The Role of Management Practices in Acquisitions and the FDI Location Decision*

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Abstract

This paper investigates how management practices as intangible transfers are associated with the performance of multinational business groups. Differences in the management level across source countries are predictive for multinationals' investment patterns for a given destination country. This study argues that acquisitions are a means to transplant management practices from parents to affiliates abroad. It finds that better-managed parents decrease employment and increase productivity post-acquisition. The productivity gains are driven by targets with less developed management practices and by targets of larger parents. Better-managed parents are also more likely to install or retain a manager from the parent country post-acquisition. (JEL F21, F23, F61, L20)

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1 Introduction

Multinational corporations are the most productive firms in the global economy. The question of why multinationals operate efficiently across many countries is still open and puzzling.

One potential explanation for their productivity advantage across borders is the intangible transfers within multinational firms. Examples of measurable intangible transfers include spillovers from R&D investment (Bilir and Morales 2020) and the transplantation of the organizational structure (Marin, Rousova, and Verdier 2013). Important theoretical work has featured intangible transfers within multinationals (for example, Markusen 1984). Implicitly, the assumption that more productive firms can transplant their productivity advantage to their affiliates abroad has already been featured in models of foreign direct investment (for example, Helpman, Melitz, and Yeaple 2004; Burstein and Monge-Naranjo 2009; Arkolakis et al. 2018; Alviarez, Cravino, and Ramondo 2020).

The idea of knowledge sharing within multinational firms has been examined in the management literature (for example, Gupta and Govindarajan 2000). Case studies lend further support to the notion of sharing managerial knowledge within the firm, which leads to a transfer of management practices between affiliates. Khanna and Palepu (1997) report that an Indian business group used professional management training to facilitate talent and information flows within the group.

This paper introduces the idea of the portability of management practices as intangible transfers that can be shared within multinational firms. Management practices have for a long time been considered a productivity driver. They were measured systematically for the first time through the World Management Survey (Bloom and Van Reenen 2007). One finding that is robust across firms surveyed in the World Management Survey (WMS) in all countries is that multinational affiliates are better-managed than domestic firms. The superior management practices of affiliates could be related to selection of better-managed domestic firms into acquisitions or due to transplantation of management practices from parents to affiliates. This study argues that the superior performance of some multinational affiliates post-acquisition is due to the transplantation of management practices from better-managed parents to these affiliates. This paper contributes to the literature by using the World Management Survey data to study the role of parents' management practices and country level measures of management practices in the location decisions by geography. Second, it contributes by leveraging acquisitions as an event study to examine the effects of parents' management practices on their targets' productivity.

This study finds a positive association of management practices with the investment decision to invest and to own an affiliate in a given destination market. Firm-level management practices are positively correlated with the investment decision. At the aggregate level, the share of domestic firms entering a foreign market as multinationals is positively correlated with the country-level differences between the source and the origin country in management

practices, which define the management gap.

In a second step, this study examines the relationship between parent management practices and affiliate outcomes in a dynamic context by leveraging acquisitions. The key result is that better-managed parents increase three different measures of affiliates' productivity post-acquisition. Better-managed parents improve affiliates' labor productivity by reducing employment more than affiliate sales. Furthermore, better-managed parents improve upon productivity in terms of the Solow residual and value added per employee in the medium-term. These findings suggest and quantify a new channel of productivity gains in foreign direct investment: the transplant of best parent management practices to affiliates abroad intra-firm. The productivity gains are significantly larger in countries with a lower level of management practices, lower GDP per capita, and for larger parents, which is consistent with transplantation of management practices. One way of transferring management practices intra-firm is through installing or maintaining managers from the parent country in acquired affiliates abroad. Consistent with this mechanism, the study finds that parents with better people management are more likely to have a manager from the parent nation post-acquisition facilitating the transfer of management practices across countries.

This paper contributes to four strands of the literature. The first contribution speaks to a literature on the determinants of foreign direct investment, which is the focus of a vast number of papers that empirically and theoretically analyze the determinants of M&A activity (for example, di Giovanni 2005; Head and Ries 2008), the differences between determinants of greenfield FDI and M&A (for example, Nocke and Yeaple 2008; Davies, Desbordes, and Ray 2018), or FDI stocks (for example, Buch et al. 2014). Eicher, Helfman, and Lenkoski (2012) and Blonigen and Piger (2014) review the literature on gravity in FDI and analyze many potential FDI determinants to identify those that are statistically robust. This paper contributes by suggesting that differences in country-level management practices between the source country and the destination country are a determinant of FDI activity, which so far has not yet been examined in the literature.

The second body of the literature to which this study contributes seeks to understand whether there are overall productivity gains from foreign direct investment. Generally, this strand of the literature focuses on the comparison between acquired and domestic firms using cross-border acquisitions through foreign multinationals as an event study. Most studies, such as Arnold and Javorcik (2009) in the case of Indonesian firms and Guadalupe, Kuzmina, and Thomas (2012) for Spanish firms establish positive gains from acquisitions. Bircan (2019) shows that multinationals in Turkey raise physical productivity in their acquisition targets by lowering prices post-acquisition. On the other hand, Wang and Wang (2015) do not find any productivity advantage from foreign acquisitions in China. Fons-Rosen et al. (2013) estimate modest effects of foreign investment on country-level productivity growth. Criscuolo and Martin (2009) point out source-country heterogeneity in productivity of foreign affiliates in the United Kingdom, namely that affiliates of American multinationals are more productive than

affiliates of non-American multinationals.

An open question in this literature is how multinationals improve productivity in their foreign affiliates. The literature has highlighted various channels through which multinationals increase productivity such as an increase in access to foreign markets (Arnold and Javorcik 2009) or the interplay between the adoption of organizational innovations and market access (Guadalupe, Kuzmina, and Thomas 2012) as potential mechanisms. This paper contributes to this strand of the literature by suggesting that parent management practices are important for understanding the readjustment to acquisitions within firm boundaries post-acquisition.

Another strand of this literature deals with the intersection of organizational economics and multinational companies. Bloom, Sadun, and Van Reenen (2012b) find that the productivity advantage from IT investment of foreign affiliates in Europe managed by US multinationals over affiliates managed by non-US multinationals can be explained by the complementarity between IT investment and tougher people management practices. Marin, Rousova, and Verdier (2013) investigate when multinationals transplant the mode of their organization to foreign affiliates. Their conclusion is that competition in the host market as well as corporate culture matter for the likelihood of transplanting the organizational mode. Bloom, Sadun, and Van Reenen (2012c) show causally that trust in the region of multinational headquarters facilitates decentralization and multinationals from high trust regions have larger affiliates. Bloom, Sadun, and Van Reenen (2016) document superior management practices of multinational affiliates in comparison with domestic firms. Understanding how multinational affiliates acquire good management practices is important for drafting policies. It could be that multinational parents acquire affiliates with the best management practices, or there could be a treatment effect and the transplantation of best management practices leads to the improvement of management practices in the affiliate. This paper contributes to the literature by presenting evidence consistent with the second explanation.

A strand of literature has started to intertwine both research on management practices and international economics. In the context of international trade, Bloom et al. (2020) provide evidence that better-managed firms are likely to export more products to more destinations. Alfaro et al. (2018) analyze the role of delegation for company boundaries. They point out that the positive relationship between delegation and integration is mediated through management practices. The work perhaps most closely related to this paper is by Heyman, Norbäck, and Hammarberg (2019). They use WMS data to calculate management source-country fixed effects and examine the impact of source-country management practices on productivity changes in foreign affiliates in Sweden as a FDI destination market. They find that heterogeneity in the average management score of source countries is important to productivity in Swedish affiliates: multinationals from the US, the country with the highest source-country fixed effect, improve productivity most in their Swedish affiliates compared to all other FDI source countries. One disadvantage of source-country management fixed effects is that they mask heterogeneity in firms' management practices across sectors and within countries. In fact, within

the set of multinational parents country fixed effects can only explain up to 14 percent of the variation in management practices. This paper differentiates from the work by Heyman, Norbäck, and Hammarberg (2019) and contributes to the literature on international economics and management practices in two important aspects. First, the analysis accesses management practices measured at the parent level and assumes that management practices are transferred from parents to the affiliates and thereby improve affiliate productivity. Second, this study moves beyond source-country management fixed effects and leverages management practices measured at the *firm-level*, instead of the variation of management practices across countries. It uses acquisitions as an event study to identify the dynamic effects of parent management practices on their acquisition targets over time. This study also makes a data contribution to the literature by linking the WMS data to data on FDI activity of surveyed firms from Orbis for the first time.

The remainder of this paper is organized as follows: The second section describes the World Management Survey design. The next section deals with the data and how they are organized for the analysis. The following section analyzes the relationship between management practices and the multinationals investment flows and stocks. The penultimate section examines the association of parent management practices with affiliates' performance post-acquisition. The final section concludes.

2 Measuring Management Practices - the World Management Survey

This section succinctly delineates the design of the World Management Survey.[1] The World Management Survey collected firm-level management survey data across many countries in the manufacturing sector. Firms in the survey were scored from 1 to 5 on a grid, which was developed by a leading international consulting firm to evaluate management practices. Best management practices are viewed to potentially apply to all firms and are not idiosyncratic to an individual firm as strategic management decisions are likely to be. The survey questions can be grouped into four broad categories: monitoring (five questions), operations (two questions), people (six questions), and targets (five questions). Monitoring involves tracking and improving performance through indicators. Operations include the major aspects of lean manufacturing. People management examines the degree to which companies promote and fire employees based on performance. Finally, questions concerning the category "targets" include the setting of targets, their horizon, and the actions taken to meet them. Several sub-questions are asked for each specific question. For example, the question considering the "time horizon of targets" contains sub-questions on the time scale of targets and the relationship between short-run and long-run goals. The Online Appendix contains one sample question for each category.[2]

[1] Since the design of the survey has been described in the literature on management practices, interested readers are referred to Bloom and Van Reenen (2007) for a more detailed overview.

