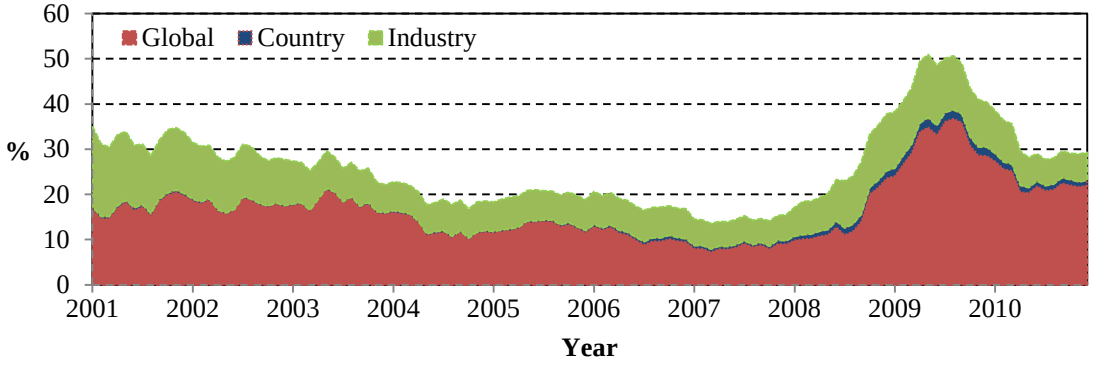
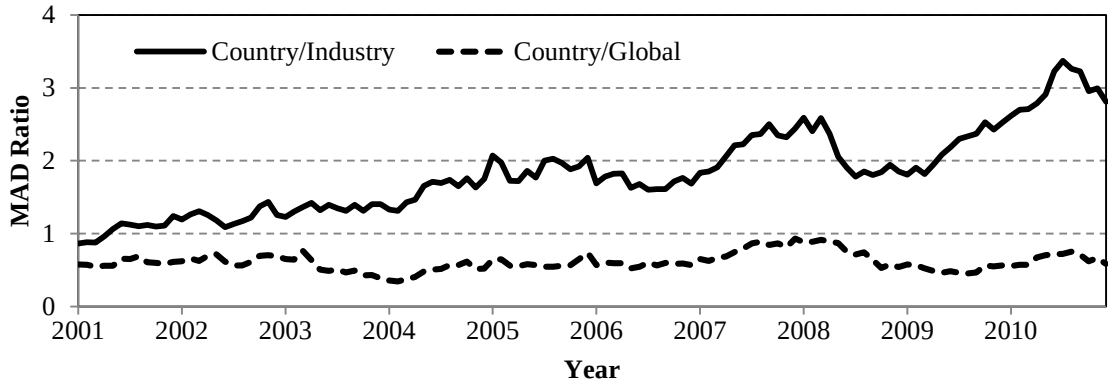


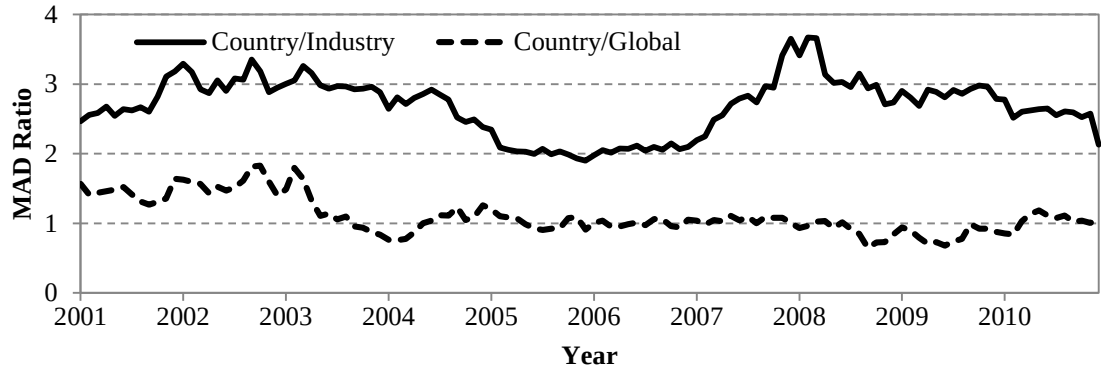
Figure 5
Country-to-Industry Ratio and Institutional Ownership: Heston-Rouwenhorst Model

This figure presents the 12-month moving average of ratios of annualized value-weighted mean absolute deviations (*MAD*) of the country factor relative to the *MAD* of the industry factor and global factor for different groups of stocks using the Heston and Rouwenhorst (1994) model from January 2001 to December 2010. Stocks are divided into deciles by month based on lagged total institutional ownership (*IO*). The low and high *IO* groups consist of those firms whose total institutional ownership is in the lowest and highest deciles.

