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Convergence to the Managerial Frontier

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ABSTRACT

Convergence to the Managerial Frontier*

Using detailed survey data on management practices, this paper uses recent advances in unconditional quantile analysis to study the changes in the within country distribution of management quality associated with country convergence to the managerial frontier. It then decomposes the contribution of potential explanatory factors to the distributional changes. The US emerges as the frontier country, not because of on average better management, but because its best firms are far better than those of its close competitors. Part of the process of convergence to the frontier across the development process represents a trimming of the left tail, much is movement of the central mass and, for rich countries, it is actually the best firms that lag the frontier benchmark. Among potential explanatory variables that may drive convergence, ownership and human capital appear critical, the former especially for poorer countries and that latter for richer suggesting that the mechanics of convergence change across the process. These variables lose their explanatory power as firm and average country management quality rises. Hence, once in the advanced country range, the factors that improve management quality are less easy to document and hence influence.

JEL Classification: C21, L2, M2, O33, O47

Keywords: management practices, convergence, development, quantile regression, RIF decomposition

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1 Introduction

A growing literature documents the importance of management quality to productivity growth and other measures of firm progress.[1] Bloom and Van Reenen (2007) have given the field a quantum push by undertaking globally comparable surveys of management practices. For the US, Germany, the UK and Sweden, they find a correlation of their management scores with firm level productivity, growth and survival. They document large within country heterogeneity[2] and identify the degree of product market competition and ownership structure as critical determinants of the average level of management quality, particularly working through the extended lower tails of the distribution.[3] More recently, exploring a broader range of middle income and developing countries, Bloom and Van Reenen (2010) show average management scores to be highly correlated with aggregate labor productivity (see Figure 1). Improving managerial quality thus appears to be an important and heretofore understudied ingredient in fomenting economic development.

These findings raise the question of the process through which countries achieve such improvements. This paper uses recent advances in unconditional quantile decompositions (Machado and Mata, 2005; Firpo et al., 2009) and the Bloom and Van Reenen international firm level data base to analyze the changes in the within country distribution of management quality associated with convergence to the managerial frontier.[4] That is, we would like to know if convergence arises from progressively trimming the left tails, a more general rightward shift of the distribution due to, perhaps, the general accumulation of human capital, or perhaps the emergence of superstars in the right tails?[5] Our empirical approach allows us to move beyond the central tendency and more fully characterize the entire country distribution relative to the frontier and generate estimates of the drivers of distributional

[1] See Syverson (2011) for a review and Bertrand and Schoar (2003); Kaplan et al. (2012); Malmendier and Tate (2009); Ichinowski et al. (1997); Lazear (2000); Bloom et al. (2013).

[2] Their findings are perhaps expectedly analogous to those found for firm productivity more generally. See Syverson (2011) for a full survey of this literature; Syverson (2004); Eslava et al. (2004); Foster et al. (2008).

[3] They conclude that "Low competition and primogeniture in family firms account for about half of the tail of poorly performing firms."

[4] For other work using this data see, for example, Lemos and Scur (2013) who focus on the role of firm ownership structure.

[5] For instance Malmendier and Tate (2009) show that compensation, status, and press coverage of managers in the United States follow a highly skewed distribution with a very small number of "superstars."

shifts that are robust to the endemic non-normality.

We begin by documenting the heterogeneity in that ways in which country distributions differ from the frontier benchmark, the US, and highlight some important regularities characterizing the convergence process. While relatively longer left tails do characterize underdevelopment, this is not true among more advanced countries for whom it is the best firms that lag the frontier. Further, across the development process, the median score moves up broadly proportionately with the mean implying that movement in the overall mass of the distribution is a critical part of the process.

We then revisit the issue of which factors appear to drive these difference in managerial quality across the whole distribution, employing recent advances by Machado and Mata (2005) and Firpo et al. (2009) to decompose the contributions of covariates and coefficient differences. In particular, we confirm Bloom and Van Reenen (2007)'s findings, and recently those of Bandiera et al. (2013) about the importance of ownership and in fact find the effect emerges much more strongly across the global sample than in their four advanced country sample and is especially important for the poorest countries. Likewise, the human capital of the managers appears central, particularly among more advanced countries. This suggests that the mechanics of convergence change across the process. However, the competitiveness of the firm environment does not seem to be driving the distributions for most countries and this is especially the case, surprisingly, in the lower tails where we might expect competition to be most biting.[6]

Finally, the explanatory power of the covariates appears to decrease with the quality of management. That is, we can explain less in the rich countries than in the poor at every quantile, and less among the best firms than among the worst in a given country.

[6]As they note, competition could work either through the more rapid exit of badly managed firms and/or the inducement of greater managerial effort. They cite Syverson (2004a, 2004b) who focuses on productivity and offers supportive evidence for these predictions in his analysis of the U.S. cement industry, finding that tougher competition is associated with both a higher average level of productivity and a lower dispersion of productivity, as the less efficient tail of firms have been selected out. On the other hand, they also note that the sign is not a priori obvious. Profit margins will be lower when competition is more intense, so the rewards of the profit related component of pay will also be lower, and this could tend to depress managerial effort.

This suggests that the factors leading to improved management among poor management countries are perhaps more standard, but that the marginal factor that makes a world class manager- some particular drive or ability- is likely to be harder to document.

2 Methodology: Estimation and Decomposition of Unconditional Quantiles

To compare distributions, track how they change over the development process, and identify what factors drive these distributional changes, quantile regression and related techniques offer a useful set of tools. As Figure 2 demonstrates, two countries with similar average managerial scores can have radically distinct underlying distributions. Country B, for instance, actually has better managers for the top 10% of firms, but the extraordinarily poor management of its worst firms offset this advantage leaving the same average score as country A which has a more symmetric distribution of scores. Quantile analysis, introduced in Koenker and Bassett Jr (1978); Koenker and Hallock (2001) permits quantifying these difference by estimating curves where approximately τ% of the residuals lie below the regression line and $(100 - \tau)$% above. The τ^{th} quantile of Y conditional on Z is given by:

$$Q_\tau(Y_i|Z_i) = Z_i'\beta(\tau) \tag{1}$$

where $\beta(\tau)$ is the slope of the quantile line and thus gives the effect of changes in Z on the τ-*th* conditional quantile of Y. A straightforward application permits capturing how two distributions differ:

$$M_i = \sum \delta_{ij} + f(\varepsilon_i,\, d_j) \tag{2}$$

where M_i is the management score of firm i, δ_{ij} is an indicator variable that takes a value of 1 for firm i if it is in country j and 0 otherwise. The error term reflects the fact that the distribution of the errors is an unspecified function of the particular categorical dummy d_j and is thus, by definition, heteroskedastic.[7] In figure 2, for $j = B$, $d_{B,50}$ slightly less than

[7]If there are outliers, or the distribution of the disturbances is non-normal, quantile estimates of these effects are efficient and consistent unlike OLS. Median regression ($\tau = 0.5$) and OLS give the same results

0 suggests that the two distributions are closely centered, but that country B's median is slightly lower. However, at the 10^{th} quantile, $d_{B,10} < 0$ and $< d_{B,50}$ implies that we have long left tails comprising firms that are especially bad, rather than the distribution simply being uniformly shifted left. $d_{B,90} > 0$ gives us evidence of the superiority of country B's best firms relative to those of A. Together, these three (20 in the next section) coefficients help describe the shape of the distribution of country B relative to A.

Moving beyond description of distributions, we want to understand the impact of covariates on unconditionally bad or good firms. Conventional quantile analysis, which estimates conditional quantiles, is not appropriate. That is, if we run management quality on human capital and ownership structure, the coefficient estimates at the 10^{th} quantile do not correspond to the worst firms, but rather the worst firms *conditional on the covariates*. In this case, a firm in the 10^{th} quantile might be an excellently managed firm, but one which one would expect to be better given, for instance, its high level of human capital.

Recent work has allowed the decomposition of the contribution of each factor across the distribution of the unconditional dependent variable. Traditionally, the classical Oaxaca-Blinder (OB) (see Oaxaca, 1973; Blinder, 1973) method is the basic tool that enables us to decompose management score mean differential between respective countries. The standard assumption used in these decompositions in that the outcome variable, Y, is linearly related to the covariates, X, and that the error term ϵ is conditionally independent of X:

$$Y_{ji} = \beta_{j0} + \sum_{k=1}^{K} X_{ik}\beta_{jk} + \epsilon_{ji}, \quad j = A, B, \tag{3}$$

where Y is the management score, X is the vector of covariates and $\mathbb{E}(\epsilon_{ji}|X_i) = 0$. Thus, the overall difference in average outcomes between A and B's managers,

$$\widehat{\Delta}_O^{\mu} = \overline{Y}_B - \overline{Y}_A$$

can be written as:

when the distribution is symmetric.

$$\widehat{\Delta}_O^{\mu} = \underbrace{\left(\widehat{\beta}_{B0} - \widehat{\beta}_{A0}\right) + \sum_{k=1}^{K} \overline{X}_{Bk}\left(\widehat{\beta}_{Bk} - \widehat{\beta}_{Ak}\right)}_{\widehat{\Delta}_S^{\mu}} + \underbrace{\sum_{k=1}^{K} \widehat{\beta}_{Ak}\left(\overline{X}_{Bk} - \overline{X}_{Ak}\right)}_{\widehat{\Delta}_X^{\mu}} \tag{4}$$

where $\widehat{\beta}_{j0}$ and $\widehat{\beta}_{jk}$ are the estimated intercept and slope coefficients, respectively, of the regression models for countries $j = A, B$. The first term in the equation is what is usually called the unexplained effect in OB decomposition the gap due to differing "returns" to the covariates (differences in coefficients). The second component is a composition effect, which is also called the explained effect (by differences in covariates) in the OB decomposition.[8] However, we are interested in what drives movements in the entire distribution of management quality and the OB method applies only at the mean. However, there is no easy analogy in the quantile case since while, at the mean, each coefficient is interpreted as the effect of increasing the average value of X on the (unconditional) average value of Y, in the quantile case it the impact on the conditional quantile (Fortin et al., 2011). Put differently, the law of iterated expectation does not hold in the case of quantiles.

In order to overcome this problem, Machado and Mata (2005) (MM) propose estimating quantile regressions for all $\tau \in (0, 1)$ as the way characterizing the full conditional distribution of Y given X and then using these estimates to construct the different components of the aggregate decomposition using simulation methods. Though we tabulate the results using this technique, it does not allow detailed decomposition because it does not satisfy the adding-up property (see Machado and Mata, 2005; Fortin et al., 2011).

A recent approach that allows us to disaggregate each component uses the recentered influence function (RIF) regressions proposed by Firpo et al. (2009). The central insight of this procedure is that decomposing proportions is easier than decomposing quantiles. More formally, the procedure consists in using the recentered influence function for the distribution statistic of interest instead of the usual outcome variable Y as the dependent variable. The RIF for a given quantile can be written as:

[8]Both the OB and the techniques discussed below of course examine the partial effects of the covariates. Induced effects through other covariates are attributed to them.

$$RIF(y;Q_\tau) = Q_\tau + \frac{\tau - \mathbb{1}\{y \leq Q_\tau\}}{f_Y(Q_\tau)} \tag{5}$$

where f_Y is the marginal density function of the score management and $\mathbb{1}\{\}$ is an indicator function. Firpo et al. (2009) show that if the RIF regression $\mathbb{E}\left(RIF(y;Q_\tau)|X\right)$ is well modeled by the linear regression model $\mathbb{E}\left(RIF(y;Q_\tau)|X\right) = X\beta$, then the coefficients represents the mean marginal effects of the explanatory variables on the quantiles of Y. Since the true $RIF(y;Q_\tau)$ is not observed, we can use its sample version $\widehat{RIF}(y;\widehat{Q}_\tau)$. Replacing the unknown quantities by the corresponding estimator we have:

$$\widehat{RIF}(y;\widehat{Q}_\tau) = \widehat{Q}_\tau + \frac{\tau - \mathbb{1}\left\{y \leq \widehat{Q}_\tau\right\}}{\widehat{f}_Y(\widehat{Q}_\tau)} \tag{6}$$

where $\widehat{Q}_\tau$ is the τ^{th} sample quantile and $\widehat{f}_Y$ is the kernel density estimator. A typical OB decomposition can be performed over $\widehat{RIF}(y;\widehat{Q}_\tau)$.

Summarizing, the quantile is non-linear functional form of the distribution and therefore the OB decomposition, which is based on the expectation, cannot be simply applied to quantiles. Using RIF method allow us to linearize the quantile and then use the OB decomposition.

In performing the decompositions, we also take into account two important issues. First, the decomposition results for categorical predictor, such as our ownership variables, depend on the choice of the omitted base category. To overcome this problem, we follow the normalization procedure proposed by Yun (2005) which restrict the coefficients for the single categories to sum to zero, that is, to express effects as deviations from the grand mean. The second issue is that the results can vary depending on whether we use the coefficient of group B or A in equation 4. In this work we follow Jann (2008)'s suggested approach which uses the coefficient from a pooled regression (with a group indicator) over both groups as an estimate of β^*.