[2] The questionnaire is available at `https://worldmanagementsurvey.org/wp-content/images/2010/09/Manufacturing-Survey-Instrument.pdf`

The management z-score is then the unweighted average across eighteen survey questions.[3]

Companies were surveyed by graduate and MBA students, who received training on leading telephone interviews that typically took about 45 minutes. Surveys of the same company conducted by two different interviewers revealed a strong and significant correlation of 0.51 between management scores, which validates the way management practices were measured across different interviewers (Bloom et al. 2012a).[4]

The interview design prevents psychological bias from the interviewers or interviewees as documented in the surveying literature, due to the use of the "double blind" procedure.[5] The survey was introduced to interviewees as an interview about lean manufacturing, i.e. they were not aware that their answers were scored. On the other hand, interviewers were not given any information about the companies, apart from their contact details. Therefore, interviewers presumably did not know anything about the performance of the companies they were surveying as the firms surveyed were not generally well known. More importantly, interviewers did not have access to any financial data on the companies they were interviewing. They were only provided with their names and contact details. In addition, interviewers were paid by the number of interviews, so they had no incentive to search for further information about companies during their working time. For the purpose of this study, it is noteworthy that interviewers asked about multinational status but did not further interrogate about any information on affiliates abroad of global ultimate owners in the survey, the structure of multinational business groups, and completed or planned acquisitions. Therefore, the measure of parent management practices is unbiased for the following analysis that relates parent management practices to their location decision and to affiliate outcomes in the context of acquisitions.

Unlike in the influential work by Bertrand and Schoar (2003) and Bennedsen et al. (2007) that highlights the effects of CEOs and CFOs for firm performance, typically, the interview partner in the WMS is a plant manager, who is familiar with the production process and can answer questions pertaining to day-to-day routines.[6] Interview requests were supported by endorsements of official government institutions such as the Bundesbank in Germany or the Treasury in the United Kingdom. The response rate was high and not correlated with any financial fundamentals of firms included in the random sample.

Recently, official government statistics have started to adopt the methodology of the WMS to measure management practices on a larger scale. The US census bureau conducted the "Management and Organizational Practice Survey" (MOPS) as part of the 2015 census data collec-

[3]There are very few missing questions for individual firms. A share of 98 percent of the global ultimate owners was scored on at least 17 out of 18 questions. The minimum number of questions scored was 14.

[4]Furthermore, Bloom et al. (2012a) report a correlation between management scores of 0.89, when double scoring the same interview by two interviewers. In addition, it is possible to reduce measurement error in the survey through noise controls (interviewer fixed effects).

[5]Details on psychological biases in survey data can be found in Bertrand and Mullainathan (2001).

[6]Dessein and Prat (2019) distinguish between the leader-centric empirical approach (for example, CEOs) and the organization-centric approach (for example, management practices).

tion for which the WMS served as basis (Buffington et al. 2017).[7] The survey was mandatory for all manufacturing companies to participate in.

Firms in the WMS were randomly sampled medium and large firms (50-10,000 employees, median 300 employees) from population databases. This study makes use of data from twenty-three countries that were collected in survey waves between 2001 and 2014.[8] Overall, the WMS data contain interview scores for approximately 8,700 firms.

3 Data

This paper combines the WMS data with three data sources. This section briefly describes each of the data sources used in this paper.

3.A Orbis Ownership Database

One can match approximately three-quarters of the 8,700 firms, i.e. 6,618 firms, to a corresponding Bureau van Dijk ID. Within this set of firms, 839 firms are identified as global ultimate owners at some point between 2007 and 2015. The ownership tree for global ultimate owners is constructed with ownership data from Orbis. Figure 1 illustrates the ownership concept with a fictitious example. The concept of global ultimate ownership follows the international standard definitions for multinational corporations (OECD 2008). The Historical Ownership Database is available from Bureau van Dijk (2015). It collects information on business groups and contains the direct and ultimate owner for each company in the data between 2007 and 2015. The database is updated annually. In the following, this study will refer to this data set as "Orbis-WMS data".

3.B Zephyr Acquisitions Data and Orbis Financial Data

All acquisitions by firms in the WMS whose deal status is recorded as "complete" or "assumed complete" are obtained from the Zephyr database by Bureau van Dijk. Overall, there are 836 cross-border acquisitions. The acquisition data from Zephyr are complemented with unconsolidated financial data on affiliates from Orbis (Bureau van Dijk 2016). The financial data from Orbis provide information on affiliates' employment, sales, fixed tangible assets, and value added to construct outcome variables. Information on affiliates' industry was downloaded from Orbis. This study refers to the merged data set as "Zephyr-WMS data".

[7] One can map the 16 questions in the MOPS survey into sub-questions of nine questions in the WMS. There are more questions in the WMS than in the MOPS, because the WMS interviews were conducted by phone and the survey contains open questions, whereas the MOPS questionnaire was completed on paper.

[8] The set of countries is listed in the Online Appendix.

3.C BSD

The Business Structure Database (BSD, Office for National Statistics 2017) provided by the Office for National Statistics (ONS) contains almost all economic activity in the UK. For example, in 2004 it was estimated that firms in the BSD captured 99 percent of economic activity in the UK. The BSD distinguishes between firms (enterprises) and local units (plants). The data span the years 1997 to 2016. The UK is the country with the largest sample size in the WMS. The British firms in the WMS sample are merged to the BSD data to identify acquisitions of local units through firms in the WMS that are part of a multinational business group.[9] Enterprises recorded in the BSD may themselves be part of a business group and only acquisitions in which the business group as well as the enterprise that owns a local unit change simultaneously are considered. The BSD contains limited information on local units, such as the industry code and employment. Hereafter, this study will refer to this data set as "BSD-WMS data".

3.D Summary Statistics

Table 1 shows summary statistics for global ultimate owners in the Orbis-WMS data. In 2007, the average multinational parent company owned approximately 10.25 affiliates. The distribution of affiliate ownership is right-skewed with a median of three affiliates. The management z-score of global ultimate owners with above median affiliates is 0.21 which suggests that better-managed parents own more affiliates. The mean employment of global ultimate owners in 2007 was 2,150. Again, the employment distribution is right-skewed with a median employment of 468. Figure 2 plots the management z-score distinguishing global ultimate owners in 2007 by below and above median employment. This figure confirms for the set of global ultimate owners that larger firms have better management practices.[10]

Table 2 documents that the affiliates in the Zephyr-WMS sample had on average 251 employees, sales of 64.7 million US dollars and labor productivity of 1.45 Mio. US dollar per employee in the last year with available data before the acquisition.

4 Management Practices and Investment Flows and Stocks

The following analysis will consider the investment stocks and investment flows of global ultimate owners in the WMS as outcomes, thereby conditioning on parents that own at least one affiliate.[11] For each regression, the firm-level management z-score is standardized such that its distribution is standardized to mean 0 and standard deviation 1 for the global ultimate owners in

[9] The matching of the WMS data with the anonymized firm identifier in the BSD was performed by the ONS.

[10] This stylized fact has been shown in many studies. For example, Broszeit et al. (2019) show a similar figure for all firms in Germany.

[11] The analysis refrains from analyzing whether management practices are associated with becoming a multinational.

the respective data set.[12] Hence, a unit increase in the management z-score can be interpreted as a one standard deviation increase in management practices. The management z-score is defined over time to make it consistent with other data as explained in Table A.1 in the Online Appendix.

This section investigates whether there is an association between country-level management practices and the decision as to in which countries multinationals own an affiliate. The set of destination countries is restricted to 23 countries included in the WMS data. For each pair of the twenty-three countries considered in this paper, the management gap between origin and the destination country is constructed. For this purpose, the management score in a country k is decomposed into a within- and between-firm component, following Bloom, Sadun, and Van Reenen (2016) and Olley and Pakes (1996):

$$M^k = \sum_i M_i \times \text{empl}_i = \sum_i \left[(M_i - \overline{M_i}) \times (\text{empl}_i - \overline{\text{empl}_i}) \right] + \overline{M_i}, \tag{1}$$

where M_i is the management score of firm i. The first term in the decomposition is a between-firm reallocation term that weights an individual firm's deviation from the average management score of the country by its deviation in employment share from the average employment share in the WMS sample of the respective country. The second term is the unweighted mean of management practices across firms within a country. In the following, the management gap is defined as the difference between management practices in the origin country o and destination country d:

$$\text{management gap}_{od} = M^o - M^d. \tag{2}$$

Since the management score is unavailable for most affiliates, the country-level management score is a proxy for the average level of management practices of a representative domestic firm in a given destination country.[13] One reason for using the weighted decomposition of the management country index is the selection of multinational status by size. Multinationals tend to own larger affiliates compared to the average firm (Guadalupe, Kuzmina, and Thomas 2012). Weighting by size partially accounts for this assortative matching without imposing any restriction for the set of potentially foreign owned firms.

Firm-level FDI is increasing in productivity (Helpman, Melitz, and Yeaple 2004) and management practices are positively associated with productivity. Therefore one would expect firm-level greenfield FDI to increase in management practices. The question is why multinational affiliates have better management practices. It could be due to the selection of acquisition targets with better management practices or to the intra-firm transplantation of best management practices. If multinationals create value through acquisitions by transplanting their manage-

[12]For example, the mean of management scores for global ultimate owners in the Orbis-WMS data is 3.09 and the standard deviation is 0.67. For BSD-WMS data at the ONS, the management score is normalized to the distribution of enterprises with at least one plant.

[13]The country management score is calculated considering only observations of domestic firms including domestic multinationals but excluding affiliates of multinationals with parents located in a foreign country.

ment practices abroad, and this is a motive for them to acquire targets, then multinationals' investment patterns will be influenced by where they can create value, which is approximated by the management gap between countries.

Hypothesis 1: Multinationals seek to create value by transplanting management practices intra-firm. Therefore, the FDI between two countries is positively associated with the management gap between them.