Panel A: All Stocks



Panel B: Low Institutional Ownership



Panel C: High Institutional Ownership

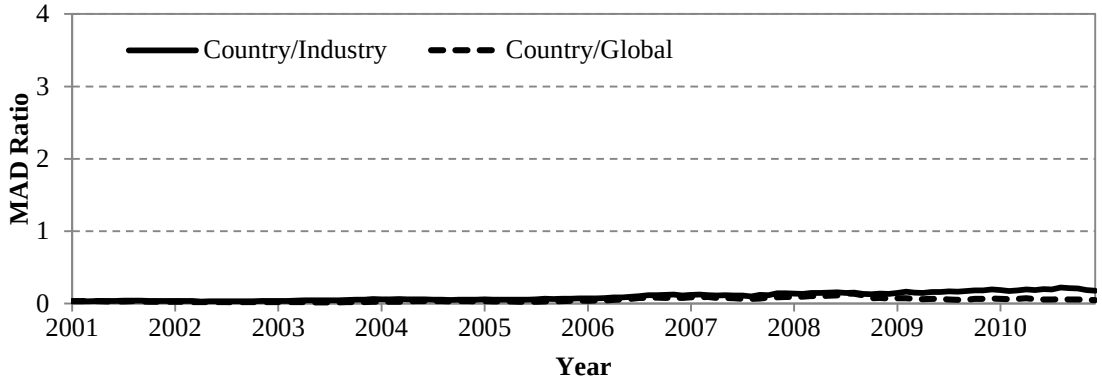
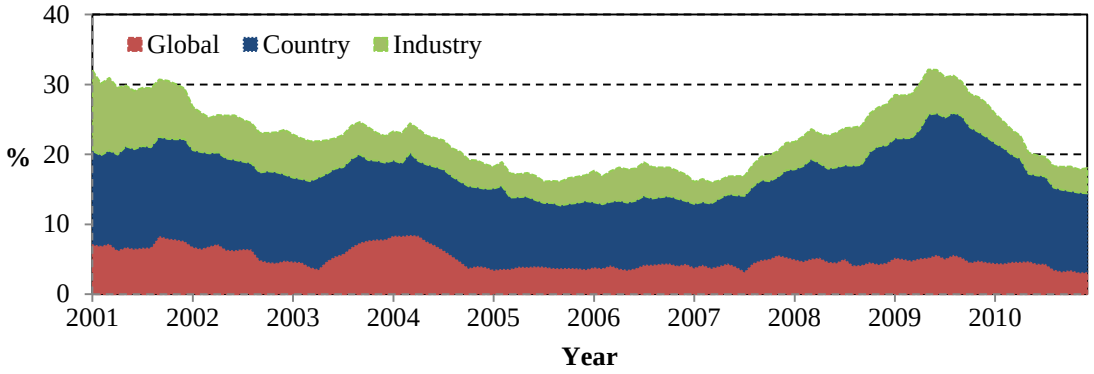


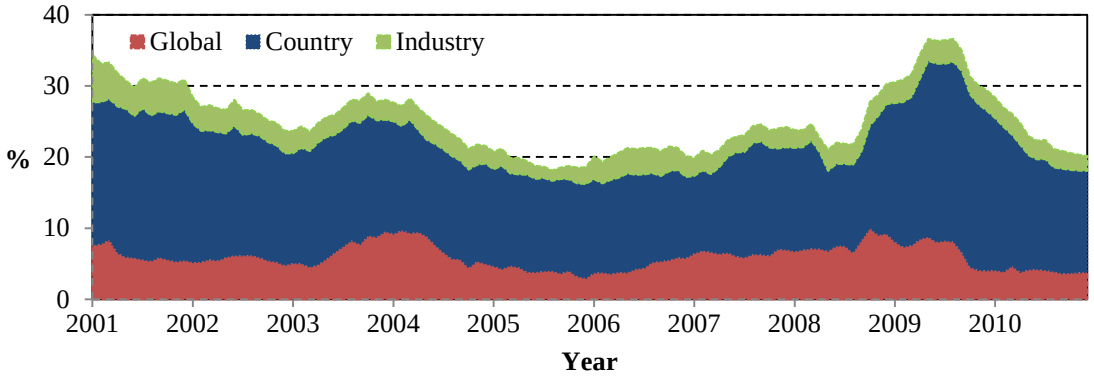
Figure 6
Country and Industry Effects and Institutional Ownership: Variance Decomposition