3 Describing the Distribution of Managerial Quality

3.1 Measuring Management Practices

The sampling methodology is taken from Bloom and Van Reenen (2007) and the reader is referred to that work for detail.[9] For most countries in the global sample, the sample of firms to be interviewed is drawn from BvD Orbis which collects comparable information on firms worldwide. The sample is further restricted to manufacturing companies between 50 and 5000 employees. Hence, the generally low poor country scores are not driven, for example, by an exaggerated informal sector.[10] A random sample is then extracted to be interviewed with attention paid to ensuring that both small and large firms are interviewed within the size band. The sample is thus representative of medium-sized manufacturing firms.

Table 1 presents the summary statistics by country. Because our later analysis will require standardization of the management variables, the z statistic is presented below the raw management score in the first line. Table 2 offers a more compact presentation of the statistics for high management score ($z > 0$) and low management ($z < 0$) countries which maps broadly to rich and poor countries.

In terms of the size of firms in the sample, poor country firms in the sample tend to be smaller than in richer countries, although there is a fair amount of dispersion. The largest mean firms sizes are found in the US (1,254), Germany (937), China (960), Australia (847) and the UK and France (828). In a middle group of between 400 to 700 we find all the Latin American countries, Greece, India, Italy, Japan, Poland, the Republic of Ireland and Sweden. Among the smallest average size we find New Zealand (265) and Portugal (339).

Whether or not a firm is a subsidiary of a foreign or domestic multinational is not known until the end of the survey when the firm is asked for ownership information.

[9]The additional Latin American data financed by the present authors was collected by their survey team and is hence fully consistent.

[10]Orbis does not provide a good sampling frame for some countries. The UK data, for example, comes from Companies House. Chile is also not drawn from Orbis.

Here, again, we see substantial variance across the sample. The highest shares are, again, found among the most advanced countries. France (.74), Sweden and Australia (.67), Germany (.64), Greece (.61), UK (.58). A middle group, from roughly .4 to .55 includes Poland, Republic of Ireland, Portugal, the US Italy, China and New Zealand. The lowest group runs from India (.22) to Chile (.38) and includes the Latin Countries and Japan.

Analysts then call the management of these firms and code the perceived responses to a detailed set of questions. Bloom and Van Reenen (2007) have developed an interview-based evaluation tool that defines and scores firms from 1 ("worst practice") to 5 ("best practice") on 18 basic management practices used by industrial firms. These practices are grouped into four broad areas: operational management techniques, systematic performance monitoring, appropriate target setting, and talent management. The composite score aggregates over all 18 dimensions.

3.2 Establishing the Managerial Frontier.

Tables 1 and 3 suggest that if we restrict the sample to only those firms for which we have the complete set of explanatory covariates, Japan has the highest mean management score followed closely by the US, Germany and Sweden. Clearly, this ranking depends somewhat on the weighting of sub components: Japan dominates in Target Management and Personnel Policies, but lags the US in Operations and Monitoring. Overall, however, the correlation among these sub components is sufficiently high that the ranking is not dramatically changed by moderately different weighting schemes. Further, when we allow the data to choose the weights by extracting the first factor across all of the sub measures (column 4), the ranking is not dramatically altered.

However, we are concerned with the entire distribution of quality and not just the mean. Figures 3 report the kernel density plots of each country against the US and calculates the Kolmogorov-Smirnov test which takes as its null the equivalence of the entire distribution. For only three countries, Germany, Japan and Sweden, we cannot reject equivalence with

the US distribution.[11] For two of the three countries in the original Bloom and Van Reenen (2007) sample, the UK and France, equivalence is emphatically rejected. To quantify these patterns more robustly, Table 4 presents quantile regressions of each country against the US at the 10^{th}, 50^{th} and 90^{th} quantiles. Rendering the previous discussion of ranking of mean quality somewhat moot, Sweden, Germany and Japan show no significant difference with the US at the median (50^{th}) while all other countries do. What is striking, however, is that the three frontier countries lag the US importantly (and Germany and Japan statistically significantly so) at the 90^{th}. That is, while the US does not have significantly better median firms than its close competitors, its best firms are better and by a substantial amount (.2). Japan more than offsets its weaker performance here by having significantly better firms at the lower tail to give it the highest mean value. But overall, the superior performance of the US at the upper tail suggests that Bloom and Van Reenen's treatment of the US as the frontier- the best of the best- is justified and we follow their lead for the rest of the paper.

3.3 What Distributional Changes Characterize the Process of Convergence?

Figure 4 pushes this simple quantile exercise further to allow us to graphically identify where the distributions most diverge. Every country in the sample is paired with the US data and a quantile regression is run of management quality on a constant, capturing the US, and dummy corresponding to the individual country as described earlier. The estimation is run for each viniventile ($1/20^{th}$) of the distribution and the coefficient on the dummy, capturing the difference with the US score, and the standard errors are plotted (see Koenker and Hallock, 2001). This allows us to graphically detect whether the coefficient of one quantile lies outside the confidence interval of another. The upper left-most panel in figure confirms the obvious. For the US, the higher quantiles have higher scores and significantly so. The standard errors are relatively small and the coefficients drift out of the confidence interval confirming that, indeed, the 50^{th} quantile is significantly better than the 25^{th}.

[11] In each case, and in particular, Japan, there is more mass at the center of the distribution and less in the tails, perhaps reflecting the smaller sample sizes: US (256), Sweden (208), Japan (53), Germany (116)- which would, *ceteris paribus*, generate fewer extreme observations.

The pattern of evolution across quantiles offers a more precise description than the simple kernel plots in Figures 3 about how the distributions differ with the US.[12] Together with Table 4, the picture that emerges is provocative. A close look at, for instance, the Latin countries- Argentina, Brazil, Chile and Mexico suggests an important first observation- every decile is below that of the US and in no case does any confidence interval include zero (at the very top of the graph) which, were it the case, would suggest that the point estimates of the Latin country and the US were statistically indistinguishable: Latin firms do significantly worse across the entire distribution. Further, in the case of Argentina, Brazil and Mexico, India, Greece, Republic of Ireland and Northern Ireland, the slope of the quantile curves is positive suggesting that, indeed, the lower quantiles differ from the US by more than the upper: The left tails appear extended. The fact that in Table 4 the coefficients on the 10^{th}, 50^{th} and 90^{th} are statistically different from each other confirms that this non-uniform shift to the left is statistically significant in these cases.

However, this is not always the case. In Chile the overall impression is of a relatively constant difference with the US. Although estimates of the lower quantile in Table 4 appear to be driven by an idiosyncratic drop at that point in the distribution, overall, Chilean firms are about .55 below the US with no especially long left tails. In fact, as is also the case for Australia, Germany, Italy, New Zealand, and Sweden, whatever difference with the US appears to be relatively uniform across the distribution or even declining as we move up the distribution.

As a way of identifying any regularities across the trajectory of improved average management quality, Figure 5 plots two sets of summary statistics against the mean z score. The left panel plots the coefficient on the difference between the individual country and the US at the median, effectively the 50^{th} quantile of each of the graphs in Figure 4 (estimates in Table 4). What is clear is that the quality improvement process is not just happening at the tails. Moving from India to Sweden and Germany, we see the median firm moving from .8 behind the US to .1. The center of the mass is moving nearly as much as the mean.

[12]There appears to be a jump up in quality at the very bottom, suggesting that it is not the very worse firms that drive the US/Brazil difference. However, the "edge" quantiles are very hard to estimate and the standard errors are large enough to make telling such a story with confidence difficult.

The right panel of Figure 5 then asks whether the evolution over the development process also involves a progressive reduction in lower tails or the emergence of superstars. It plots the ratio of the coefficient on the 90^{th} over the coefficient on the 10^{th}. That is, it takes the gap with the US distribution at the 90^{th} divided by the gap at the 10^{th}. If the distribution is uniformly shifted at the extremes from the US, then the value will be 1. If the gap is larger among the worst firms, then the ratio will be less than 1. If among the best, it will be greater than 1.

The graph is striking. There is a clear upward slope, even dropping Sweden and Germany, suggesting that while for many low average management quality countries, the ratio is below 1, as we approach the frontier, the 90^{th} to 10^{th} ratio increases to above 1. This suggests that our earlier finding in section 3.2 that the frontier countries lag the US more in their best firms is part of a more systematic evolution across the development process. Below $z = 0$, the tendency is for lower tails the be more and more the defining feature. Most fall below 1 (along with Great Britain, and Italy), but with the exception of Great Britain and Italy, all countries with $z > 0$ lag at the top.

Due to confidentiality issues, our data base lacks the industry level dummies. However, another available subset of the data does include these although at the cost of fewer covariates and figure A.1 in the annex replicates figure 5 controlling for possible industry effects. The basic pattern is bourne out.

A notable exception is China where the gradient in Figure 4 shows a very strong downward slope: relative to US firms, the median Chinese firm is substantially worse than Latin firms are, for example. But the bottom tail is only .3 points below the worst of US firms, a situation unequaled by, for instance, any of the Latin cases. Most strikingly, the top of its firms are among the worst in the sample .9 points below the comparable US quantile. Also striking (not shown) is that in terms of Clarity of Goals and Measurement sub score, China ranks first in the world, but both in elements of just in time management or long run strategic thinking, they are among the worst. Both sets of findings are arguably consistent with Cooke (2008)'s review of five industries in China. He finds that though aggregate production growth has been impressive, at the individual firm level the country lags in

management quality: in general "they rely on their low cost advantage and mass production mode as their main competitive advantage instead of product innovation and quality of products and services." Arguably Chinese managers are very astute in terms of very short run assembly line management, but without vision or plans for long technological advancement.[13]

4 What Factors Are Correlated with Managerial Performance Across the Convergence Path?

4.1 Explanatory Variables

The available data is a single cross section. The available covariates can be divided broadly into 3 categories: Human capital, firm characteristics, and firm ownership structure.

Human Capital

1. Manager studied abroad?
2. Manager has a degree?
3. Share of managers with a college degree.
4. Share of employees with a college degree.

Firm Core Characteristics

1. Multinational?: Indicator.
2. Firm Size: Number of reported employees.

[13]In addition, he finds relatively low acceptance of the importance of HR policy. In a survey of self-reported important practices of 30 top performing firms, only 15 reported detailed accounting of HR policy, five only mentioned it briefly, and 10 not at all. More generally, performance management often is based more on morality, political attitudes, seniority and maintenance of harmonious relations with colleagues than on productivity related performance. Cooke also offers an explanation for the relatively poor performance of the best firms which found resonance in our interviews in China in the fact that senior managers in SOEs are normally appointed by higher-level authorities and hence "These managers thus tend to be more preoccupied with their political performance than the financial performance of their enterprises." Hence, it is possible that many ex state owned firms,while among the most established and relatively well run, still respond to non-profit oriented incentives. Recruitment and promotion in Ex SOEs and joint ventures in the automobile industry also seem dominated more by patronage decisions than those related to maximizing shareholder return.

3. Degree of Competition: Following Bloom et al, competition is a categorical variable which is equal to 0 if the firm has 0 competitors, 1 if the firm has between 1 and 5 competitors and 2 if has more than 5 competitors.

4. Exports: Share of output exported.

Ownership Structure: A series of indicator variables describing firm ownership:

1. Dispersed: Whether ownership is diffused among, for instance, many shareholders.

2. Family: Whether firm is held by a family.

3. External CEO: Whether the firm has an external CEO.

4. Founder: Whether the firm is still run by its founder.

5. Private: held as a private firm.

6. Other (composed of unknown owner, pension/trust fund, private equity or venture capital, employee/coop, foundation/research institute/joint venture and other)

4.2 Summary Statistics

From Table 1, several notable features emerge from the data:

Among the human capital variables, there are important variations in whether the manager has studied abroad. The core advanced countries with highly developed educational structures, such as the US, Sweden or Japan are under 5%, although surprisingly Germany is perhaps double that. More peripheral countries tend to have higher levels, perhaps reflecting a preference for established business schools in the advanced countries: 13% in Brazil, 12% in Argentina and 12% in Chile, 22% in Poland, 25% in New Zealand and Greece leads the list with 43%. China is surprisingly low with 3.5%.

The two variables capturing whether the principal manager has a degree or not suggests less variation. Most countries have around 80% or above with a few notable exceptions: Australia (.7), China (.54), the UK (.57), Italy (.73), New Zealand (.65) both Irelands (.58), Sweden (.62). The share of all managers with a degree varies widely with, again, many

advanced countries apparently with far fewer degrees than developing countries.

With respect to firm properties, the multinational participation and firm size were discussed above in the context of sampling. The measure of competition shows moderate degree of variation with few obvious patterns. China, Italy and Japan report the highest degree of competition, but some of the other wealthy countries, including the US, show less.

Exports conform to basic intuition. Sweden dominates with 59.7%, Portugal (56%), China and Mexico (48%). The US (17%) and Japan (20%) Brazil (13.8%), perhaps because of their size, are among the least open.

Firm ownership shows very striking differences. As an example, the share of firms with diffused ownership is the highest in the richer countries: Japan (53%), Sweden (51%), US (.46%). Most non-frontier countries show substantially less: Portugal (4%), in Brazil (12%), in Argentina (18%), 25% in Chile and China, and 28% in Mexico. The lower management score countries tend to have more family owned and founder owned firms as well.