The relationship between management practices and investment is tested using the following regression:

$$\begin{aligned} g(\text{investment stock}_{pjod}) = \beta_0 + \beta_1 \times \text{management}_p + \beta_2 \times f(\text{management gap}_{od}) \\ + \delta_j + \gamma_d + \phi' \times X_{od} + \gamma' \times Z_o + \varepsilon_{pjod}. \end{aligned} \tag{3}$$

In equation (3), the index "p" denotes the firm, "j" denotes industry, "o" denotes origin, "d" denotes destination, and "t" denotes time. The outcome is a function g of the investment stock, which is defined as the number of affiliates owned by firm p in country d. The regression controls for destination fixed effects, γ_d, to compare the investment behavior of firms, denoted by p, across source countries for a given destination country. The vector X_{od} includes common gravity controls such as distance, common language, colonial relationship, and contiguity. Additionally, the regression controls for a vector of origin controls Z_o, which includes GDP to capture the market size, GDP per capita as proxy for development, and the ratio of credit over GDP as a measure of financial development. The first two controls were identified as an important determinant of FDI, for example, in Eicher, Helfman, and Lenkoski (2012), while the latter control is based on the findings of Desbordes and Wei (2017). Feld and Heckemeyer (2011) show in a meta-study that FDI reacts significantly to the destination country tax rate. Therefore, a dummy equal to one, if the destination country tax rate was lower than the source country tax rate, is included as control. Furthermore, the regression includes industry fixed effects, δ_j, and interviewer fixed effects as noise controls, although the notation suppresses them for brevity. Finally, ε_{pjod} represents the error term. A positive coefficient β_1 would suggest a positive association between management practices and investment at the firm-level. A positive coefficient β_2 would indicate that firms enter on average more in regions where the average level of management practices is lower than in the source country. The following results are consistent with Hypothesis 1.

[Table 3 here]

The regression is estimated using data in 2007. In doing so, the time difference between the WMS interviews and the measurement of FDI stock is minimized between 2007 and 2015.[14]

[14]The time difference between the measurement of the FDI and that of management scores was on average 2 years in 2007. The results are similar for other years, but the time difference between measurement of the FDI stock and flows and the measurement of the management z-score increases for later years.

The distribution of management z-scores for global ultimate owners does not change significantly over time (Figure 3). Columns (1) to (4) of Table 3 estimate equation (3) using a dummy, whether the firm owned an affiliate in country d as outcome. The probability of owning at least one affiliate is 15.5% across all parent-destination pairs in the sample. The first two columns specify probit regressions.[15] The gravity controls in columns (1) and (2) have the expected sign and are all statistically significant apart from contiguity. A lower tax rate in the destination country increases the likelihood of owning an affiliate in that country. Lastly, global ultimate owners from developed economies are more likely to own an affiliate abroad. Firm-level management practices are positively and significantly associated with the likelihood of owning an affiliate in a given destination. The point estimate is statistically significant at the 1 percent level. Column (1) introduces a dummy equal to one as control, if the management gap between origin and destination is positive. The point estimate is positive but marginally insignificant. The specification in column (2) uses the management gap as control. The coefficient is statistically significant at the 1 percent level. To ease the interpretation of coefficient estimates, columns (3) and (4) estimate the same regressions using a linear probability model. The controls behave similarly as in the case of the probit regressions in terms of significance and sign. The dummy variable for contiguity turns significant. The point estimate for the management score suggests that a one standard deviation increase in management practices is associated with a 3.2 percent higher probability to own an affiliate. The coefficient estimate for a positive management gap is positive and marginally significant at the 10 percent level implying that the ownership probability is higher for firms from source countries where the average management score is larger than in the destination country. There are on average potential gains from sharing management practices with the destination country, when the management gap is positive. The size of the coefficient is approximately equivalent to a 61.27 percent decrease in distance. The regression in column (4) uses the level of the management gap instead of a dummy as control. The coefficient estimate is positive and significant at the 5 percent level. It suggests that moving from the 25th percentile to the 75th percentile in the distribution of the management gap increases the likelihood to own an affiliate by 7.87 percent. This corresponds to a 142.13 percent decrease in distance. Columns (5) and (6) estimate the association between management practices and the extensive margin of FDI. The outcome is the inverse hyperbolic sine of the number of affiliates.[16] The pattern of coefficients for gravity controls is similar in comparison with columns (3) and (4). The source country financial development as captured by credit of GDP by the origin country is statically significant at the 5 percent level. Firm level management practices are positively associated with the number of affiliates and the coefficients are significant at the 1 percent level. Finally, a positive management gap suggests a larger number

[15] In unreported results, estimating a logit regression delivered similar results.

[16] The inverse hyperbolic sine of y is defined as $\text{IHS}(y) = ln(y + (y^2+1)^{\frac{1}{2}}) \approx ln(2) + ln(y)$, so that first differences can be interpreted as approximate log changes (Burbidge, Magee, and Robb 1988). The results are similar, when using the total number of investments as outcome and winsorizing.

of affiliates owned, whereas the level of the management gap is positive, but insignificant. This could be a result of more complex affiliate structures in destination countries where the management gap is positive, but small compared to country pairs for which the management gap is positive and large.

The following equation has a parallel structure in terms of controls to equation (3), but the outcome is a measure of investment flows.

$$g(\text{investment flow}_{pjod}) = \beta_0 + \beta_1 \times \text{management}_p + \beta_2 \times f(\text{management gap}_{od}) + \delta_j + \gamma_d + \phi' \times X_{od} + \gamma' \times Z_o + \varepsilon_{pjod}. \quad (4)$$

[Table 4 here]

The sample comprises investments of existing and new global ultimate owners in 2008. The probability of investing into a destination was 4.87 percent in 2008. Columns (1) and (2) display the estimates of probit regressions of investing in 2008. Investment is associated positively and significantly with sharing a common language, and negatively and significantly with physical distance. The association between contiguity, colonial links, and investment is statistically insignificant. The correlation between GDP per capita, the GDP of the origin country, and investment is negative but insignificant. The point estimate for firm-level management z-score is positive and significant at the 1 percent level. Likewise, the coefficient estimate of a positive management gap in column (1) is positive and significant at the 1 percent level. In contrast, the point estimate of the management gap is positive but insignificant. This finding suggests that better-managed parents do not invest in countries with a higher management gap last, but they rather invest first in countries where gains from transplanting management practices are higher. The pattern of results is very similar when specifying a linear probability model in columns (3) and (4). The point estimate of the firm-level management z-score implies that a one standard deviation increase in management practices is associated with a 0.73 percent higher likelihood of investment. A positive management gap is associated with a 3.37 percent higher likelihood of investment, which is large compared to the baseline investment probability of 4.87 percent. The coefficient on the management gap turns marginally significant at the 10 percent level. The conclusion that management practices, both at the firm and country level, are an important determinant of investment, also applies to the analysis of the extensive margin of investment in columns (5) and (6). Firm level management practices are positively and significantly correlated with the number of investments. Just like for the investment stock, the extensive margin is statistically significantly correlated with a positive management gap at the 10 percent level (Column 5), but the coefficient estimate of the management gap is positive but insignificant (Column 6). Table A.2 in the Online Appendix shows estimates of a conditional logit model to account for dependencies between investment objects. The coefficient on the

dummy of a positive management gaps remains positive and significant at the 1 percent level.[17]

Does the positive relationship between the decision to own an affiliate and the management gap also extend to the aggregate? Figure 4 provides descriptive evidence that this could be the case. The countries in Figure 4 are ordered such that the country level management score decreases from the top to the bottom. Red colored cells indicate a low share, yellow colored cells a medium share, and green colored cells a high share of domestic firms investing in the respective destination country. Indeed, as one moves from the bottom to the top of the table the number of yellow and green colored cells increases markedly. The following regression captures this visual relationship quantitatively:

$$\begin{aligned}\text{Share of firms owning an affiliate}_{od} = \beta_0 + \beta_1 \times f(\text{management gap}_{od}) \\ + \gamma_d + \phi' \times X_{od} + \gamma' \times Z_o + \varepsilon_{od}.\end{aligned} \tag{5}$$

The specification includes gravity controls, denoted by X_{od}, controls for origin country controls namely the size and the level of development through GDP and GDP per capita and the ratio of credit to GDP, denoted by Z_o, and destination country fixed effects, denoted by γ_d. The comparison of investment is across sources for a given destination country. The coefficient of interest is β_1. Equation (5) is estimated using OLS.[18]

[Table 5 here]

In column (1), the function f is a dummy which is equal to one if the management gap is positive. The point estimate is positive but insignificant. The independent variable of interest in column (2) is the level of the management gap. The point estimate is positive and significant at the 1 percent level. The magnitude suggests that moving from the 25th percentile to the 75th percentile in the management gap raises the share of firms investing by 0.75 percent, which is substantial compared to the baseline mean of 0.82 percent. The results in column (3) explore heterogeneity of the management gap by distance. The correlation between the management gap and the share of owners is only significant for country pairs in the first three quartiles of the distance distribution across country pairs.

This is logical given that distance is a cost-increasing factor of transplanting management practices internationally.[19] Physical distance increases the cost of communication, monitoring, and travel costs for managers from the headquarters to their affiliates.[20]

[17]The estimation of the corresponding regression using the management gap as regressor was not solvable as the objective function was not concave.

[18]The results are also robust when using beta regressions to take the boundedness of the dependent variable into consideration.

[19]Within France, Charnoz, Lelarge, and Trevien (2018) find that the expansion of the French high-speed rail increased affiliate size through the reduction of communication costs, especially for business trips. Giroud (2013) shows that plants which experience a reduction in travel time to the headquarters, due to the opening of new airline routes, increase investment and productivity. Kalnins and Lafontaine (2013) establish a causal link between establishments' distance to headquarters and their longevity.

[20]Ambos and Ambos (2009) show that distance has a moderating effect on knowledge transfer within multi-

5 Management Practices and Affiliates' Outcomes Post-Acquisition

This section analyzes the association between parent management practices and affiliate employment and productivity post-acquisition. Thereby, this study moves beyond source-country fixed effects used in Heyman, Norbäck, and Hammarberg (2019). Indeed, as shown in Table A.3 in the Online Appendix source-country fixed effects can only explain up to 14 percent of the variation in management practices across firms. Before doing so, Figure 5 provides descriptive evidence that management practices at the affiliate and parent level are correlated. While the WMS does not deliberately survey management practices for both the parent and its affiliate in general, a management score in 35 parent-affiliate relationships for both the parent and the affiliate exists.