This figure presents the 12-month moving average of annualized standard deviations (*SD* in percentage) of the global, country, and industry factors for different groups of stocks using a variance decomposition of stock returns from January 2001 to December 2010. Stocks are divided into deciles by month based on lagged total institutional ownership (*IO*). The low and high *IO* groups consist of those firms whose total institutional ownership is in the lowest and highest deciles.

Panel A: All Stocks



Panel B: Low Institutional Ownership



Panel C: High Institutional Ownership

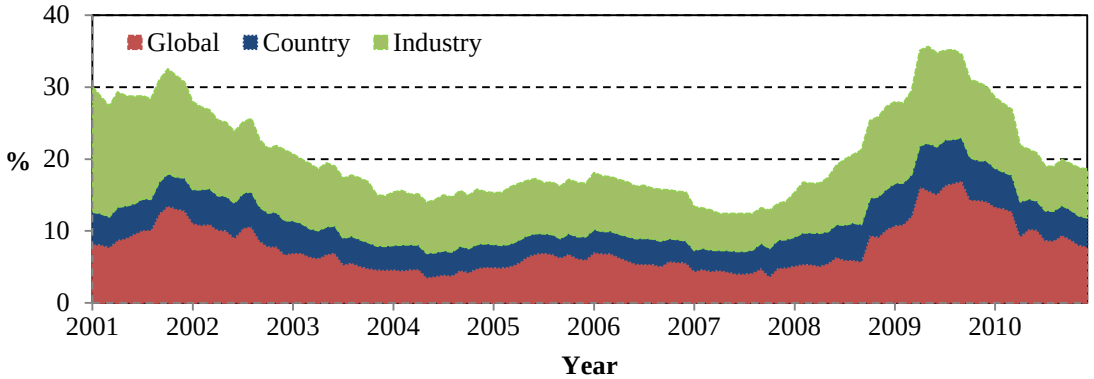
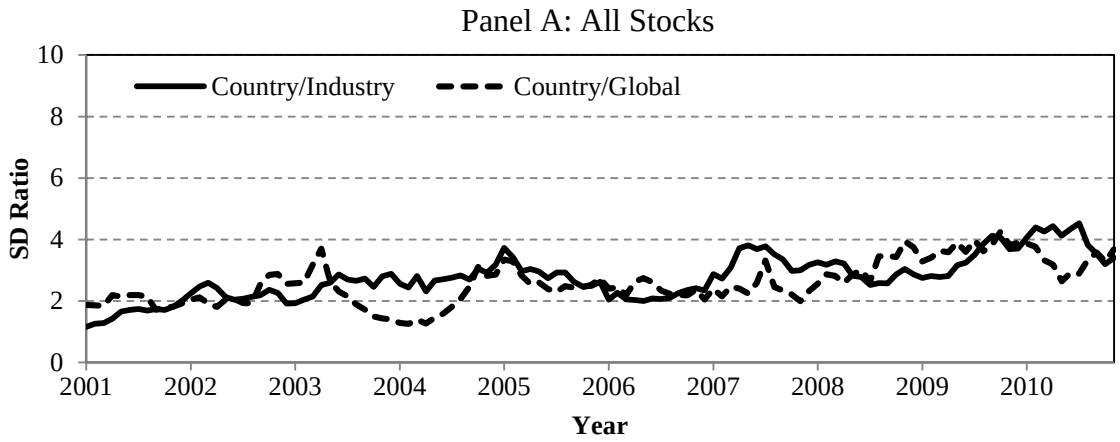
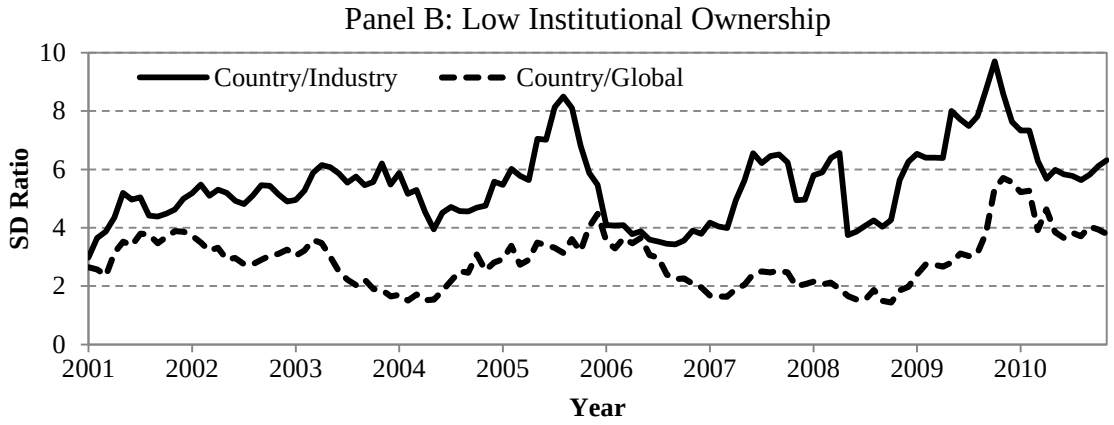