In sum, the largest variance appears along the dimension of managerial experience abroad, multinational participation and ownership.

5 Correlates with Managerial Quality

As Bloom and Van Reenen (2007) note, many of the covariates discussed above are potentially endogenous and the reader is referred to their original work for a thorough discussion of the issue. We can think of the exercises below as adopting their same strong identification assumptions, but then exploring how we can push their findings further by exploring the correlations across the whole distribution, and including the entire spectrum of countries in the sample.

5.1 The Bloom-Van Reenen Sample

Table 5 closely replicates the original regressions of Bloom and Van Reenen for the US, Germany, the UK and France. As we are interested in a broader range of variables than they were, we lose some observations but, as we will have many more degrees of freedom in subsequent exercises, we also leave disaggregated some sets of variables such as ownership which were made composite variables. In addition to the extraordinary care in the collection of data, double checking for bias etc., Bloom and Van Reenen also used a full set of covariates to account for possible interview bias- time of day, particular interviewer etc. We do not have those controls for the entire sample. Column 1 and 2 of Table 5 replicate their specifications with and without those noise controls and they do not appear critical to establishing the key relationships. This suggests that, going forward, we are unlikely to be suffering from such biases in specifications which become more complex with number of covariates estimated.

Again, the results are again robust to the inclusion or exclusion of sectoral dummies which our full sample does not have. As in Bloom and Van Reenen, in both OLS specifications, whether or not the manager has a degree emerges and the share of employees with a college degree emerges significantly and positively. If the firm is family controlled emerges negatively although we find that the noise controls does reduce the significance of the negative effect of being founder owned. Finally, competition emerges as positively correlated in both specifications. As an additional test of robustness, we employ our other subset of the data that includes industry level dummies, but not some of our preferred variables. Running the smaller sample (Table A.1) with fewer covariates suggests that most covariates preserve their sign and significance, especially the human capital variables when industrial dummies are included.

The unconditional quantile technique permits us to look at the correlates of these variables across the distribution. Columns 3-5 report the unconditional 10^{th}, 50^{th} and 90^{th} quantiles. For the most part, the Bloom and Van Reenen findings hold up well, although with some important additional insights. First, the correlation of the two human capital variables with quality is most importantly an effect among the best firms. Having

a managerial degree has under half the effect at the 10^{th} as it does at the median and 90^{th} quantiles, and is not significant. Similarly, the positive correlation of the share of employees with degrees and quality increases in magnitude and significance as we move up the distribution.

The contrary appears to be the case with ownership variables. The negative impact of being family owned or privately held is dramatically larger and significant only at the bottom quantile and has no impact at the median or 90^{th}. This would suggest that these particular ownership structure are holding back firm management quality through the lower tail. Being founder owned appears to be an effect largely at the median, but not higher. Somewhat unexpectedly, having an external CEO has a negative effect, but only at the top quantile. This last result will not prove robust.

Competition continues to enter, and across the spectrum with the largest impact at the median. This suggests that competition is indeed important, but not especially through clipping the left tails. It is arguably a more uniform force that, as Bloom and Van Reenen suggest, may cause firms to work harder across the sample.[14]

5.2 The Global Sample

Table 6 replicates the previous exercise, but using the entire sample of surveyed countries. With one important exception, the correlates that were significant in the original four country sample broadly enter in a similar fashion. On the human capital side, whether or not the manager has a degree enters significantly, and more or less uniformly, across the sample whereas before it affected the higher parts of the distribution. The share of workers with a degree also enters again strongly significantly, and of similar magnitude as with the Bloom Van Reenen sample. In addition, we find that whether the manager studied abroad now has a very significant impact and, again, particularly among the better firms. Further, the share of managers with a degree now also enters significantly with the highest correlation

[14]Since in our LDC sample, the effects of exporting are often stressed, we include this variable as well in separate specifications. However, we lose a substantial number of observations as it appears that in some waves and countries, this variable was not collected.

among the best firms.

Size again enters significantly and positively, although now the correlation is large and more significant among the better firms. At the median, however, the coefficient is quite close to that of the previous exercise. We also include the multinational and export variables. Both enter strongly and consistently across the distribution. What does not enter here at all, with or without the multinational and export variables entered, is the measure of competition. It enters somewhat counter intuitively negatively in the OLS regressions. These results suggest that, while in the original four advanced country sample, competition seems to push companies to improve across the spectrum, across the larger process of convergence, the effect is substantially less present.

The ownership type variables, however, enter with renewed force. Being family, founder owned or privately held all enter significantly, often at the 1% level and generally, as before, with a larger impact on the lower tail of the distribution.

In sum, whether the interviewed manager has a degree, or whether s/he has studied abroad enter of large magnitude, and generally at the higher end of the distribution. Family ownership appears even more significantly than in Bloom and Van Reenen's results, although, in this case, it has a disproportionate correlation at the lower end of the distribution. Competition, however, never enters in the quantile regressions at any part of the distribution. Table A.2 replicates the exercise with the smaller sample including industry fixed effects and suggests that their inclusion would not importantly change the conclusions.

6 Decomposing the Contributions to the Gap

A more careful break down of the contribution of differences in the covariates, and differences in their impact on the shape and position of the distribution of management quality can be mapped using the decomposition methods discussed in section 2.

6.1 Bloom Van Reenen Sample: US vs. France, Germany, UK

Table 7 first explores Bloom and Van Reenen's sample, decomposing the gap between the US, the UK, France, and Germany. Lines A, B and C correspond to the raw z score gap from the simple quantile comparison, the Machado-Mata and Melly estimates, and then the RIF estimates respectively. The results are broadly consistent across measures and with our previous findings: the gap in all cases is largest at the top, in the case of the RIF .278, .266, .321, at the 10^{th} 50^{th} and 90^{th} respectively.

The next lines in panels B and C are the amount of this gap that can be explained by firm characteristics. Overall, the MM method suggest statistically explanatory power only at the 10^{th}, of roughly 80% of the gap. Again, this method does not allow us to identify which covariates are most responsible. The RIF methodology does, and suggests more significant explanatory power across the distribution, ranging from 41% at the 10^{th} to 31% at the 90^{th}. Looking at the covariates individually, whether the manager has a degree accounts for 21% of the gap with the US at the 10^{th}, 12% at the median, and 9.0% at the 90^{th}. The greater explanatory power in the lower quantiles despite the higher coefficient in the higher quantiles in table 5 reflects the larger gap in this variable among the worst firms. At the median, the share of managers with a degree accounts for 18.4% but is not significant at the other quantiles. The share of employees with degrees accounts for 9.8% a the 50^{th} and 12% at the 90^{th}. The contribution of human capital variables to explaining the gap is high across the distribution. As found earlier by Bloom and Van Reenen and Bandiera et al. (2013), diffuse ownership appears important, accounting for 11% at the 10^{th} and 7.9% and the 50^{th}. In these decompositions, the degree of competitiveness does not enter importantly or significantly.

The next panel explores the overall explanatory power of differing "returns" to each of these covariates and suggest that the contribution is higher than the differences in endowments. However, first, this includes differences in the constant term which picks up unspecified residual factors. Further, the only significant entries are on size and being a founder owned firm at the 50^{th}, both of which are negative, meaning that their differing returns with the US are not contributing to explaining the gap but rather the reverse. For

instance size, the marginal impact of increasing firm size is smaller in the US, hence the larger firm size there contributes less to the gap than would be expected from the quantile regressions in table 5. Overall, the differing "endowments" of human capital and ownership structure are most important in explaining the gap.

6.2 US vs. Better Managed Countries, $z > 0$

Table 8 expands the sample to include other advanced countries ($z > 0$), and then, Table 9, those with $z < 0$. Operationally, this translates to the rich countries (Australia, Italy, France Great Britain, Sweden, German, Japan and the US) vs the rest.

Again, for the near frontier countries, the gap is largest among the best firms either using the raw, MM or RIF calculations, the latter yielding the most attenuated gradient across quantiles 0.293, 0.267 and 0.317 respectively. Only the MM shows statistically significant explanatory power of the covariates at any quantile (10^{th} quantile) of 63% of the gap. For the RIF, the overall explanatory power of the covariates is low 17%, 9% and 12% at the 10^{th}, 50^{th} and 90^{th}, and never significant.

That said, individual covariates do emerge as significant. Whether the manager has a degree accounts for almost 19% at the 10^{th}, 7% at the median and 3.5% at the 90^{th}. The share of managers who have a degree accounts for roughly 5.5%, 16% and 14% respectively. The share of employees with a degree accounts for roughly 6% across the distribution. Again, the share of exports and being a multinational have negative explanatory power and competition, none. This reflects, in the first two cases, the relatively smaller quantities in the US than the average for this group. Again, being a diffusely owned company appears to account for roughly 4-5% for at the 10^{th} and 50^th with no explanatory power at the 90^th.

Again, we find few important differences in coefficient values corresponding to these characteristics, although the magnitudes in this case are not trivial. At the 10th, whether the manager has studied abroad is worth about 5% and dispersed ownership about 30%. The latter suggests that, while it is the case that the fact that the US has more firms with

diffuse ownership than the $z > 0$ category as a whole, it also gets a bigger kick out of it in terms of managerial quality.

6.3 US vs. Worse Managed Countries, $z < 0$

Table 9 shows that the overall results are more dramatic for the gap between the badly managed countries vs. the frontier. Consistent with previous findings, the raw, MM and RIF measures all show that the gap is largest among the worse firms: for the RIF 0.729, 0.594, and 0.432 at the 10^{th}, 50^{th} and 90^{th} respectively. This is the reverse of the finding for the aggregate better managed country ($z > 0$) sample. The MM only shows statistically significant explanatory power at the 10^{th} quantile (23% of the gap). However, in this case the RIF explanatory power of the covariates is importantly higher and very significant at every quantile.

Looking at the significant individual covariates, we find the same negative contribution of managers studying abroad found previously and, as Table 1 suggests, for the same reason- the US studies abroad very little. Whether the manager had a degree was not significant at the 10^{th} and marginally so at the 50^{th} and 90^{th}, explaining about 2% the gap. Surprisingly, the share of managers with a degree never enters significantly. The share of employees with degrees is highly significant across the distribution but explaining only 2% for the lower two quantiles, although up to 11% at the 90^{th}. Being a multinational is now very significant across the distribution with explanatory power of 2% at the 10^{th}, 6% at the 50^{th} and 8% at the top.

Ownership, again enters with massive importance and significance and across more different types of structures than observed above. Diffuse ownership contributes 4.5%, 5.9% and 15% the 10^{th}, 50^{th} and 90^{th} respectively, being family owned about 1.5% at the 10^{th} and 50^{th}, and Founder owned 3.5 to 6% moving up quantiles. Ownership differences appear to explain almost 10% at the 10^{th}, 11% at the median and 21% at the 90^{th}. Though the marginal effect of diffuse management is highest at the lower quantiles, the difference in relative endowments among the best firms means its overall impact on the gap is larger. Ownership-related variables enter as the most important variables, especially as we move

away from the worst of the worst.

In terms of how different coefficients on characteristics contribute, again, we find that the higher coefficient on having studied abroad in the US has an effect at the 10^{th}, and again, the lower impact of size in the US actually works against size being an important explanatory variable across the spectrum. Further, at the median, the impact of being a multinational appears higher in the poorer countries leading to a negative effect on explaining the gap. Finally, the differential return to diffuse ownership at the 90^{th} works against explaining the gap among the best firms.

In sum, the relative stocks of factors tell the most consistent story across samples compared to the returns to these factors. In particular the human capital variables and ownership structure enter consistently with explanatory power. However, their importance as explanatory factors shows very different patterns. The various dimensions of human capital have differing effects across the distribution for the better managed samples: $z > 0$ whether the manager has a degree has the highest explanatory power at the top, the share of managers with a degree a larger impact at the bottom. In both cases, however, the impact is important. By contrast, for the $z < 0$ sample, explanatory power is largest among the best firms, but human capital variables explain much less than in the $z > 0$ sample with the share of managers with degrees not entering at all. The reverse is true with ownership structure- the largest explanatory power for better firms in the low management quality sample, and the worse firms in the better managed samples but the explanatory power is higher for the $z < 0$ sample. This suggests that the evolution of ownership structure is a much more critical factor for convergence among developing countries, and human capital for the richer.

6.4 How Does Explanatory Power Change across Management Quality?

The differences in explanatory power across quantiles and across samples suggests further investigation. Figures 6 plot the explanatory power of the RIF at each quantile against the standardized average quality. At all quantiles, 10^{th}, 50^{th} and 90^{th} we broadly find a downward slope with average score, implying that the covariates "explain" progressively

less as average managerial quality improves.[15] Also consistent with this is the fact that as we progress from the bottom decile to the top, explanatory power falls. That is, the best managed firms in any country show the same pattern of weaker explanatory power that we find at the national level. As examples, Australia, France, Portugal, Sweden and German, New Zealand, Great Britain, Republic of Ireland show decreasing explanatory power moving up firm quality from the 10^{th}, to 90^{th} quantiles of firm quality. Argentina, Mexico Chile, India, Italy, Greece, Northern Ireland all show their greatest explanatory power at the 10^{th}.