Figure 5 reveals that there is a positive correlation between the management scores of parents and their affiliates, i.e. a high correlation of management practices for members of the same multinational business group. The correlation is positive and highly significant after conditioning on country fixed effects for parents and affiliates.[21] The scatter plot in Figure 5 underpins the notion that there is a positive relationship between the management score of parents and affiliates, possibly due to the sharing of management practices.[22] However, Figure 5 does not reveal anything about the direction of transplantation. The management literature suggests that knowledge flows rather from multinational parents to their affiliates than the other way around (Gupta and Govindarajan 2000). In order to establish a clear direction of knowledge flows, this study uses acquisitions of affiliates by WMS parents.

The data for WMS firms with the Bureau van Dijk identifier from Zephyr that covers mergers and acquisitions go back to 1997. When defining the sample, the analysis focuses on new acquisitions and excludes stake increases in existing parent-affiliate relationships. Finally, only deals with a "complete" or "assumed complete" status are considered. There are 836 cross-border acquisitions to which financial data are merged. To increase the sample size, acquisitions by both shareholders and global ultimate owners are included in the sample.[23]

Following the methodology of Bandiera et al. (2020), the dynamic effects of parent management practices on affiliate performance are estimated through an event study design with

nationals. The notion of affiliate productivity decaying with distance between affiliate and parent is also featured in models of multinational production (for example, bilateral MP costs in Arkolakis et al. 2018). Furthermore, the negative coefficients on distance are in line with research that finds that international technology diffusion diminishes with distance (for example, Keller 2002).

[21] The correlation is similar when not conditioning on country fixed effects.

[22] Bloom et al. (2019) use the "Management and Organizational Practice Survey" that measures management practices for the first time on a large scale in the context of the US manufacturing census. They show that management practices not only vary between firms, but that 40 percent of the variation in management practices is within firms.

[23] In Figure 1 company A is a global ultimate owner and companies B, C, and D are shareholders.

the following difference-in-differences model:

$$\begin{aligned}\ln(\text{outcome}_{apjodqt}) = {} & \beta_0 + \beta_1 \times \text{management}_{pq}^{parent} \times \mathbb{1}(\text{takeover}_{1-3\text{years}}^{post}) \\ & + \beta_2 \times \text{management}_{pq}^{parent} \times \mathbb{1}(\text{takeover}_{4-6\text{years}}^{post}) \\ & + \beta_3 \times \mathbb{1}(\text{takeover}_{1-3\text{years}}^{post}) + \beta_4 \times \mathbb{1}(\text{takeover}_{4-6\text{years}}^{post}) \\ & + \beta_5' \times \mathrm{X}_{apq} \times \mathbb{1}(\text{takeover}_{1-3\text{years}}^{post}) \\ & + \beta_6' \times \mathrm{X}_{apq} \times \mathbb{1}(\text{takeover}_{4-6\text{years}}^{post}) \\ & + \nu_a + \lambda_t + \varepsilon_{apjodqt}.\end{aligned} \tag{6}$$

In equation 6, the index "a" denotes affiliate, "p" denotes parent, "j" denotes industry, "o" denotes origin, "d" denotes destination, "q" denotes the year of the acquisition, and the index "t" denotes time. The outcomes comprise employment, sales, labor productivity, the Solow residual, and value added per employee.[24] The specification controls for affiliate fixed effects, denoted as ν_a, time fixed effects, denoted as λ_t, and for two dummies, which are equal to one, 1 to 3 years and 4 to 6 years post-acquisition, respectively. Additionally, these dummies are interacted with industry and region fixed effects, denoted by the vector X_{apq}, to control for shocks at the industry level such as industry wide productivity shocks and different acquisition adjustments across continents as regions. The total treatment window includes six years pre- and post-acquisition as well as the acquisition year. The most recent parent interview information at the acquisition year is used as parent management score. The coefficients of interest are β_1 and β_2, which capture the correlation between parent management practices and acquisition targets' outcomes 1 to 3 and 4 to 6 years post-acquisition, respectively.

[Table 6 here]

The coefficient estimates for β_1 and β_2 in column (1) of Table 6 show that there is a negative correlation between parent management practices and affiliate employment. However, the point estimates are insignificant. As is discussed below, the results are similar in the BSD-WMS data, and there are negative and statistically significant employment effects for takeovers of better-managed parents post-acquisition. The point estimates in column (2) imply that better-managed parents tend to decrease sales but not significantly. This suggests that management practices do not alter market size or provide access to new export markets, which were previously associated with productivity gains from acquisitions (Arnold and Javorcik 2009; Guadalupe, Kuzmina, and Thomas 2012). The following outcomes are three measures of productivity. The results in column (3) show a positive and significant point estimate for labor productivity 1 to 3 years post-acquisition and a positive but insignificant point estimate 4 to 6 years post-acquisition.

[24] All outcomes are winsorized at the 1st and 99th percentile of their distribution to mitigate the impact of outliers. The results are similar when not winsorizing. The variables turnover and operating revenue from the Orbis financial data are combined to define sales as outcome to increase the sample. The correlation between the two variables is 0.996.

This suggests that there is a short-term increase in labor productivity due to stronger negative employment effects in the short-term. The estimated correlation of parent management practices with affiliate productivity in the Zephyr-WMS data 1 to 3 years post-acquisition is large but attenuated compared to the estimate of the management score on firms' productivity itself, which is 2.5 times as large (Bloom and Van Reenen 2010).[25] The outcome in column (4) is the Solow residual. It is calculated by running a regression of sales as the dependent variable and estimating a Cobb-Douglas production function by controlling for employment, the book value of tangible fixed assets, and time fixed effects. The coefficient estimate for parent management practices 1 to 3 years post-acquisition is positive, although marginally insignificant. In the second period, the association between parent management practices and the Solow residual is positive and significant at the 10 percent level. The coefficient estimate implies that a one standard deviation increase in management practices increases productivity by 12.7 percent. Finally, the results for value added per employee are very similar. The second period coefficient is positive and significant at the 10 percent level. This suggests that a one standard deviation increase in management practices increases value added per employee by 13.1 percent.

As an alternative sample, acquisitions of domestic *plants* in the UK are analyzed. Acquisitions are identified in the Business Structure Database (BSD) as a change in ownership of a plant between companies in which both the enterprise and business group change simultaneously. In so doing, 723 acquisitions by multinationals in the BSD-WMS sample are identified. The takeovers of plants by either domestic or foreign multinationals in the WMS are taken into consideration to maximize the sample size.[26] Hence, the estimation for the dynamic effects of parent management practices on affiliate employment is based on a larger sample compared to the acquisitions in the Zephyr-WMS data. However, the outcome for plants in the BSD is limited to employment.

[Table 7 here]

In terms of employment, the effects are similar to those in the Zephyr-WMS sample when considering the larger sample of BSD-WMS acquisitions. The point estimates for β_4 suggest that multinationals generally decrease employment post-acquisition in this sample. The tendency to decrease employment is more pronounced for better-managed parents. There is no significant effect 1 to 3 years post-acquisition. The coefficient for β_2 using the parent management score in column (1) of Table 7 is negative but marginally insignificant. When similar regressions as in equation (6) are estimated with the sub-component people management as treatment variable, the results turn out stronger as shown in column (2). The point estimate on parent management practices 4 to 6 years post acquisition is significant at the 5 percent level. A one standard deviation increase in the people management z-score decreases employment by

[25] In Bloom and Van Reenen (2010) a one standard deviation increase in management practices is associated with an increase in labor productivity of 0.299 log points.

[26] Results are similar when restricting the sample to foreign multinationals.

19 percent in the medium-term 4 to 6 years post-acquisition. People management is the sub-component of the management score that one would expect to be most relevant for employment decisions.

The findings from the Zephyr-WMS and BSD-WMS estimations highlight that better-managed foreign firms might be more willing to restructure their staff, for example through people management that is based on removing poor-performing people and identifying and distilling talent. Better-managed firms are more willing to take tougher decisions after they acquire a firm or a plant and reduce employment in the medium-term. There are positive gains from takeovers by better-managed parents in terms of labor productivity in the short-term and positive increases in the Solow residual and value added per employee in the medium term. The results on acquisitions are particularly relevant for multinational business groups as acquisitions account for a significant share of global FDI flows. For example, the value of cross-border acquisitions was 62.4 percent of global investment flows in 2006 (UNCTAD 2007).

5.A Heterogeneity by management gap, destination country development, and parent size

This section examines the heterogeneity of the association between parent management practices and affiliate outcomes post-acquisition. The heterogeneity categories are binary variables distinguished by the median of the respective category. As the exercise focuses on multinational acquisition targets, the heterogeneity among the treated is used to test the following hypothesis:

Hypothesis 2: Productivity gains in acquisition targets from better management practices arise through the transfer of management practices within firm boundaries.

The first heterogeneity exercise investigates whether the effect of parents' management practices on affiliates is stronger for country pairs in which the management gap between source and destination country is above median across all country pairs in the Zephyr-WMS sample. The management gap is a proxy for expected differences in management practices between parents and affiliates.

[Table 8 here]

The results in column (1) of Table 8 show a negative and significant response in affiliates' employment for parent and affiliate pairs for which the management gap is above the median. The total reduction in employment is large and lies above 40 percent for pairs with a management gap above the median. The baseline coefficients for country pairs which belong to the group of pairs below median management gap are positive and significant in the short-term 1 to 3 years after the acquisition. The triple interaction terms using sales as outcome in column (2) are negative and large but insignificant. They are, however, smaller than the interaction terms in column (1). Therefore, the triple interaction terms in column (3) for labor productivity are positive and significant for 1 to 3 years post-acquisition. This suggests that the positive

labor productivity response is entirely driven by country pairs for which the management level is higher on average than in the destination country. The triple interaction terms in columns (4) and (5) using the Solow residual and value added per employee as outcomes do not display significant heterogeneity. The triple interaction term 1 to 3 years post-acquisition is positive, whereas the triple interaction term 4 to 6 years is negative. Possibly due to the smaller sample size for these outcomes the heterogeneity with respect to the management gap is not as clear as for the other outcomes.