Figure 7
Country-to-Industry Ratio and Institutional Ownership: Variance Decomposition

This figure presents the 12-month moving average of ratios of annualized standard deviations (*SD*) of the country factor relative to the *SD* of the industry factor and global factor for different groups of stocks using a variance decomposition of stock returns from January 2001 to December 2010. Stocks are divided into deciles by month based on lagged total institutional ownership (*IO*). The low and high *IO* groups consist of those firms whose total institutional ownership is in the lowest and highest deciles.





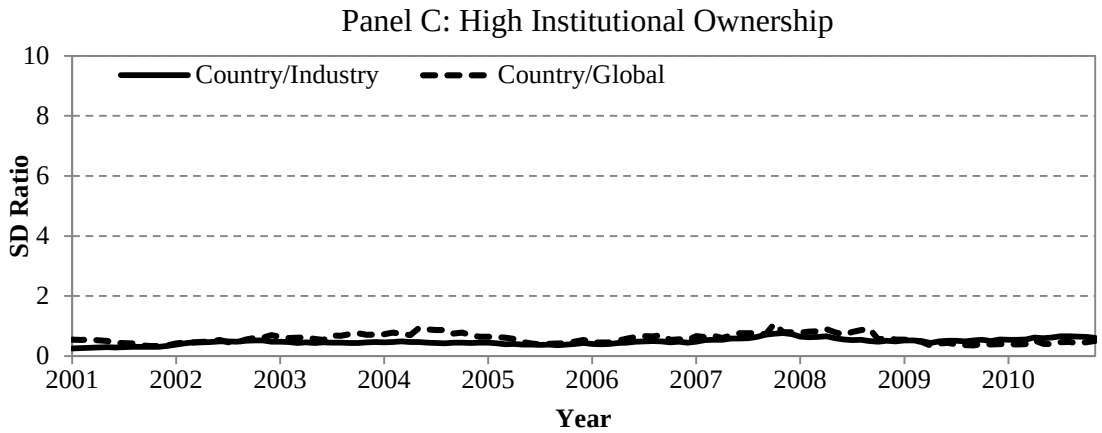


Figure 8
Diversification Benefits by Level of Institutional Ownership

This figure plots the ratio (in percentage) of the variance of an equal-weighted stock portfolio relative to the average stock variance for portfolios with different number of stocks returns from January 2001 to December 2010. For each month, stocks are picked with no restriction (global strategy) from a randomly drawn industry (country strategy) or country (industry strategy). The number of simulations is 1,000 for each month. Stocks are divided into deciles by month based on lagged total institutional ownership (*IO*). The low and high *IO* groups consist of those firms whose total institutional ownership is in the lowest and highest deciles.