Figure 6 also confirms that the ratio of explanatory power at the top to the bottom deciles decreases with average aggregate level of management quality.[16] The observed pattern suggests that not only are we less and less able to explain management quality as the mean level rises, but that explanatory power falls more rapidly for the best firms than for the worst.

7 Conclusion

By collecting standardized management data from around the world, Bloom and Van Reenen (2007) have given the study of management quality an important push forward. They document key empirical regularities at the mean and argue that, in particular, competition and ownership structure are key to explaining the average differences across their four top countries.

This paper builds on their work in two ways as it explores the process to which countries converge to the frontier in managerial quality. First, it exploits the entire sample of firms and middle income and poor countries to study the larger process of convergence across the development process. Second, it uses recent advances in unconditional quantile and RIF techniques to study the process through which the entire distribution shifts, not just the

[15] This contradicts the results from Table 9 which suggested that, for $z < 0$ countries, explanatory power increased as firm quality increased. But this appears to be an artifact of the sample division that disappears once the entire sample is considered.

[16] Poland and Mexico, the only countries beginning negative at the 10^{th}, should be ignored since that makes the ratio uninformatively positive. A negative RIF explained implies that, given the characteristics of a particular country's firms, their average score should actually be better. For example, Mexico, at every quantile has enough college graduates, exports and those who have studied abroad would predict a lower gap with the US than is actually seen.

central tendency (mean). Further, it explores the correlates of these shifts at each point of the distribution.

Studying the entire distribution is important even for establishing what is the frontier country in terms of management quality. We establish that, though the US is not robustly ahead of Japan, Germany or Sweden at the mean or median, it is dominant at the upper quantiles. That is, the best US firms are, in fact, the very best globally and dominate those of the near frontier countries. It is these best firms that confirm the US as the frontier.

This finding highlights a larger pattern in the way in which countries differ from the frontier benchmark and hence the process of convergence. For firms in on average badly managed countries, relatively longer left tails do contribute to lower mean scores. With the exception of China, the bottom quantiles lag more than the top quantiles. However, the process of convergence is more complex than simply trimming these under-performers. We find that the gap in the median score between individual countries and the US benchmark, moves up proportionally with the mean suggesting a movement in the overall mass of the distribution. Further, as we move from the worse managed to better managed countries, the left tail becomes less important, and richer countries appear to increasingly lag more in the upper tail. The convergence process ceases to be about bringing along or culling the worst firms and more about pushing ahead the best firms.

Second, we revisit the issue of which factors appear to be correlated with quality using the recently developed decomposition methodologies of Machado and Mata (2005) and Firpo et al. (2009) which allow us to decompose the contributions of covariates and coefficient differences in explaining the difference with the US for any quantile. In particular, we confirm Bloom and Van Reenen's findings about the importance of ownership and in fact find the effect emerges much more strongly across the global sample than in their four country sample. In particular, the marginal impact of non-traditional ownership structures appears greatest among the worst firms (lower quantiles), and of human capital for the best firms. Our decomposition results suggest that ownership structures are more important factor for convergence in less well-managed countries, human capital in the better, suggesting that

there may be several distinct dynamics at work across the convergence process. Bloom and Van Reenen's finding of the role of competition appears less general. We replicate their results for their four advanced country sample and find that the impact is not especially higher at the lower tails, but rather, as they postulate, it would seem to encourage firms across the quality spectrum to work harder. However, the effect in the decompositions is not significant and across the combine, poor and rich country sub-samples, competition almost never enters. There are, as they note, issues in measuring competition, but trimming the left tail through increased competition does not emerge as a dominant driver of convergence to the frontier.

Third, the RIF explanatory power of the covariates appears to decrease with the quality of management. That is, we can explain less in the rich countries than in the poor at every quantile, and less among the best firms than among the worst in a given country. It appears that we have some idea of what drives convergence for the globally worst firms: ownership structure and to a lesser degree, dimensions of human capital. But to explain what makes the best US firms better than the best Swedish, Japanese or German firms, we remain largely at a loss. Most of the "explanatory" power here appears in differing coefficients weighting the covariates. This is potentially reasonable to the degree that we may expect that the marginal factor that makes a world class manager- some particular drive or ability- is likely to be unobserved.

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Tables

Table 1: Summary Statistics

	Argentina		Australia		Brazil		Chile		China	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Management	2.742	0.705	2.977	0.600	2.716	0.684	2.742	0.630	2.876	0.502
z-management	-0.212	0.681	0.014	0.578	-0.231	0.658	-0.210	0.606	-0.076	0.485
Manager studied abroad	0.117	0.322	0.210	0.408	0.134	0.341	0.122	0.329	0.035	0.185
Manager has degree	0.895	0.307	0.697	0.460	0.796	0.404	0.824	0.381	0.541	0.500
% Mangers college degree	54.665	32.286	44.848	31.299	69.988	35.422	86.505	25.776	37.112	31.265
% Employees college degree	5.268	11.278	8.169	14.021	8.423	12.029	11.569	12.714	4.324	10.413
Multinational	0.356	0.480	0.638	0.481	0.212	0.409	0.383	0.487	0.518	0.501
Size	518.188	636.030	847.394	1340.627	580.628	772.384	486.883	760.417	960.365	815.452
Competition	1.703	0.467	1.676	0.487	1.703	0.473	1.574	0.506	1.824	0.426
Export	21.682	25.077	18.622	27.205	13.787	23.781	29.968	37.164	48.053	40.121
Dispersed	0.176	0.381	0.411	0.493	0.124	0.330	0.245	0.431	0.247	0.433
Family	0.205	0.405	0.146	0.353	0.229	0.421	0.186	0.390	0.047	0.212
Ext. CEO	0.084	0.277	0.029	0.168	0.049	0.215	0.085	0.280	0.018	0.132
Founder	0.209	0.408	0.099	0.299	0.321	0.467	0.144	0.352	0.294	0.457
Private	0.226	0.419	0.181	0.385	0.144	0.351	0.282	0.451	0.176	0.382
Other	0.100	0.301	0.134	0.341	0.134	0.341	0.059	0.235	0.218	0.414
Observations	239		343		411		188		170	
	France		Germany		Great Britain		Greece		India	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Management	3.044	0.482	3.282	0.510	3.078	0.594	2.897	0.875	2.619	0.617
z-management	0.077	0.464	0.307	0.496	0.113	0.573	-0.066	0.845	-0.330	0.595
Manager studied abroad	0.088	0.285	0.121	0.327	0.025	0.157	0.429	0.498	0.123	0.330
Manager has degree	0.837	0.371	0.879	0.327	0.573	0.495	0.976	0.153	0.947	0.224
% Mangers college degree	51.231	27.236	57.336	29.354	40.876	29.221	77.214	19.455	85.612	23.764
% Employees college degree	5.735	11.498	6.931	10.549	7.952	13.507	16.833	17.708	12.630	20.160
Multinational	0.741	0.439	0.638	0.483	0.581	0.494	0.607	0.491	0.216	0.412
Size	828.102	948.951	937.560	1099.996	828.365	2943.069	569.143	842.882	684.789	972.488
Competition	1.565	0.511	1.716	0.453	1.691	0.492	1.560	0.588	1.775	0.439
Export	38.599	29.818	45.767	24.347	39.472	33.320	31.774	29.600	29.533	31.651
Dispersed	0.272	0.447	0.250	0.435	0.343	0.475	0.321	0.470	0.207	0.406
Family	0.150	0.358	0.190	0.394	0.143	0.351	0.238	0.428	0.211	0.409
Ext. CEO	0.048	0.214	0.129	0.337	0.065	0.246	0.036	0.187	0.040	0.196
Founder	0.041	0.199	0.017	0.131	0.070	0.256	0.167	0.375	0.357	0.480
Private	0.320	0.468	0.284	0.453	0.183	0.387	0.143	0.352	0.062	0.241
Other	0.170	0.377	0.129	0.337	0.197	0.398	0.095	0.295	0.123	0.330
Observations	147		116		356		84		227	
	Italy		Japan		Mexico		New Zealand		Northern Ireland	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Management	3.059	0.528	3.416	0.392	2.922	0.717	2.812	0.570	2.919	0.795
z-management	0.100	0.508	0.437	0.378	-0.034	0.691	-0.148	0.549	-0.036	0.766
Manager studied abroad	0.059	0.236	0.038	0.192	0.310	0.464	0.250	0.435	0.026	0.161
Manager with degree	0.725	0.448	0.962	0.192	0.952	0.214	0.650	0.479	0.579	0.497
% Mangers college degree	57.863	29.414	56.340	30.107	81.631	26.749	45.917	30.557	47.737	32.764
% Employees college degree	12.647	15.871	28.075	21.276	14.923	20.929	8.500	14.660	8.197	15.825
Multinational	0.520	0.502	0.358	0.484	0.387	0.488	0.583	0.495	0.526	0.503
Size	422.824	625.383	436.849	481.741	593.863	863.811	265.425	314.316	691.487	983.651
Competition	1.833	0.375	1.887	0.320	1.696	0.474	1.650	0.513	1.592	0.495
Export	51.275	28.679	19.981	27.167	38.149	35.541	48.216	36.957	31.947	37.522
Dispersed	0.206	0.406	0.528	0.504	0.280	0.450	0.242	0.430	0.263	0.443
Family	0.304	0.462	0.415	0.497	0.185	0.389	0.158	0.367	0.184	0.390
Ext. CEO	0.108	0.312	0.000	0.000	0.125	0.332	0.042	0.201	0.013	0.115
Founder	0.118	0.324	0.019	0.137	0.190	0.394	0.175	0.382	0.197	0.401
Private	0.176	0.383	0.019	0.137	0.161	0.368	0.267	0.444	0.224	0.419
Other	0.088	0.285	0.019	0.137	0.060	0.237	0.117	0.322	0.118	0.325
Observations	102		53		168		120		76	
	Poland		Portugal		Republic of Ireland		Sweden		United States	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Management	2.892	0.698	2.847	0.580	2.897	0.747	3.275	0.507	3.376	0.612
z-management	-0.059	0.673	-0.109	0.561	-0.058	0.721	0.300	0.490	0.397	0.592
Manager studied abroad	0.223	0.419	0.045	0.208	0.065	0.248	0.046	0.211	0.035	0.185
Manager with degree	0.957	0.203	0.902	0.298	0.576	0.497	0.620	0.488	0.863	0.344
% Mangers college degree	78.585	23.759	40.233	26.293	52.554	33.347	37.370	24.757	67.191	30.451
% Employees college degree	17.149	16.758	5.128	9.998	11.804	20.442	7.417	12.242	14.613	18.640
Multinational	0.415	0.495	0.481	0.502	0.457	0.501	0.676	0.470	0.484	0.501
Size	456.989	509.495	339.256	485.211	531.826	1016.192	594.944	747.188	1254.137	3838.058
Competition	1.798	0.404	1.797	0.404	1.576	0.497	1.648	0.499	1.645	0.496
Export	35.691	32.990	56.173	34.281	36.554	41.284	59.769	32.537	16.891	21.082
Dispersed	0.213	0.411	0.038	0.191	0.261	0.442	0.509	0.502	0.457	0.499
Family	0.064	0.246	0.263	0.442	0.141	0.350	0.065	0.247	0.121	0.327
Ext. CEO	0.064	0.246	0.090	0.288	0.065	0.248	0.037	0.190	0.035	0.185
Founder	0.074	0.264	0.158	0.366	0.207	0.407	0.019	0.135	0.078	0.269
Private	0.319	0.469	0.263	0.442	0.120	0.326	0.157	0.366	0.160	0.367
Other	0.266	0.444	0.188	0.392	0.207	0.407	0.213	0.411	0.148	0.356
Observations	94		133		92		108		256	

Note: See text for complete description of variables.

Table 2: Summary Statistics: Low and High Management Countries

	Low Management Countries		High Management Countries	
	Mean	SD	Mean	SD
Management	2.788	0.673	3.144	0.585
z-management	-0.165	0.650	0.175	0.564
Manager studied abroad	0.146	0.354	0.088	0.283
Manager with degree	0.814	0.389	0.730	0.444
% Mangers college degree	65.308	34.319	50.130	31.069
% Employees college degree	9.711	15.510	9.858	15.341
Multinational	0.376	0.484	0.593	0.491
Size	570.287	788.428	855.933	2311.164
Competition	1.700	0.476	1.683	0.483
Export	31.387	34.829	32.742	31.723
Dispersed	0.200	0.400	0.373	0.484
Family	0.186	0.389	0.159	0.366
Ext. CEO	0.061	0.239	0.053	0.225
Founder	0.234	0.424	0.069	0.253
Private	0.187	0.390	0.192	0.394
Other	0.132	0.339	0.153	0.360
Observations	2002		1481	

Note: High management countries are Australia, France, UK, Germany, Italy, Japan, Sweden and United States. See text for complete description of variables.