The second heterogeneity exercise examines differential response by the median in real GDP per capita in the destination country in the acquisition year. The median real GDP per capita income corresponds to France's in 2013 with approximately 41,300 in constant 2010 US dollar. The correlation between the management country index and GDP per capita is high with 0.59; therefore, the findings from the heterogeneity analysis are similar.

[Table 9 here]

The results in Table 9 show that the triple interaction term in column (1) for destination countries with below the median GDP per capita is negative and significant at the 10 percent level. The overall short-term effect in affiliate employment is negative and significant at the 10 percent level for this set of countries. The triple interaction term in column (3) 1 to 3 years post-acquisition is positive and significant at the 10 percent level, whereas the baseline coefficient is positive but insignificant. The triple interaction terms in column (4) are positive and significant at the 5 and 10 percent level. The baseline coefficients are small and insignificant. This implies that the positive response in productivity response is entirely driven by destination countries with below median GDP per capita. The response in value added per employee 4 to 6 years post-acquisition appears to be more pronounced in developed economies, as highlighted by the negative but insignificant triple interaction term in column (5).

[Table 10 here]

Finally, Table 10 investigates heterogeneity by parent size. The heterogeneity category comprises parents with below-median employment in the WMS data. The results in columns (3)-(5) show a significant response in the three measures of productivity. The response is sizeable and ranges from a 13 percent increase in labor productivity to a 26 percent increase in value added per employee. The triple interaction terms for parents with below-median employment are all negative but statistically insignificant. Nonetheless, the results suggest that productivity gains from superior management practices are more likely to occur for acquisitions by larger parents. This could be due to the increase in size of parent management practices (see Figure 2). If transfer of management practices takes through personal interactions with the parents, larger parents are also less likely to face time constraints of managers.

5.B Robustness checks

In the following, three robustness checks are carried out to show that the results are robust to alternative mechanisms and to different sample definitions.

The first robustness check shows that the results are robust to controlling for parent size. As Arnold and Javorcik (2009) and Guadalupe, Kuzmina, and Thomas (2012) have shown that acquisitions increase affiliates market access and raise export opportunities. Parent size is used as an imperfect proxy, to rule out that the results are driven by this market access channel. However, parents' employment may itself be a function of parent management practices and therefore the results have to be interpreted with caution.

The results in Table A.4 in the Online Appendix show that the baseline results are not driven by parents' market access. The short-term effect on affiliate productivity in column (3) remains significant at the 5 percent level and the medium-term effect on the Solow residual in column (4) remains significant at the 10 percent level. The medium-term coefficient using value added per employee as outcome in column (5) turns marginally insignificant but remains similar in magnitude compared to the baseline estimation.

One concern is the direction of causation. Potentially, affiliates could share their managerial knowledge with the parents and the flow of managerial knowledge as intangible transfers is reverse than what is assumed in the analysis. To address this concern, the following results use only pre-determined management scores of parents that were surveyed before the acquisition as treatment.

The results presented in Table A.5 in the Online Appendix show that the results are robust to restricting the sample to pre-determined parent management scores. The short-term effect on labor productivity in column (3) and the medium-term effect on the Solow residual in column (4) remain significant at 5 percent and 10 percent, respectively. The point estimate in column (5) for the interaction term 4 to 6 years post-acquisition for value added per employee remains positive but turns marginally insignificant.

The last robustness exercise examines whether the effects are driven by affiliates with few observations. For this purpose, the sample is restricted to affiliates with a minimum of six observations by outcome.

The results shown in Table A.6 in the Online Appendix are the same in terms of significance compared to the baseline results in Table 6. Hence, affiliates with few observations do not drive the effects.

5.C Mechanism: Evidence on Management Practices and Intra-firm Spillovers

The most immediate channel for sharing knowledge between parents and affiliates is through transfers of managers intra-firm. Cho (2018) provides evidence that this channel operates within Korean multinationals. Affiliates with a higher share of managers transferred intra-firm

report higher productivity.[27] This could also be a potential mechanism for transferring management practices post-acquisition. Even though there are no comprehensive data available for all managers at acquisition targets, data for directors, managers, and advisors are retrieved from Orbis. Then, a dummy is defined as equal to one if the affiliate has a record in one of the three functions from the parent country of the parent after the acquisition date. As there are not enough data available to meaningfully study within affiliate variation, the sample is post-acquisition and the analysis explores cross-sectional variation.

$$\begin{aligned}\mathbb{1}(\text{manager from parent cty}^{post}_{apjodq}) = \beta_0 + \beta_1 \times \text{management}_{pt} + \delta_j \\ + \gamma' \times X_{apq^{post}} + \varepsilon^{post}_{apjodq}.\end{aligned} \tag{7}$$

The regression controls for industry fixed effects, region fixed effects, and the number of managers with nationality information retrieved from Orbis.

[Table 11 here]

The results in Table 11 show a positive but insignificant correlation of the parent management score with the likelihood of installing or maintaining a manager from the home country. The correlation turns significant when considering the people management score as the treatment, which is probably the most important component of management practices when thinking about the mediation of management practices within a multinational firm.

Previous experimental studies also lend support for the notion that sharing of management practices takes place intra-firm Bloom et al. (2013) and Bloom et al. (2020). The positive association between management practices and firm performance was causally identified by Bloom et al. (2013), who designed a randomized controlled trial (RCT) in India and found that there was a causal relationship between better management practices and productivity. They show that treatment plants that were offered free consulting through a diagnostic and an implementation phase not only took up management practices themselves (a 37.8 percentage point increase of practices adopted) but also non-experimental plants in treatment firms showed a significant increase in the adoption of management practices (a 17.5 percentage point increase). Bloom et al. (2020) revisit their RCT experiment to ask whether management interventions have long lasting effects. The non-experimental plants in treatment firms that adopted fewer practices from 2008 to 2010 continued to adopt practices reaching adoption rates very similar to the experimental plants in treatment firms, which suggests substantial intra-firm spillovers from sharing knowledge about management practices eliciting to convergence in adoption rates between non-experimental plants and experimental plants (Bloom et al. 2020, Figure 1). This experimental finding underpins the idea of sharing managerial knowledge that leads to a trans-

[27] A similar mechanism may also apply, if domestic firms hire foreign managers. For example, Exadaktylos, Riccaboni, and Rungi (2020) report positive productivity effects for domestic firms, when they recruited a foreign manager.

fer of good management practices across plants and is the key mechanism to the empirical approach.

6 Conclusion

Understanding the mechanisms underlying productivity gains from international integration in business groups is an important question in an increasingly intertwined globalized world. This paper introduces the idea of transplanting management practices from parents to affiliates as an explaining factor.

Drawing on a unique sample of management data obtained through individual interviews, this study further augments the WMS data set by constructing the complete ownership tree of corporate relationships. There is a positive association between better parent management practices and the decision to own an affiliate and to invest abroad at the firm level. In aggregate, cross-country differences in management practices are predictive of investment and ownership patterns. By supplementing information of acquisitions with affiliates' financial data, this study further investigates the role of parent management practices on affiliate performance for new relationships made through acquisitions. The results show a positive association between parent management practices and affiliates' productivity post-acquisition. The heterogeneity analysis suggests that improvement in affiliate productivity is driven by the transplantation of management practices from parents with better management practices to affiliates with worse management practices.

The findings highlight that the channel of transplanting management practices is of particular relative importance when contemplating the welfare effects of foreign direct investment in developing and emerging economies. The total gains could be even larger due to agglomeration effects and learning of domestic firms through interaction with multinational affiliates. The evidence in Bloom et al. (2019) shows that there are also potential indirect gains through management spillovers due to incumbents' learning from the arrival of multinational firms. Abebe, McMillan, and Serafinelli (2018) and Alfaro-Urena, Manelici, and Vasquez (2019) find that domestic suppliers of multinational affiliates in developing economies improve managerial practices through their interactions with multinational affiliates.

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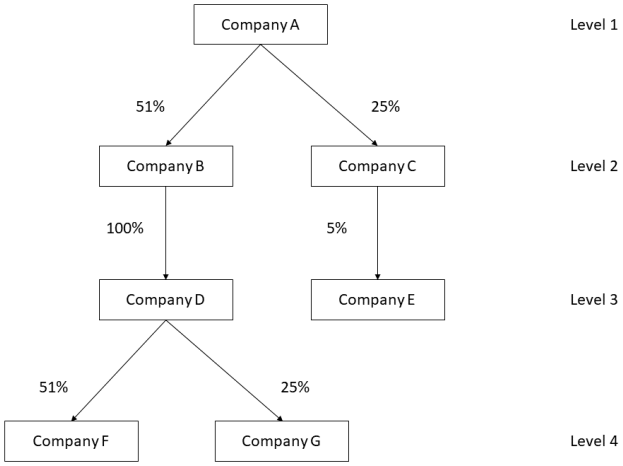
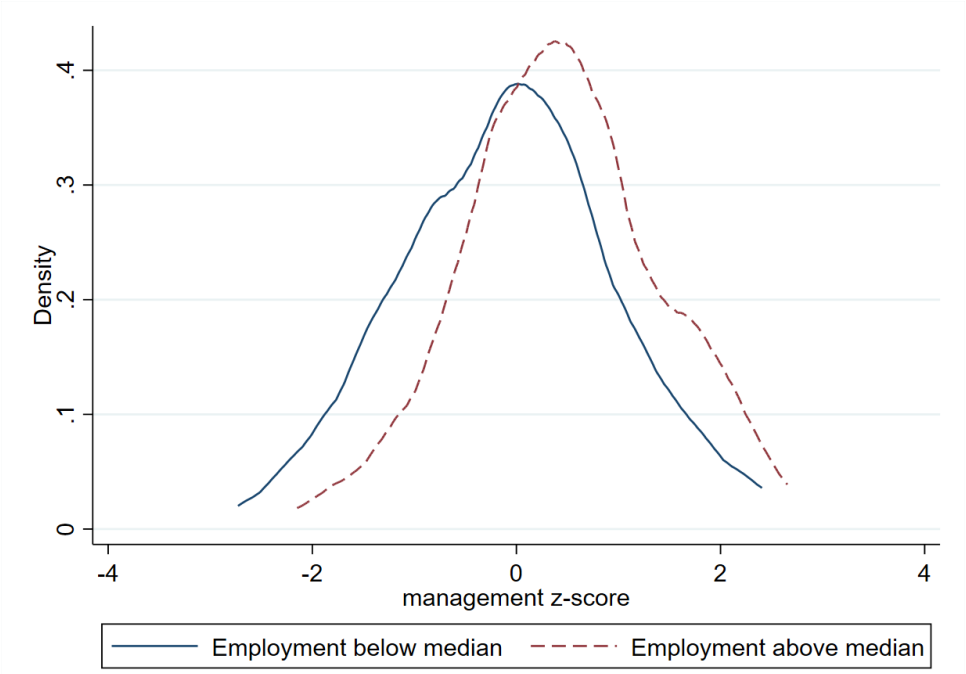
Figures