Table 3: Ranking

Country	**N**	**Rank Management**	**Rank Operations**	**Rank Monitoring**	**Rank Targeting**	**Rank Human Resources**	**Rank First Factor**
Argentina	239	17	13	17	18	19	17
Australia	343	8	5	10	8	13	8
Brazil	411	19	20	13	17	17	19
Chile	188	18	14	15	19	15	18
China	170	14	17	11	14	10	14
France	147	7	6	5	5	14	5
Germany	116	3	3	4	3	3	4
Great Britain	356	5	7	6	7	6	6
Greece	84	12	8	19	15	11	11
India	227	20	19	20	20	16	20
Italy	102	6	10	7	6	5	7
Japan	53	1	4	3	1	1	1
Mexico	168	9	15	8	10	12	9
New Zealand	120	16	9	16	16	20	16
Northern Ireland	76	10	11	12	11	7	10
Poland	94	13	18	18	9	8	15
Portugal	133	15	16	9	13	18	12
Republic of Ireland	92	11	12	14	12	9	13
Sweden	108	4	2	1	4	4	3
United States	256	2	1	2	2	2	2

Note: See text for complete description of variables.

Table 4: Quantiles: US as the Base Category

	(1) QR=0.1	(2) QR=0.5	(3) QR=0.9
Argentina	-0.799***	-0.616***	-0.428***
	(0.105)	(0.045)	(0.088)
Australia	-0.459***	-0.341***	-0.377***
	(0.070)	(0.047)	(0.072)
Brazil	-0.738***	-0.682***	-0.515***
	(0.077)	(0.055)	(0.085)
Chile	-0.754***	-0.589***	-0.563***
	(0.096)	(0.075)	(0.092)
China	-0.399***	-0.467***	-0.622***
	(0.108)	(0.067)	(0.077)
France	-0.150*	-0.380***	-0.430***
	(0.083)	(0.059)	(0.076)
Germany	0.023	-0.080	-0.210**
	(0.166)	(0.069)	(0.092)
GB	-0.362***	-0.241***	-0.310***
	(0.113)	(0.042)	(0.068)
Greece	-0.865***	-0.448**	-0.159
	(0.118)	(0.185)	(0.141)
India	-0.777***	-0.762***	-0.597***
	(0.091)	(0.071)	(0.065)
Italy	-0.231	-0.268***	-0.370**
	(0.183)	(0.084)	(0.145)
Japan	0.324***	0.034	-0.222**
	(0.118)	(0.070)	(0.090)
Mexico	-0.771***	-0.389***	-0.327***
	(0.145)	(0.095)	(0.092)
New Zealand	-0.576***	-0.552***	-0.647***
	(0.120)	(0.058)	(0.132)
Northern Ireland	-0.628***	-0.446***	-0.112
	(0.162)	(0.132)	(0.147)
Poland	-0.650***	-0.519***	-0.252***
	(0.155)	(0.102)	(0.086)
Portugal	-0.476***	-0.555***	-0.411***
	(0.132)	(0.055)	(0.113)
Republic of Ireland	-0.671***	-0.539***	-0.219
	(0.111)	(0.130)	(0.156)
Sweden	-0.008	-0.070	-0.207**
	(0.107)	(0.065)	(0.103)
Constant	-0.300***	0.420***	1.111***
	(0.072)	(0.032)	(0.056)
N	3483	3483	3483

Note: Dependent Variable is z-score. See text for complete description of variables. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Correlates with Management Quality: USA, Germany, UK and France: Wave: 2006

	(1) OLS	(2) OLS	(3) QR=0.1	(4) QR=0.5	(5) QR=0.9
Human Capital Controls:					
-Manager studied abroad	0.135	0.030	0.123	0.113	0.116
	(0.132)	(0.128)	(0.253)	(0.205)	(0.116)
-Manager with degree	0.249***	0.189***	0.092	0.212**	0.246**
	(0.067)	(0.065)	(0.128)	(0.085)	(0.103)
-% Mangers college degree	0.002	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
-% Employees college degree	0.004**	0.004**	0.005*	0.005**	0.007**
	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)
Firm Controls:					
-Size	0.050***	0.050***	0.070**	0.059**	0.030
	(0.016)	(0.013)	(0.028)	(0.025)	(0.022)
-Competition	0.287***	0.261***	0.290***	0.307***	0.216***
	(0.058)	(0.054)	(0.105)	(0.098)	(0.080)
Ownership Controls:					
-Family	-0.186**	-0.196**	-0.426**	-0.178	-0.115
	(0.088)	(0.080)	(0.212)	(0.114)	(0.136)
-Ext. CEO	-0.117	-0.070	-0.353	-0.129	-0.289*
	(0.123)	(0.118)	(0.275)	(0.163)	(0.150)
-Founder	-0.205**	-0.110	-0.323	-0.210**	-0.309
	(0.099)	(0.096)	(0.263)	(0.091)	(0.233)
-Private	-0.112	-0.070	-0.241*	-0.018	-0.183
	(0.084)	(0.076)	(0.133)	(0.137)	(0.135)
-Other	0.016	0.040	0.075	-0.025	-0.084
	(0.074)	(0.069)	(0.138)	(0.109)	(0.093)
Germany	-0.098	-0.022	-0.016	0.066	-0.459***
	(0.089)	(0.094)	(0.226)	(0.144)	(0.125)
UK	-0.226***	-0.234***	-0.316**	-0.143*	-0.460***
	(0.060)	(0.060)	(0.131)	(0.075)	(0.093)
France	-0.122	0.208	0.359	0.077	-0.770**
	(0.241)	(0.185)	(0.372)	(0.390)	(0.314)
Constant	-0.467***	-2.862***	-1.103***	-0.490**	0.556***
	(0.128)	(0.239)	(0.243)	(0.198)	(0.211)
Noise Controls	No	Yes	No	No	No
Observations	508	508	508	508	508

Note: Dependent Variable is z-score. Noise controls correspond to the day of the week the interview was conducted, the time of the day the interview was conducted, the duration of the interview, and an indicator of the reliability of the information as coded by the interviewer. See text for complete description of variables. OLS with robust standard errors and quantile regression with bootstrap standard error using 400 replications. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Correlates with Management Quality: Full Sample

	(1) OLS b/se	(2) OLS b/se	(3) QR=0.1 b/se	(4) QR=0.5 b/se	(5) QR=0.9 b/se	mean
Human Capital Controls:						
-Manager studied abroad	0.227***	0.206***	0.141**	0.221***	0.234***	0.121
	(0.032)	(0.031)	(0.056)	(0.048)	(0.043)	
-Manager with degree	0.200***	0.177***	0.178***	0.209***	0.175***	0.778
	(0.025)	(0.025)	(0.049)	(0.033)	(0.040)	
-% Mangers college degree	0.003***	0.002***	0.002***	0.002***	0.003***	58.854
	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	
-% Employees college degree	0.005***	0.004***	0.005***	0.003***	0.005***	9.774
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	
Firm Controls:						
-Multinational		0.237***	0.212***	0.213***	0.196***	0.468
		(0.023)	(0.049)	(0.029)	(0.033)	
-Size	0.026*	0.021*	0.003	0.041**	0.046***	0.692
	(0.014)	(0.012)	(0.017)	(0.016)	(0.016)	
-Competition	-0.054***	-0.039**	-0.040	-0.029	-0.043	1.693
	(0.020)	(0.020)	(0.035)	(0.027)	(0.029)	
-Export		0.001***	0.001**	0.001***	0.001*	31.963
		(0.000)	(0.001)	(0.000)	(0.001)	
Ownership Controls:						
-Family	-0.330***	-0.204***	-0.245***	-0.230***	-0.166***	0.175
	(0.031)	(0.032)	(0.068)	(0.038)	(0.044)	
-Ext. CEO	-0.107**	-0.029	-0.056	-0.031	-0.070	0.058
	(0.042)	(0.041)	(0.091)	(0.043)	(0.073)	
-Founder	-0.411***	-0.275***	-0.339***	-0.304***	-0.289***	0.164
	(0.032)	(0.034)	(0.062)	(0.044)	(0.044)	
-Private	-0.196***	-0.118***	-0.135**	-0.125***	-0.142***	0.189
	(0.029)	(0.029)	(0.058)	(0.036)	(0.040)	
-Other	-0.180***	-0.136***	-0.131**	-0.167***	-0.148***	0.141
	(0.031)	(0.031)	(0.060)	(0.044)	(0.052)	
Country Dummies:						
Argentina	-0.445***	-0.467***	-0.593***	-0.464***	-0.422***	0.069
	(0.053)	(0.052)	(0.103)	(0.065)	(0.086)	
Australia	-0.272***	-0.329***	-0.295***	-0.340***	-0.383***	0.098
	(0.045)	(0.045)	(0.088)	(0.061)	(0.074)	
Brazil	-0.465***	-0.451***	-0.434***	-0.471***	-0.480***	0.118
	(0.046)	(0.045)	(0.087)	(0.061)	(0.074)	
Chile	-0.579***	-0.596***	-0.592***	-0.521***	-0.741***	0.054
	(0.051)	(0.050)	(0.100)	(0.065)	(0.086)	
China	-0.187***	-0.277***	-0.299**	-0.274***	-0.385***	0.049
	(0.052)	(0.053)	(0.117)	(0.072)	(0.076)	
France	-0.207***	-0.314***	-0.230*	-0.337***	-0.488***	0.042
	(0.051)	(0.051)	(0.118)	(0.062)	(0.074)	
Germany	-0.011	-0.103*	-0.060	-0.092	-0.179	0.033
	(0.060)	(0.059)	(0.115)	(0.074)	(0.113)	
UK	-0.091*	-0.166***	-0.251**	-0.167***	-0.206***	0.102
	(0.047)	(0.047)	(0.100)	(0.060)	(0.067)	
Greece	-0.536***	-0.592***	-0.805***	-0.592***	-0.399***	0.024
	(0.086)	(0.085)	(0.119)	(0.135)	(0.105)	
India	-0.661***	-0.651***	-0.724***	-0.667***	-0.621***	0.065
	(0.051)	(0.051)	(0.091)	(0.068)	(0.075)	
Italy	-0.134**	-0.225***	-0.221	-0.193***	-0.318***	0.029
	(0.060)	(0.061)	(0.155)	(0.073)	(0.092)	
Japan	0.037	0.057	0.181	0.060	-0.232**	0.015
	(0.060)	(0.060)	(0.133)	(0.073)	(0.098)	
Mexico	-0.470***	-0.490***	-0.649***	-0.476***	-0.427***	0.048
	(0.059)	(0.059)	(0.098)	(0.069)	(0.082)	
New Zealand	-0.374***	-0.470***	-0.360***	-0.487***	-0.535***	0.034
	(0.057)	(0.057)	(0.102)	(0.079)	(0.085)	
NI	-0.208**	-0.278***	-0.421***	-0.248**	-0.112	0.022
	(0.084)	(0.082)	(0.159)	(0.111)	(0.089)	
Poland	-0.496***	-0.508***	-0.557***	-0.487***	-0.433***	0.027
	(0.071)	(0.069)	(0.125)	(0.088)	(0.149)	
Portugal	-0.258***	-0.360***	-0.370***	-0.359***	-0.348***	0.038
	(0.061)	(0.060)	(0.136)	(0.072)	(0.123)	
RI	-0.274***	-0.324***	-0.433***	-0.326***	-0.233**	0.026
	(0.070)	(0.070)	(0.126)	(0.083)	(0.105)	
Sweden	0.046	-0.053	-0.134	-0.025	-0.070	0.031
	(0.061)	(0.063)	(0.112)	(0.072)	(0.125)	
Constant	0.163***	0.009	-0.566***	0.019	0.699***	
	(0.057)	(0.058)	(0.119)	(0.070)	(0.083)	
Observations	3483	3483	3483	3483	3483	

Note: Dependent Variable is z-score. See text for complete description of variables. OLS with robust standard errors and quantile regression with bootstrap standard error using 400 replications. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: Decomposition: USA vs UK, France and Germany