Figure 1: Corporate hierarchy of a multinational business group



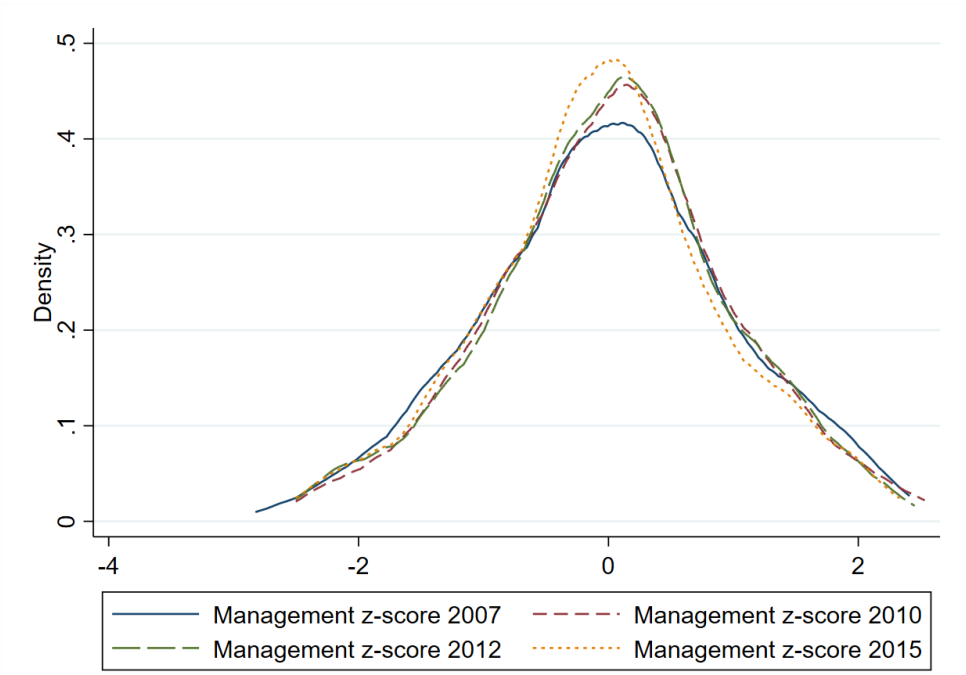
Company A is the global ultimate owner of affiliates B, D, and F.

Figure 2: Management z-score of global ultimate owners over time



The figure plots the distribution of the management z-score separately for global ultimate owners with above and below median employment in 2007.

Figure 3: Management z-score of global ultimate owners over time



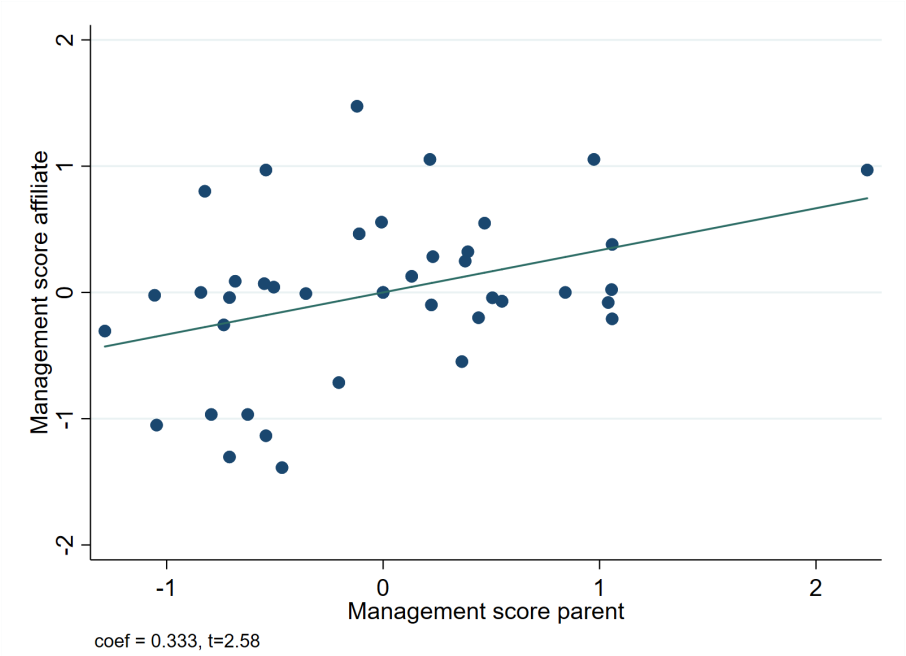
The figure plots the distribution of the management z-score for 2007, 2010, 2012, and 2015. All distributions are standardized by the mean and standard deviation in the management z-score of global ultimate owners in 2007.

Figure 4: Intensity of bilateral investment stock

S/D	US	DE	JP	SE	CA	FR	GB	IT	SG	ES	AU	NZ	MX	PT	PL	CL	TR	IN	CN	IE	BR	AR	GR
US		10,77%	5,92%	3,77%	14,54%	9,69%	14,36%	5,57%	3,41%	5,92%	4,85%	1,80%	8,26%	1,26%	2,69%	1,44%	0,36%	2,33%	7,90%	3,59%	4,31%	2,15%	0,90%
DE	8,04%		2,45%	2,45%	2,45%	8,39%	9,44%	5,24%	3,50%	6,64%	2,10%	0,00%	2,45%	1,40%	4,55%	0,35%	1,75%	3,15%	4,20%	1,05%	2,80%	1,05%	2,10%
JP	4,39%	0,00%		0,00%	0,88%	0,88%	4,39%	0,00%	0,00%	0,88%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
SE	4,49%	5,13%	0,64%		1,92%	4,49%	4,49%	1,28%	1,28%	1,92%	0,64%	0,00%	0,64%	0,64%	3,85%	0,00%	0,64%	0,64%	1,92%	1,28%	1,28%	0,00%	0,00%
CA	0,00%	0,00%	0,00%	0,00%		0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,59%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
FR	3,95%	1,75%	0,88%	1,32%	1,32%		2,63%	1,75%	0,88%	2,63%	0,44%	0,44%	1,32%	0,88%	1,32%	0,88%	0,88%	1,32%	1,32%	0,00%	1,32%	0,44%	0,88%
GB	5,20%	5,67%	1,10%	1,57%	3,15%	3,94%		1,89%	1,26%	2,20%	1,42%	0,79%	0,79%	0,16%	1,89%	0,00%	0,47%	0,79%	2,83%	3,46%	0,94%	0,31%	0,16%
IT	1,85%	1,85%	0,00%	0,00%	1,23%	1,23%	1,23%		0,00%	1,23%	0,00%	0,00%	0,00%	1,23%	0,62%	0,00%	0,62%	0,00%	1,23%	0,00%	0,62%	0,00%	0,00%
SG	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%		0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	1,87%	0,00%	0,00%	0,00%	0,00%
ES	3,25%	3,25%	0,00%	0,00%	0,00%	4,55%	1,95%	1,95%	0,65%		0,65%	0,00%	1,95%	1,30%	1,30%	0,00%	0,00%	0,00%	1,95%	0,65%	2,60%	0,00%	0,00%
AU	17,78%	5,56%	4,44%	4,44%	7,78%	3,33%	16,67%	4,44%	5,56%	2,22%		18,89%	3,33%	2,22%	0,00%	4,44%	0,00%	0,00%	3,33%	1,11%	3,33%	4,44%	1,11%
PT	0,68%	1,36%	0,00%	0,00%	0,00%	0,68%	1,36%	0,68%	0,00%	4,08%	0,00%	0,00%	0,00%		0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	1,36%	0,00%	0,00%
PL	0,00%	1,28%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%		0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,64%
CL	0,90%	0,90%	0,00%	0,00%	0,00%	0,00%	2,70%	0,00%	0,00%	0,00%	0,00%	0,00%	0,90%	0,00%	0,00%		0,00%	0,00%	0,00%	0,00%	0,00%	3,60%	0,00%
TR	0,00%	1,62%	0,00%	0,00%	0,00%	0,00%	0,32%	0,00%	0,00%	0,32%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%		0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
IN	0,00%	1,02%	0,51%	0,00%	0,00%	0,00%	2,04%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,51%	0,51%	0,00%	0,00%		0,00%	0,00%	0,00%	0,00%	0,00%
CN	0,00%	0,53%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%		0,00%	0,00%	0,00%	0,00%
IE	0,97%	0,00%	0,97%	0,00%	0,97%	0,00%	2,91%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%		0,00%	0,00%	0,00%
BR	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,24%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,24%	0,00%	0,00%	0,00%	0,00%		0,24%	0,00%
AR	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,78%		0,00%
GR	1,32%	3,31%	0,00%	0,66%	1,99%	2,65%	2,65%	3,31%	0,00%	1,99%	0,00%	0,00%	0,00%	0,66%	3,97%	0,00%	1,32%	0,66%	0,66%	1,32%	0,00%	0,66%	

The figure shows the intensity of the bilateral investment stock. The rows represent source countries and the columns destination countries. The rows are ordered such that the aggregate country management score decreases as one moves from the left (United States) to the right (Greece). The percentages represent the shares of domestic firms that owned an affiliate in the respective partner country in 2007. Red colored cells represent bilateral investment shares up to the 75th percentile of the distribution across country pairs, yellow colored cells represent bilateral investment share between the 75th and 90th percentile of the distribution across country pairs, and green colored cells represent bilateral investment shares above the 90th percentile of the distribution across country pairs.

Figure 5: Correlation between parent and affiliate management z-scores



The figure shows the management z-scores 35 parent-affiliate pairs in the Orbis-WMS data. The regression conditions on country fixed effects for parents and affiliates. The t-statistic is calculated using robust standard errors.

Tables

Table 1: Summary statistics - Orbis-WMS data

		Global Ultimate Owner
Variable	Mean	Number of global ultimate owners
Number of foreign affiliates	10.25 (21.40)	475
Number of employees	2,150 (9,115)	474

Notes: The table shows means (standard deviations). The data refer to global ultimate owners surveyed in the WMS and are from 2007.

Table 2: Summary statistics - Zephyr-WMS data

		Affiliate
Variable	Mean	Number of affiliates
Employment	251 (563)	227
Sales	64,749 (134,356)	219
Labor productivity	1,450 (11,479)	200

Notes: The table shows means (standard deviations). Labor productivity is defined as sales per employee. Labor productivity and sales are in thousands of US dollars. The data are from the last year for which non-missing data are available pre-acquisition.

Table 3: Parent investment stock - Orbis-WMS data

	(1)	(2)	(3)	(4)	(5)	(6)
	$\mathbb{1}$(Pos. investment stock$_{pjod}$)				IHS(investment stock$_{pjod}$)	
Mean of dep var			0.155			
Management z-score$_p$	0.1905***	0.1948***	0.0316***	0.0317***	0.0411***	0.0411***
	(0.0259)	(0.0259)	(0.0044)	(0.0044)	(0.0060)	(0.0059)
$\mathbb{1}$(Positive management gap$_{od}$)	0.1107		0.0329*		0.0494*	
	(0.0952)		(0.0178)		(0.0287)	
Management gap$_{od}$		1.3727***		0.1386**		0.1083
		(0.4030)		(0.0671)		(0.1096)
ln(GDP per capita$_o$)	0.2361**	0.0898	0.0372**	0.0274	0.0504**	0.0458*
	(0.1059)	(0.1232)	(0.0168)	(0.0192)	(0.0221)	(0.0266)
ln(GDP$_o$)	0.0853	–0.1202	0.0069	–0.0110	0.0047	–0.0053
	(0.0921)	(0.1150)	(0.0134)	(0.0182)	(0.0166)	(0.0248)
(Credit/GDP)$_o$	0.0040	0.0057*	0.0006	0.0007	0.0014**	0.0014**
	(0.0030)	(0.0032)	(0.0004)	(0.0005)	(0.0006)	(0.0006)
$\mathbb{1}$(Tax rate$_o$ >Tax rate$_d$)	0.1435**	0.1190*	0.0340***	0.0334**	0.0399**	0.0400*
	(0.0667)	(0.0698)	(0.0128)	(0.0132)	(0.0202)	(0.0206)
ln(Distance$_{od}$)	–0.3196***	–0.3438***	–0.0537***	–0.0554***	–0.0671***	–0.0682***
	(0.0561)	(0.0576)	(0.0110)	(0.0115)	(0.0159)	(0.0165)
$\mathbb{1}$(Common language$_{od}$)	0.3261***	0.3372***	0.0446**	0.0439**	0.0830***	0.0809***
	(0.0983)	(0.0986)	(0.0181)	(0.0185)	(0.0284)	(0.0290)
$\mathbb{1}$(Colonial link$_{od}$)	0.1905***	0.2420***	0.0393**	0.0452**	0.0496*	0.0550*
	(0.0733)	(0.0800)	(0.0181)	(0.0189)	(0.0266)	(0.0282)
$\mathbb{1}$(Contiguous countries$_{od}$)	0.2111	0.1705	0.0940***	0.0926***	0.1167***	0.1181***
	(0.1312)	(0.1303)	(0.0296)	(0.0304)	(0.0432)	(0.0453)
Destination country FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2			0.252	0.252	0.266	0.266
Observations	9,196	9,196	9,482	9,482	9,482	9,482

Notes: Estimates of equation (3). The unit of observation is a global ultimate owner p from country o in industry j. The dependent variable in columns (1) to (4) is a dummy which is equal to one if the global ultimate owner from country o owned an affiliate in country d in 2007. Columns (1) and (2) estimate equation (3) by probit regressions and columns (3) and (4) estimate using the linear probability model. The outcome in columns (5) and (6) is the inverse hyperbolic sine of the total number of affiliates owned in country d in 2007. The specifications include destination and industry fixed effects. The regressions control for bilateral distance, common language, contiguity, colonial relationship, and a dummy equal to one if the tax rate country was lower in the destination country than in the source country. The regressions additionally include the natural logarithm of GDP per capita, the GDP, and the ratio of credit over GDP of the source country as controls. The independent variables of interest are the management z-score, a dummy equal to one if the management gap is positive, and the management gap which is defined in equation (2). The sample is restricted to the country pairs in the WMS. Robust standard errors in parentheses, clustered at the source-destination country-pair level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Parent investment flows - Orbis-WMS data

	(1)	(2)	(3)	(4)	(5)	(6)
	$\mathbb{1}$(Pos. investment flow$_{pjod}$)				IHS(investment flow$_{pjod}$)	
Mean of dep var			0.049			
Management z-score$_p$	0.1183***	0.1227***	0.0073***	0.0074***	0.0116***	0.0115***
	(0.0363)	(0.0369)	(0.0027)	(0.0027)	(0.0032)	(0.0032)
$\mathbb{1}$(Positive management gap$_{od}$)	0.3658***		0.0337***		0.0336*	
	(0.1058)		(0.0108)		(0.0174)	
Management gap$_{od}$		0.8956		0.0638*		0.0053
		(0.6443)		(0.0373)		(0.0569)
ln(GDP per capita$_o$)	–0.1225	–0.2061	–0.0069	–0.0107	–0.0127	–0.0090
	(0.1323)	(0.1777)	(0.0072)	(0.0093)	(0.0109)	(0.0140)
ln(GDP$_o$)	–0.0410	–0.1476	0.0014	–0.0050	0.0048	0.0097
	(0.1457)	(0.2149)	(0.0086)	(0.0109)	(0.0131)	(0.0180)
(Credit/GDP)$_o$	0.0065	0.0079	0.0002	0.0003	0.0004	0.0004
	(0.0048)	(0.0054)	(0.0002)	(0.0003)	(0.0003)	(0.0004)
$\mathbb{1}$(Tax rate$_o$ >Tax rate$_d$)	0.0002	–0.0175	0.0113	0.0118	0.0166	0.0176
	(0.0963)	(0.1066)	(0.0081)	(0.0085)	(0.0118)	(0.0123)
ln(Distance$_{od}$)	–0.1999***	–0.2015***	–0.0104	–0.0109	–0.0198*	–0.0197*
	(0.0698)	(0.0769)	(0.0070)	(0.0074)	(0.0105)	(0.0105)
$\mathbb{1}$(Common language$_{od}$)	0.4909***	0.4688***	0.0232**	0.0216*	0.0185	0.0161
	(0.1390)	(0.1435)	(0.0110)	(0.0113)	(0.0152)	(0.0155)
$\mathbb{1}$(Colonial link$_{od}$)	–0.1087	–0.0715	–0.0018	0.0012	0.0114	0.0129
	(0.0919)	(0.1063)	(0.0093)	(0.0095)	(0.0130)	(0.0130)
$\mathbb{1}$(Contiguous countries$_{od}$)	0.1700	0.1791	0.0178	0.0192	0.0142	0.0169
	(0.1419)	(0.1508)	(0.0145)	(0.0146)	(0.0219)	(0.0214)
Destination country FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2			0.141	0.140	0.136	0.135
Observations	7,920	7,920	9,790	9,790	9,790	9,790

Notes: Estimates of equation (4). The unit of observation is a global ultimate owner p from country o in industry j. Columns (1) and (2) estimate equation (4) by probit regressions and columns (3) and (4) estimate using the linear probability model. The dependent variable in columns (1) to (4) is a dummy which is equal to one if the global ultimate owner from country o invested in country d in 2008. The dependent variable in columns (5) and (6) is the inverse hyperbolic sine of the number of investments in 2008. The specifications include destination and industry fixed effects. The regressions control for bilateral distance, common language, contiguity, colonial relationship, and a dummy equal to one if the tax rate country was lower in the destination country than in the source country. The regressions additionally include the natural logarithm of GDP per capita, the GDP and the ratio of credit over GDP of the source country as controls. The independent variables of interest are the management z-score, a dummy equal to one if the management gap is positive, and the management gap which is defined in equation (2). The sample is restricted to the country pairs in the WMS. Robust standard errors in parentheses, clustered at the source-destination country-pair level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Aggregate investment patterns - Orbis-WMS data