Reference Group: USA	10th Percentile	50th Percentile	90th Percentile
A: Raw z-score management gap:			
Qt(USA)-Qt(UK, Germany, France)	0.275	0.267	0.317
B: Decomposition Method: Machado-Mata-Melly			
Qt(USA)-Qt(UK, Germany, France)	0.225***	0.257***	0.301***
	(0.085)	(0.048)	(0.061)
Total Explained by Characteristics	0.183*	-0.043	-0.044
	(0.104)	(0.073)	(0.083)
Total Explained by Coefficients	0.042	0.299***	0.344***
	(0.153)	(0.081)	(0.105)
C: Decomposition Method: RIF regression			
E[RIFt(USA)]-E[RIFt(UK, Germany, France)]	0.278***	0.266***	0.321***
	(0.077)	(0.052)	(0.064)
Total Explained by Characteristics	0.104***	0.115***	0.098***
	(0.037)	(0.024)	(0.027)
Total Explained by Coefficients	0.174**	0.151***	0.222***
	(0.084)	(0.054)	(0.066)
EXPLAINED BY CHARACTERISTICS:			
Manager studied abroad	-0.003	-0.002	-0.006
	(0.003)	(0.003)	(0.005)
Manager with degree	0.059***	0.033***	0.029***
	(0.020)	(0.011)	(0.009)
% Managers with degree	0.012	0.040**	0.029
	(0.030)	(0.019)	(0.022)
% Employee college degree	0.019	0.026*	0.039**
	(0.017)	(0.014)	(0.019)
Size	0.007	0.003	0.009
	(0.005)	(0.005)	(0.008)
Competition	0.002	-0.001	0.001
	(0.003)	(0.003)	(0.003)
Ownership (Dispersed)	0.031**	0.021***	0.001
	(0.012)	(0.008)	(0.007)
Ownership (Family)	0.002	0.001	0.002
	(0.003)	(0.002)	(0.002)
Ownership (External CEO)	-0.002	-0.001	-0.005
	(0.005)	(0.003)	(0.004)
Ownership (Founder)	-0.011	-0.004	-0.001
	(0.010)	(0.004)	(0.002)
Ownership (Private)	-0.009	-0.002	-0.001
	(0.007)	(0.004)	(0.004)
Ownership (Other)	-0.003	0.000	0.001
	(0.004)	(0.002)	(0.002)
EXPLAINED BY COEFFICIENTS:			
Manager studied abroad	0.014	0.007	0.006
	(0.009)	(0.010)	(0.017)
Manager with degree	-0.301	-0.156	0.038
	(0.209)	(0.127)	(0.100)
% Managers with degree	0.208	0.063	-0.102
	(0.192)	(0.119)	(0.161)
% Employee college degree	0.026	-0.004	-0.008
	(0.050)	(0.041)	(0.053)
Size	-0.011	-0.030**	-0.011
	(0.014)	(0.012)	(0.026)
Competition	-0.092	0.009	0.142
	(0.224)	(0.171)	(0.208)
Ownership (Dispersed)	0.051	0.013	0.006
	(0.056)	(0.039)	(0.052)
Ownership (Family)	-0.036	0.013	-0.019
	(0.033)	(0.017)	(0.018)
Ownership (External CEO)	0.001	0.004	0.010
	(0.014)	(0.008)	(0.015)
Ownership (Founder)	-0.008	-0.019*	-0.006

	(0.026)	(0.011)	(0.012)
Ownership (Private)	-0.006	0.014	0.003
	(0.035)	(0.021)	(0.027)
Ownership (Other)	0.044	-0.003	-0.005
	(0.028)	(0.020)	(0.023)
Constant	0.284	0.241	0.167
	(0.334)	(0.233)	(0.252)
Observations	875	875	875

Note: Dependent Variable is z-score. See text for complete description of variables. Machado-Mata-Melly decomposition with 100 regressions estimated to approximate the conditional distribution. RIF decomposition uses OB decomposition after linearizing quantiles. Ownership categorical variable is normalized such that coefficients for the single categories to sum zero. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 8: Decomposition: USA vs High Management Countries

Reference Group: USA	10th Percentile	50th Percentile	90th Percentile
A: Raw z-score management gap:			
Qt(USA)-Qt(High)	0.286	0.267	0.314
B: Decomposition Method: Machado-Mata-Melly			
Qt(USA)-Qt(High)	0.257***	0.258***	0.307***
	(0.086)	(0.047)	(0.058)
Total Explained by Characteristics	0.163*	-0.041	-0.037
	(0.086)	(0.069)	0.070)
Total Explained by Coefficients	0.094	0.298***	0.343***
	0.144	(0.081)	(0.094)
C: Decomposition Method: RIF regression			
E[RIFt(USA)]-E[RIFt(High)]	0.293***	0.267***	0.317***
	(0.070)	(0.048)	(0.061)
Total Explained by Characteristics	0.050	0.024	0.037
	(0.035)	(0.025)	(0.030)
Total Explained by Coefficients	0.243***	0.243***	0.280***
	(0.078)	(0.050)	(0.065)
EXPLAINED BY CHARACTERISTICS:			
Manager studied abroad	-0.004	-0.010**	-0.012*
	(0.005)	(0.004)	(0.006)
Manager with degree	0.055***	0.018**	0.011*
	(0.015)	(0.007)	(0.007)
% Managers with degree	0.016	0.043***	0.045***
	(0.021)	(0.014)	(0.017)
% Employees college degree	0.019**	0.015**	0.023**
	(0.009)	(0.008)	(0.012)
Multinational	-0.020**	-0.016**	-0.019**
	(0.009)	(0.006)	(0.008)
Size	0.009	0.002	0.009
	(0.006)	(0.005)	(0.008)
Competition	0.004	-0.002	0.002
	(0.004)	(0.002)	(0.003)
Export	-0.030*	-0.037***	-0.025*
	(0.017)	(0.011)	(0.014)
Ownership (Dispersed)	0.012*	0.013**	0.003
	(0.006)	(0.006)	(0.004)
Ownership (Family)	-0.002	0.000	0.000
	(0.003)	(0.002)	(0.002)
Ownership (External CEO)	-0.002	-0.002	-0.002
	(0.003)	(0.002)	(0.002)
Ownership (Founder)	-0.004	-0.002	-0.000
	(0.006)	(0.003)	(0.001)
Ownership (Private)	-0.000	0.000	0.001
	(0.002)	(0.001)	(0.002)
Ownership (Other)	-0.000	0.000	0.000
	(0.001)	(0.001)	(0.001)
EXPLAINED BY COEFFICIENTS:			
Manager studied abroad	0.015*	0.000	0.006
	(0.008)	(0.009)	(0.015)
Manager with degree	-0.251	-0.081	0.102
	(0.198)	(0.127)	(0.099)
% Managers with degree	0.203	0.011	-0.198
	(0.180)	(0.117)	(0.162)
% Employees college degree	0.017	0.000	0.003
	(0.044)	(0.041)	(0.052)
Multinational	-0.065	-0.003	0.054
	(0.068)	(0.052)	(0.069)
Size	-0.016	-0.022*	-0.010
	(0.015)	(0.011)	(0.025)
Competition	-0.040	0.030	0.085
	(0.198)	(0.159)	(0.194)
Export	-0.109	0.032	0.054

	(0.069)	(0.042)	(0.061)
Ownership (Dispersed)	0.094*	-0.005	-0.044
	(0.057)	(0.039)	(0.054)
Ownership (Family)	-0.045	0.013	-0.012
	(0.031)	(0.016)	(0.017)
Ownership (External CEO)	-0.001	-0.002	0.008
	(0.012)	(0.007)	(0.013)
Ownership (Founder)	-0.019	-0.013	-0.004
	(0.026)	(0.011)	(0.012)
Ownership (Private)	0.017	0.019	0.007
	(0.031)	(0.019)	(0.024)
Ownership (Other)	0.046*	0.003	0.000
	(0.025)	(0.018)	(0.022)
Constant	0.396	0.261	0.229
	(0.314)	(0.224)	(0.245)
Observations	1481	1481	1481

Note: Dependent Variable is z-score. High management countries are those with z-management > 0*. See text for complete description of variables. Machado-Mata-Melly decomposition with 100 regressions estimated to approximate the conditional distribution. RIF decomposition uses OB decomposition after linearizing quantiles. Ownership categorical variable is normalized such that coefficients for the single categories to sum zero.* * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 9: Decomposition: USA vs Low Management Countries

Reference Group: USA	10th Percentile	50th Percentile	90th Percentile
A: Raw z-score management gap:			
Qt(USA)-Qt(Low)	0.721	0.594	0.429
B: Decomposition Method: Machado-Mata-Melly			
Qt(USA)-Qt(Low)	0.657***	0.597***	0.435***
	(0.074)	(0.050)	(0.064)
Total Explained by Characteristics	0.154**	0.042	0.004
	(0.067)	(0.054)	(0.067)
Total Explained by Coefficients	0.503***	0.556***	0.432***
	0.112	0.070	0.085
C: Decomposition Method: RIF regression			
E[RIFt(USA)]-E[RIFt(High)]	0.729***	0.594***	0.432***
	(0.068)	(0.048)	(0.062)
Total Explained by Characteristics	0.117***	0.094***	0.163***
	(0.028)	(0.029)	(0.043)
Total Explained by Coefficients	0.612***	0.500***	0.269***
	(0.071)	(0.051)	(0.070)
EXPLAINED BY CHARACTERISTICS:			
Manager studied abroad	-0.001	-0.020***	-0.048***
	(0.006)	(0.006)	(0.012)
Manager with degree	0.006	0.010*	0.007*
	(0.004)	(0.005)	(0.004)
% Managers with degree	0.002	0.003	0.001
	(0.003)	(0.003)	(0.001)
% Employee college degree	0.016**	0.016**	0.048***
	(0.007)	(0.007)	(0.016)
Multinational	0.017**	0.034***	0.036***
	(0.007)	(0.011)	(0.013)
Size	0.021	0.013	0.027
	(0.014)	(0.016)	(0.024)
Competition	0.003	0.002	0.007
	(0.003)	(0.002)	(0.005)
Export	-0.017*	-0.027***	-0.004
	(0.009)	(0.008)	(0.010)
Ownership (Dispersed)	0.033***	0.035***	0.066***
	(0.010)	(0.010)	(0.019)
Ownership (Family)	0.010**	0.010**	0.003
	(0.005)	(0.004)	(0.003)
Ownership (External CEO)	-0.000	-0.003	0.001
	(0.002)	(0.002)	(0.002)
Ownership (Founder)	0.026***	0.023***	0.020***
	(0.009)	(0.006)	(0.006)
Ownership (Private)	-0.001	-0.001	0.001
	(0.002)	(0.001)	(0.002)
Ownership (Other)	0.002	0.000	-0.000
	(0.003)	(0.001)	(0.001)
EXPLAINED BY COEFFICIENTS:			
Manager studied abroad	0.017**	0.001	-0.002
	(0.008)	(0.009)	(0.014)
Manager with degree	-0.042	-0.167	0.039
	(0.199)	(0.129)	(0.102)
% Managers with degree	0.172	0.057	-0.048
	(0.183)	(0.120)	(0.167)
% Employee college degree	0.015	-0.010	-0.093
	(0.046)	(0.042)	(0.056)
Multinational	-0.061	-0.101**	-0.049
	(0.059)	(0.049)	(0.068)
Size	-0.058***	-0.083***	-0.087***
	(0.016)	(0.019)	(0.033)
Competition	-0.094	0.178	0.209
	(0.192)	(0.157)	(0.198)
Export	-0.086	0.037	0.073

	(0.065)	(0.040)	(0.058)
Ownership (Dispersed)	0.081	-0.005	-0.152***
	(0.052)	(0.038)	(0.058)
Ownership (Family)	-0.014	0.030*	-0.007
	(0.029)	(0.017)	(0.017)
Ownership (External CEO)	0.002	-0.002	0.011
	(0.011)	(0.007)	(0.013)
Ownership (Founder)	-0.034	-0.019	0.002
	(0.027)	(0.011)	(0.013)
Ownership (Private)	0.006	0.006	0.013
	(0.029)	(0.018)	(0.024)
Ownership (Other)	0.026	-0.005	-0.001
	(0.022)	(0.017)	(0.022)
Constant	0.683**	0.582***	0.359
	(0.306)	(0.224)	(0.250)
Observations	2258	2258	2258

Note: Dependent Variable is z-score. Low management countries are those with z-management ≤ 0*. See text for complete description of variables. Machado-Mata-Melly decomposition with 100 regressions estimated to approximate the conditional distribution. RIF decomposition uses OB decomposition after linearizing quantiles. Ownership categorical variable is normalized such that coefficients for the single categories to sum zero. See text for complete description of variables.* * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figures

Figure 1: Relationship between Management Quality and Productivity

Note: Bloom and Van Reenen (2010) using World Management Survey. Productivity measured as the log os sales per employee

Figure 2: Mapping Relative Management Distributions

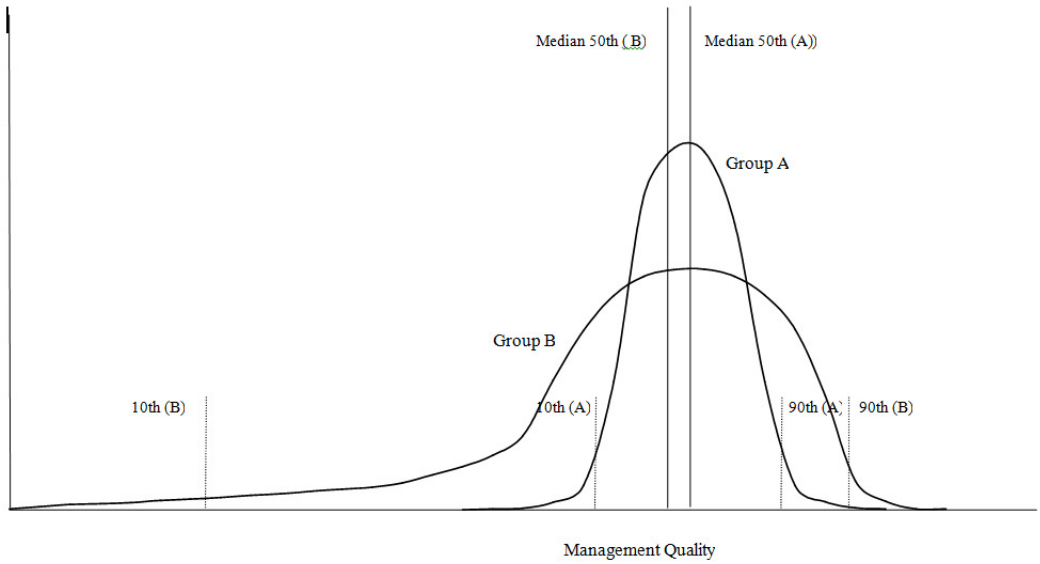
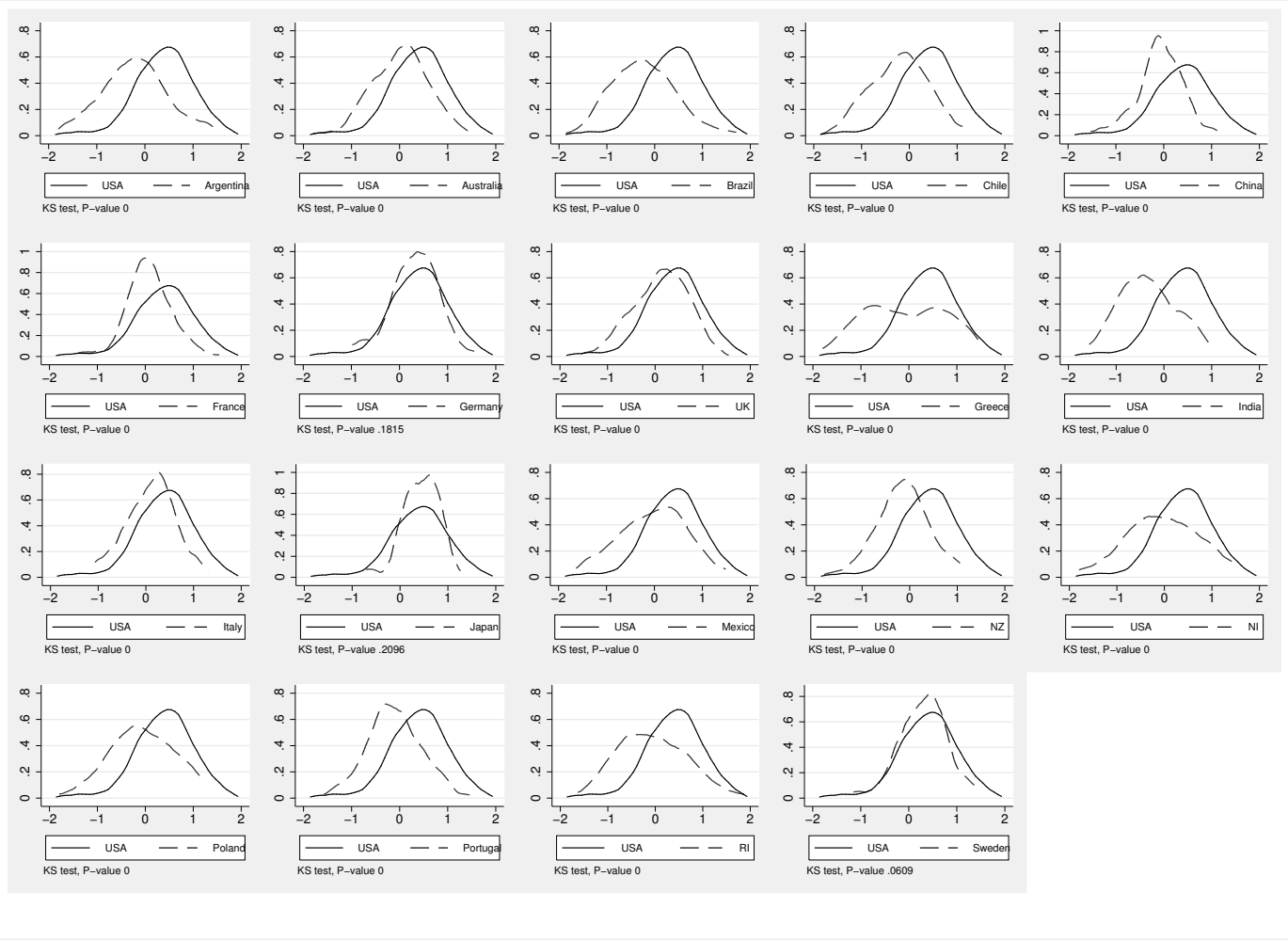
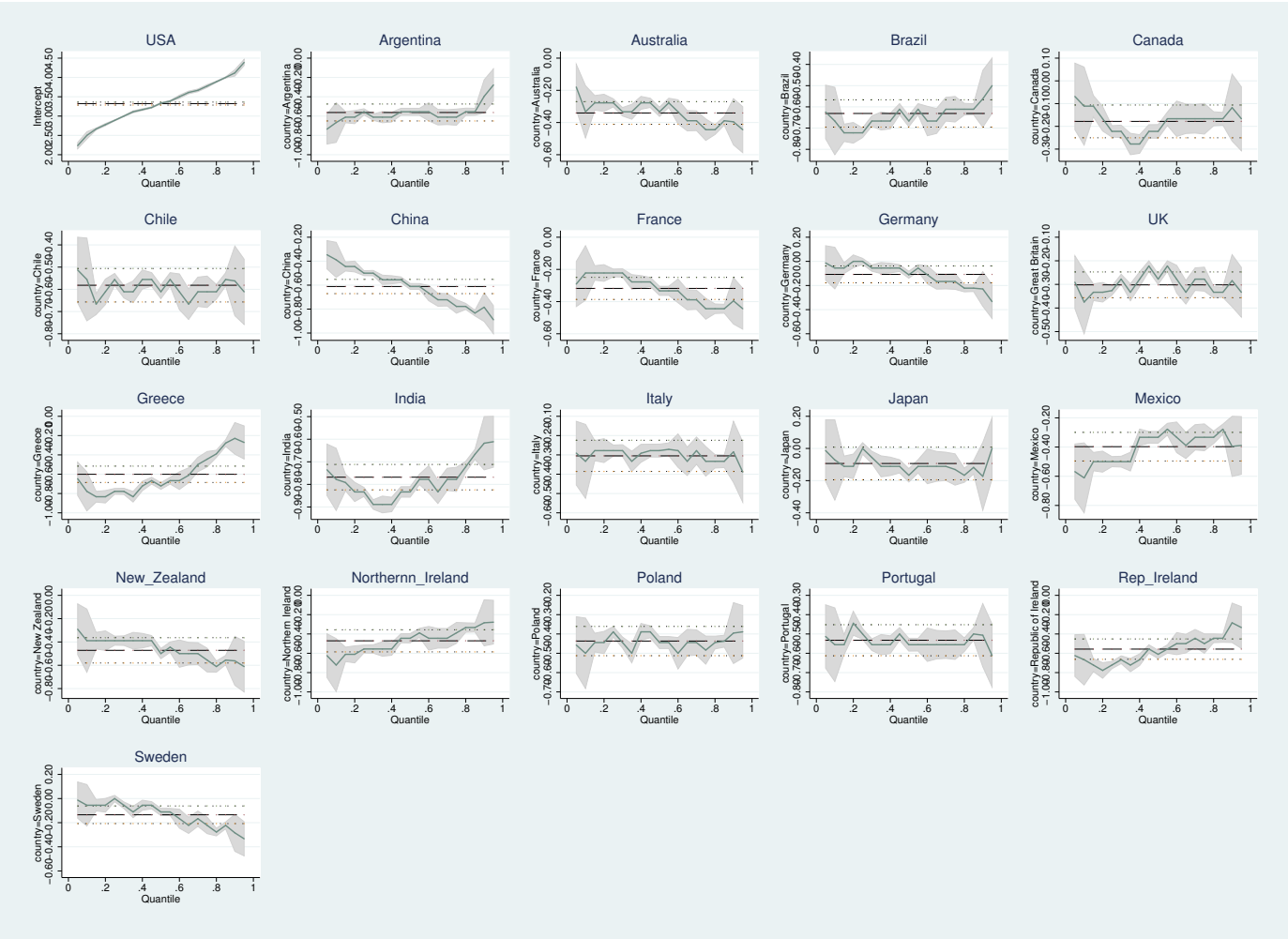


Figure 3: Kernel Density Plots and Kolmogorov-Smirnoff Test for Equivalence of Management Distributions, Country vs. Frontier (US)



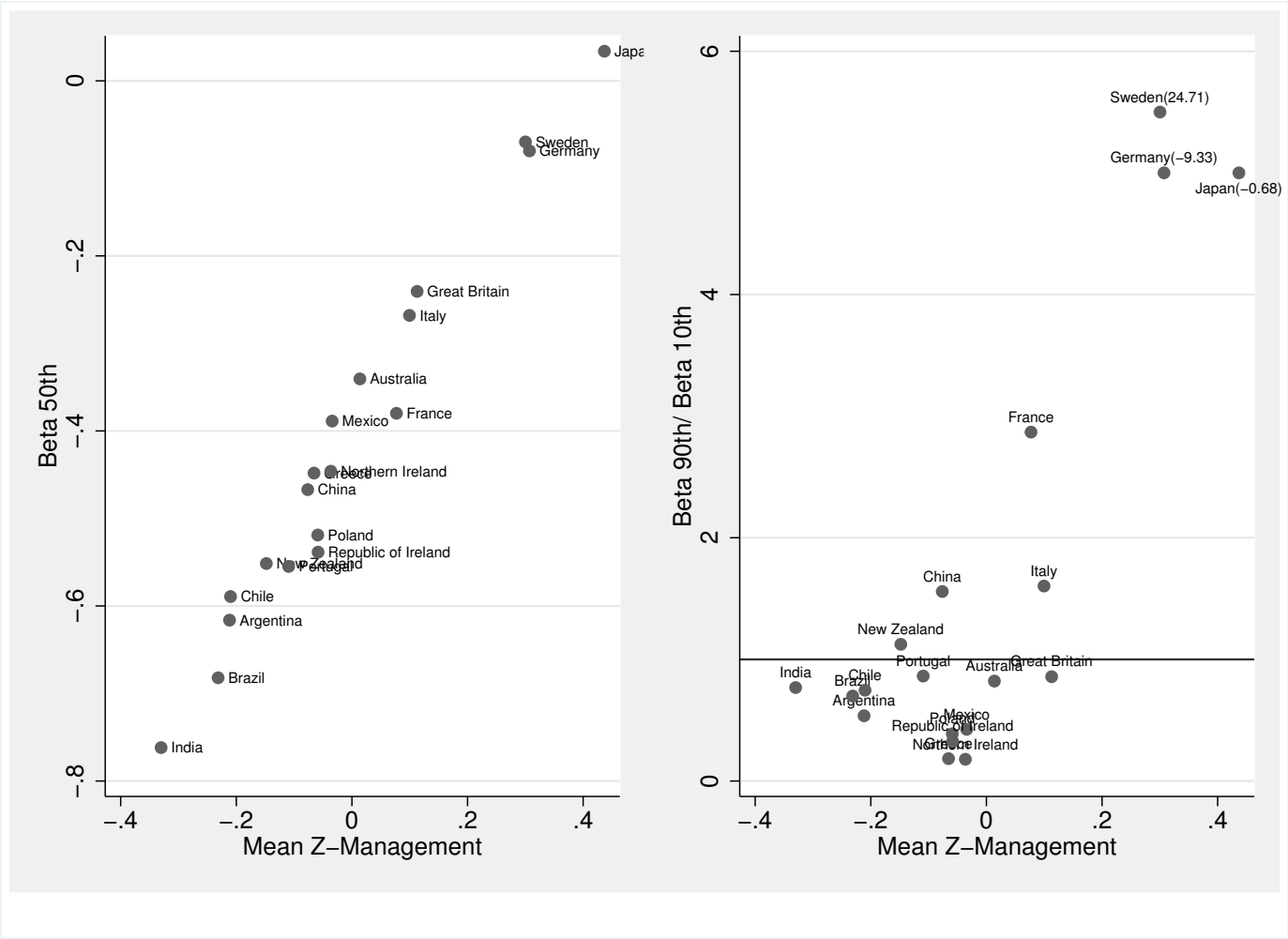
Note: Kernel density plots of country vs. US distribution of management scores derives from World Management Survey.

Figure 4: Difference of Country Management Scores from the Frontier (US) at Each Viniventile.



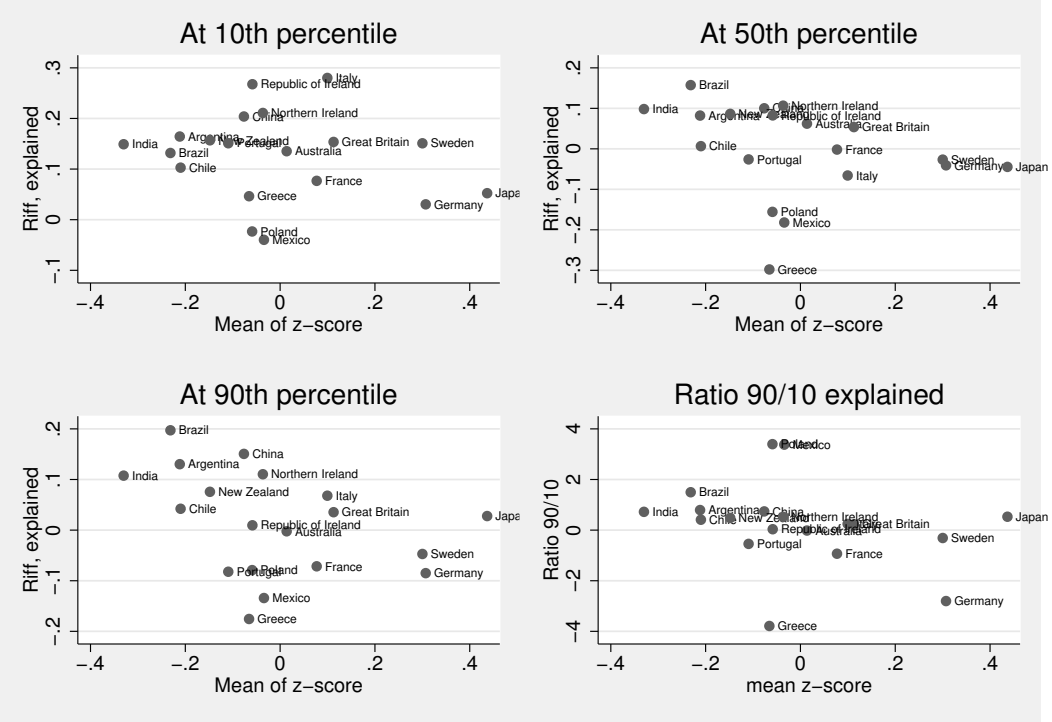
Note: Mapping of country distributions relative to the frontier (US). Plot of the country dummy coefficient in a quantile regressions at each viniventile of management scores on a constant and country dummy and 5% standard errors.

Figure 5: Change in distributions relative to the frontier with convergence: Quantile coefficients relative to the frontier (US) vs Mean Z-Score



Note: 1. Plot of coefficient on country dummies at the 50th quantile (median) of management score on constant and country dummy vs. mean management score. 2. Plot of 90th coefficient over 10th.

Figure 6: Explanatory power of covariates at each quantile: RIF Decomposition



Note: Explanatory power of covariates at 10th, 50th, and 90th quantiles using RIF methodology. Final panel is the ratio of explanatory power at the 90th to that at the 10th.

A Sample with Sectoral Dummies

Table A.1: Correlates with Management Quality: USA, Germany, UK and France (Sample with Sectoral Dummies)

	(1) OLS	(2) QR=0.1	(3) QR=0.5	(4) QR=0.9
Human Capital Controls:				
-% Managers college degree	0.003***	0.002	0.004***	0.006***
	(0.001)	(0.002)	(0.001)	(0.002)
-% Employees college degree	0.006***	0.005*	0.006**	0.009**
	(0.002)	(0.003)	(0.003)	(0.004)
-Size	0.139***	0.125**	0.136***	0.154***
	(0.028)	(0.056)	(0.049)	(0.046)
-Competition	-0.023	0.017	0.047	-0.094
	(0.056)	(0.092)	(0.072)	(0.084)
Ownership Controls:				
Family	-0.211**	-0.471**	-0.236***	-0.108
	(0.088)	(0.191)	(0.089)	(0.110)
External CEO	-0.147	-0.124	-0.225*	-0.272
	(0.125)	(0.228)	(0.130)	(0.284)
Founder	-0.470***	-0.532***	-0.460**	-0.052
	(0.129)	(0.171)	(0.186)	(0.167)
Government	-0.044	-0.565	-0.169	-0.248
	(0.237)	(0.513)	(0.276)	(0.248)
Private	-0.179**	-0.290*	-0.169	-0.089
	(0.083)	(0.163)	(0.122)	(0.112)
Other	-0.176**	-0.157	-0.204**	0.034
	(0.082)	(0.140)	(0.101)	(0.125)
Germany	-0.116	-0.018	-0.041	-0.143
	(0.095)	(0.239)	(0.114)	(0.164)
UK	-0.284***	-0.521***	-0.246***	-0.195*
	(0.077)	(0.145)	(0.092)	(0.104)
France	-0.434***	-0.238	-0.389***	-0.544***
	(0.085)	(0.173)	(0.099)	(0.136)
Constant	0.397**	-0.573**	0.229	1.197***
	(0.166)	(0.238)	(0.165)	(0.216)
Sector Dummies	Yes	No	No	No
Observations	883	883	883	883

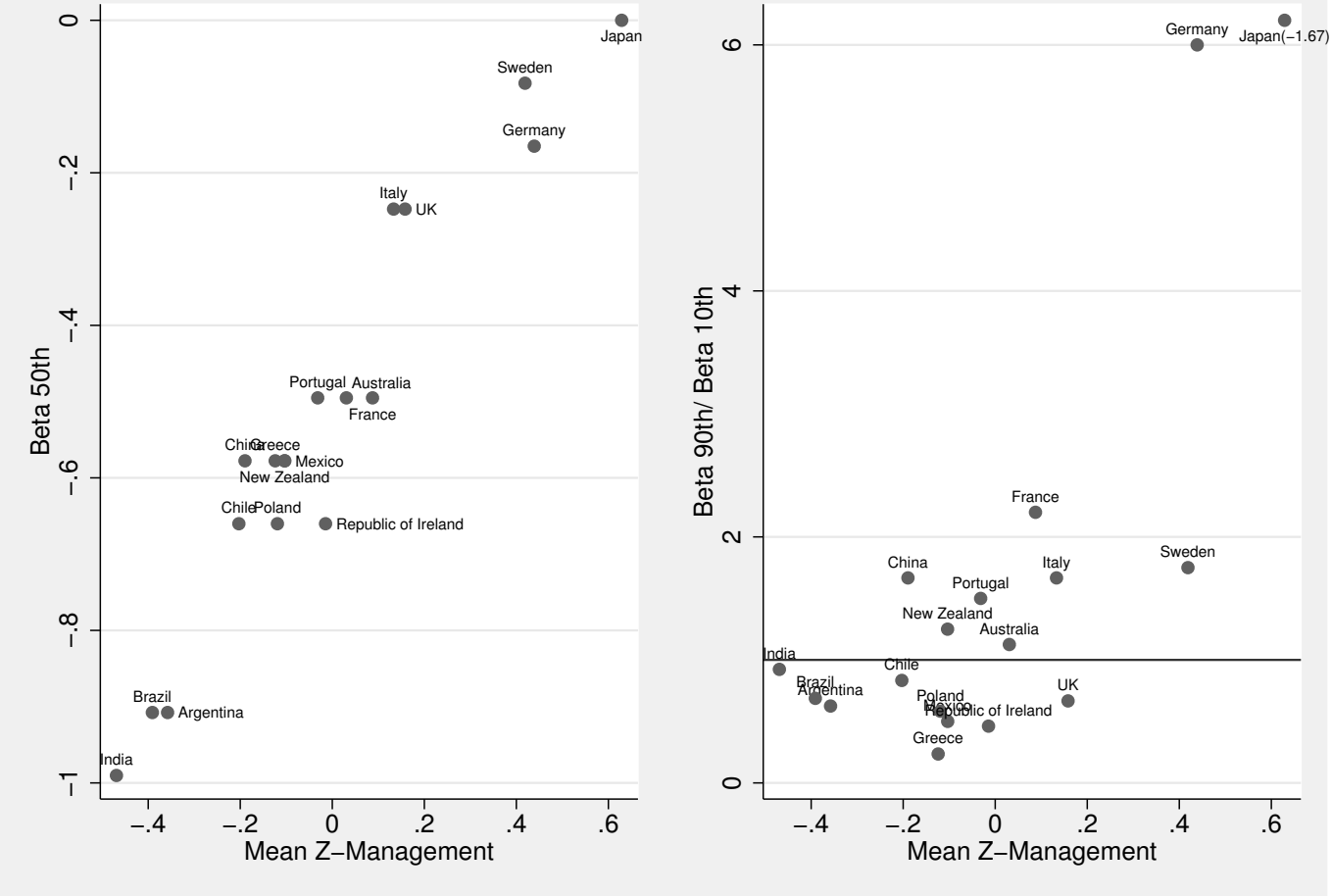
Note: Dependent Variable is z-score. OLS with robust standard errors and quantile regression with bootstrap standard error using 400 replications. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.2: Correlates with Management Quality: Sample with sectoral dummies

	(1) OLS b/se	(2) QR=0.1 b/se	(3) QR=0.5 b/se	(4) QR=0.9 b/se	mean
Human Capital Controls:					
-% Managers college degree	0.005***	0.004***	0.004***	0.005***	60.637
	(0.001)	(0.001)	(0.001)	(0.001)	
-% Employees college degree	0.005***	0.005***	0.005***	0.005***	10.350
	(0.001)	(0.002)	(0.001)	(0.002)	
Firm Controls:					
-Multinational	0.355***	0.313***	0.321***	0.422***	0.474
	(0.035)	(0.068)	(0.053)	(0.055)	
-Size	0.132***	0.119***	0.137***	0.135***	0.681
	(0.017)	(0.032)	(0.024)	(0.030)	
-Competition	-0.072**	-0.068	-0.081**	-0.039	1.691
	(0.030)	(0.059)	(0.041)	(0.055)	
-Export	0.002***	0.003***	0.002***	0.001	32.079
	(0.000)	(0.001)	(0.001)	(0.001)	
Ownership Controls:					
Family	-0.252***	-0.262***	-0.278***	-0.187**	0.168
	(0.049)	(0.097)	(0.070)	(0.087)	
External CEO	-0.004	0.045	-0.023	-0.119	0.042
	(0.070)	(0.142)	(0.093)	(0.127)	
Founder	-0.377***	-0.397***	-0.406***	-0.353***	0.172
	(0.051)	(0.082)	(0.081)	(0.081)	
Government	-0.164*	-0.119	-0.205*	-0.229	0.021
	(0.090)	(0.186)	(0.118)	(0.171)	
Private	-0.145***	-0.197**	-0.143**	-0.178***	0.183
	(0.044)	(0.082)	(0.061)	(0.069)	
Other	-0.190***	-0.214**	-0.245***	-0.123	0.136
	(0.046)	(0.086)	(0.060)	(0.084)	
Country Dummies:					
Argentina	-0.685***	-0.939***	-0.741***	-0.534***	0.069
	(0.082)	(0.162)	(0.107)	(0.139)	
Australia	-0.480***	-0.413***	-0.541***	-0.565***	0.103
	(0.069)	(0.133)	(0.094)	(0.103)	
Brazil	-0.700***	-0.851***	-0.744***	-0.650***	0.114
	(0.071)	(0.133)	(0.104)	(0.126)	
Chile	-0.822***	-0.909***	-0.844***	-0.972***	0.082
	(0.072)	(0.151)	(0.099)	(0.129)	
China	-0.552***	-0.501***	-0.588***	-0.756***	0.054
	(0.080)	(0.164)	(0.113)	(0.128)	
France	-0.514***	-0.321*	-0.589***	-0.723***	0.041
	(0.081)	(0.164)	(0.114)	(0.111)	
Germany	-0.199**	-0.176	-0.154	-0.273	0.033
	(0.091)	(0.193)	(0.111)	(0.192)	
Greece	-0.759***	-1.169***	-0.698***	-0.370*	0.022
	(0.137)	(0.223)	(0.229)	(0.198)	
India	-0.862***	-0.988***	-0.917***	-0.836***	0.074
	(0.079)	(0.125)	(0.118)	(0.123)	
Italy	-0.338***	-0.391*	-0.291**	-0.465***	0.027
	(0.096)	(0.212)	(0.119)	(0.137)	
Japan	0.130	0.289	0.150	-0.171	0.015
	(0.092)	(0.201)	(0.115)	(0.139)	
Mexico	-0.684***	-1.026***	-0.698***	-0.477***	0.050
	(0.090)	(0.158)	(0.102)	(0.130)	
New Zealand	-0.548***	-0.510***	-0.613***	-0.597***	0.030
	(0.092)	(0.187)	(0.134)	(0.162)	
Poland	-0.676***	-0.833***	-0.726***	-0.487***	0.029
	(0.104)	(0.170)	(0.138)	(0.153)	
Portugal	-0.359***	-0.299	-0.414***	-0.569***	0.030
	(0.095)	(0.201)	(0.104)	(0.199)	
Ireland	-0.525***	-0.890***	-0.557***	-0.226	0.018
	(0.139)	(0.197)	(0.182)	(0.191)	
Sweden	-0.159	-0.210	-0.150	-0.231	0.031
	(0.097)	(0.181)	(0.128)	(0.193)	
UK	-0.311***	-0.501***	-0.292***	-0.314***	0.110
	(0.072)	(0.129)	(0.106)	(0.104)	
Constant	0.071	-0.808***	0.156	1.044***	
	(0.093)	(0.188)	(0.130)	(0.142)	
Sector Dummies	Yes	Yes	Yes	Yes	
Observations	3514	3514	3514	3514	

Note: Dependent Variable is z-score. OLS with robust standard errors and quantile regression with bootstrap standard error using 400 replications. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figure A.1: Change in distributions relative to the frontier with convergence: Quantile coefficients relative to the frontier (US) vs Mean Z-Score (Sample with Sectoral Dummies)



Note: 1. Plot of coefficient on country dummies at the 50th quantile (median) of management score on constant and country dummy vs. mean management score. 2. Plot of 90th coefficient over 10th.