	(1)	(2)	(3)
	Share of firms owning an affiliate$_{od}$		
Mean of dep var	0.0082		
Positive management gap$_{od}$	0.0026		
	(0.0020)		
Management gap$_{od}$		0.0137***	0.0148***
		(0.0037)	(0.0051)
Management gap$_{od}$			0.0019
$\times \mathbb{1}$(Second distance quartile$_{od}$)			(0.0054)
Management gap$_{od}$			–0.0030
$\times \mathbb{1}$(Third distance quartile$_{od}$)			(0.0056)
Management gap$_{od}$			–0.0124**
$\times \mathbb{1}$(Fourth distance quartile$_{od}$)			(0.0059)
ln(GDP per capita$_o$)	0.0027***	0.0011	0.0013
	(0.0007)	(0.0008)	(0.0009)
ln(GDP$_o$)	0.0039***	0.0025***	0.0030***
	(0.0006)	(0.0006)	(0.0007)
(Credit/GDP)$_o$	0.000026	0.000029*	0.000032**
	(0.000016)	(0.000016)	(0.000016)
$\mathbb{1}$(Tax rate$_o$ >Tax rate$_d$)	0.0019	0.0025	0.0018
	(0.0016)	(0.0016)	(0.0017)
ln(Distance$_{od}$)	–0.0014	–0.0018	–0.0034
	(0.0013)	(0.0013)	(0.0027)
$\mathbb{1}$(Common language$_{od}$)	0.0062*	0.0057	0.0053
	(0.0036)	(0.0036)	(0.0036)
$\mathbb{1}$(Colonial link$_{od}$)	0.0008	0.0015	0.0022
	(0.0052)	(0.0052)	(0.0048)
$\mathbb{1}$(Contiguous countries$_{od}$)	0.0090	0.0085	0.0066
	(0.0057)	(0.0057)	(0.0052)
Destination country FE	Yes	Yes	Yes
R^2	0.371	0.380	0.403
Observations	462	462	462

Notes: Estimates of equation (5). The unit of observation is a country pair in the World Management Survey. The dependent variable is the share of domestic firms surveyed from country o that owned at least one affiliate in country d in 2007. The regressions control for bilateral distance, common language, contiguity, colonial relationship, and a dummy equal to one if the tax rate country was lower in the destination country than in the source country. The regressions additionally include the natural logarithm of GDP per capita, the GDP, and the ratio of credit over GDP of the source country as controls. Column (3) additionally controls for four bins for each quartile of the distance distribution across country pairs. Column (1) uses as independent variable of interest a dummy equal to one if the management gap is positive and columns (2) and (3) use the management gap as defined in (2). Column (3) examines heterogeneity of the management gap with respect to distance. Robust standard errors in parentheses, clustered at the source-destination country-pair level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Acquisition dynamics - Zephyr-WMS data

	(1) $\ln(\text{empl.}_{apjodqt})$	(2) $\ln(\text{sales}_{apjodqt})$	(3) $\ln(\text{l.p.}_{apjodqt})$	(4) $\hat{\mu}_{apjodqt}$	(5) $\ln(\text{v.a.}_{apjodqt})$
$\text{Management}_{pq}^{parent}$	–0.0960	–0.0038	0.1192**	0.0605	0.1064
$\times \mathbb{1}(\text{takeover}_{\text{1-3 years}}^{post})$	(0.0789)	(0.0720)	(0.0537)	(0.0427)	(0.0798)
$\text{Management}_{pq}^{parent}$	–0.1207	–0.1363	0.0753	0.1271*	0.1311*
$\times \mathbb{1}(\text{takeover}_{\text{4-6 years}}^{post})$	(0.1243)	(0.1250)	(0.0806)	(0.0672)	(0.0712)
$\mathbb{1}(\text{Takeover}_{\text{1-3 years}}^{post})$	0.4252**	1.0172***	1.9904***	–0.6587**	–0.1405
	(0.1741)	(0.1788)	(0.1245)	(0.2694)	(0.3922)
$\mathbb{1}(\text{Takeover}_{\text{4-6 years}}^{post})$	0.4171	–0.3196	4.4376***	1.4262**	–0.3083
	(0.3413)	(0.3032)	(0.1954)	(0.6161)	(0.3964)
Continent FE $\times$ $\mathbb{1}(\text{takeover}_{\text{1-3, 4-6 years}}^{post})$	Yes	Yes	Yes	Yes	Yes
Industry FE $\times$ $\mathbb{1}(\text{takeover}_{\text{1-3, 4-6 years}}^{post})$	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Affiliate FE	Yes	Yes	Yes	Yes	Yes
R^2	0.133	0.142	0.207	0.133	0.148
Number of acquisitions	256	241	225	163	132
Observations	1,714	1,685	1,398	1,044	763

Notes: Estimates of equation (6). The unit of observation is an affiliate a in country d, of parent p from country o, industry j, acquired at date q, and the outcome is observed at time t. The dependent variables are the natural logarithm of employment, sales, labor productivity, the Solow residual from a Cobb-Douglas estimation, and the natural logarithm of value added per employee. The independent variables of interest are the interactions between the parent management z-score and two dummies capturing the dynamics post-acquisition. The dummies are equal to one, 1 to 3 years and 4 to 6 years post-acquisition, respectively, and zero otherwise. Robust standard errors in parentheses, clustered at the parent level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: Acquisition dynamics - BSD-WMS data

	(1)	(2)
	$\ln(\text{empl.}_{apjodqt})$	
Management z-score$^{parent}_{pq}$	0.0016	
$\times \mathbb{1}(\text{takeover}^{post}_{\text{1-3 years}})$	(0.0336)	
Management z-score$^{parent}_{pq}$	−0.1176	
$\times \mathbb{1}(\text{takeover}^{post}_{\text{4-6 years}})$	(0.0743)	
People z-score$^{parent}_{pq}$		−0.0283
$\times \mathbb{1}(\text{takeover}^{post}_{\text{1-3 years}})$		(0.0442)
People z-score$^{parent}_{pq}$		−0.1896**
$\times \mathbb{1}(\text{takeover}^{post}_{\text{4-6 years}})$		(0.0900)
$\mathbb{1}(\text{Takeover}^{post}_{\text{1-3 years}})$	0.0465	0.1340
	(0.1066)	(0.1517)
$\mathbb{1}(\text{Takeover}^{post}_{\text{4-6 years}})$	−0.4180***	−0.5207***
	(0.0742)	(0.0953)
Time FE	Yes	Yes
Industry FE $\times$ $\mathbb{1}(\text{takeover}^{post}_{\text{1-3, 4-6 years}})$	Yes	Yes
Affiliate FE	Yes	Yes
R^2	0.082	0.087
Number of acquisitions	723	723
Observations	5,838	5,838

Notes: Estimates of equation (6). The unit of observation is a plant a in destination d (the UK), of parent p from country o, industry j, acquired at date q, and the outcome is observed at time t. The dependent variable is the natural logarithm of employment. The independent variables of interest in column (1) are the interactions between the parent management z-score and two dummies capturing the dynamics post-acquisition. The independent variables of interest in column (2) are the interactions of the parent people z-score with two dummies capturing the dynamics post-acquisition. The parent people z-score is defined as the average across six questions concerning people management. The dummies are equal to one, 1 to 3 years and 4 to 6 years post-acquisition, respectively, and zero otherwise. Robust standard errors in parentheses, clustered at the parent level. Source: ONS BSD data set merged with WMS data, own calculations. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 8: Acquisition dynamics - Zephyr-WMS data: heterogeneity by management gap

	(1) $\ln(\text{empl.}_{apjodqt})$	(2) $\ln(\text{sales}_{apjodqt})$	(3) $\ln(\text{l.p.}_{apjodqt})$	(4) $\hat{\mu}_{apjodqt}$	(5) $\ln(\text{v.a.}_{apjodqt})$
$\text{Management}_{pq}^{parent}$	0.1285**	0.0951	–0.0224	0.0031	–0.0795
$\times \mathbb{1}(\text{takeover}_{\text{1-3 years}}^{post})$	(0.0556)	(0.0952)	(0.0578)	(0.0731)	(0.1028)
$\text{Management}_{pq}^{parent}$	0.0131	–0.0194	–0.0131	0.1046	0.1878*
$\times \mathbb{1}(\text{takeover}_{\text{4-6 years}}^{post})$	(0.1383)	(0.1871)	(0.0774)	(0.0973)	(0.1061)
$\text{Management}_{pq}^{parent}$	–0.5334***	–0.1338	0.2186**	0.0783	0.1928
$\times \mathbb{1}(\text{takeover}_{\text{1-3 years}}^{post})$	(0.1407)	(0.1539)	(0.0868)	(0.0876)	(0.1414)
$\times \mathbb{1}(\text{Man. gap}_{\text{od}} > \text{Man. gap}_{\text{med}})$					
$\text{Management}_{pq}^{parent}$	–0.4550*	–0.2337	0.0282	–0.0941	–0.0524
$\times \mathbb{1}(\text{takeover}_{\text{4-6 years}}^{post})$	(0.2622)	(0.2807)	(0.1344)	(0.1212)	(0.1868)
$\times \mathbb{1}(\text{Man. gap}_{\text{od}} > \text{Man. gap}_{\text{med}})$					
$\mathbb{1}(\text{Takeover}_{\text{1-3 years}}^{post})$	0.3907**	0.8208***	1.7064***	–0.6773**	0.2142
	(0.1685)	(0.1865)	(0.1170)	(0.2708)	(0.3774)
$\mathbb{1}(\text{Takeover}_{\text{4-6 years}}^{post})$	0.3502	1.1155**	4.6552***	1.3906**	0.5512
	(0.3520)	(0.4857)	(0.2729)	(0.6573)	(0.4800)
Continent FE $\times$ $\mathbb{1}(\text{takeover}_{\text{1-3, 4-6 years}}^{post})$	Yes	Yes	Yes	Yes	Yes
Industry FE $\times$ $\mathbb{1}(\text{takeover}_{\text{1-3, 4-6 years}}^{post})$	Yes	Yes	Yes	Yes	Yes
$\mathbb{1}(\text{Man. gap}_{\text{od}} > \text{Man. gap}_{\text{med}})$	Yes	Yes	Yes	Yes	Yes
$\times \mathbb{1}(\text{takeover}_{\text{1-3, 4-6 years}}^{post})$					
Time FE	Yes	Yes	Yes	Yes	Yes
Affiliate FE	Yes	Yes	Yes	Yes	Yes
R^2	0.201	0.143	0.209	0.140	0.162
Number of acquisitions	182	182	169	119	96
Observations	1,228	1,333	1,106	803	630

Notes: Estimates of equation (6). The unit of observation is an affiliate a in country d, of parent p from country o, industry j, acquired at date q, and the outcome is observed at time t. The dependent variables are the natural logarithm of employment, sales, labor productivity, the Solow residual, and the natural logarithm of value added per employee. The independent variables of interest are the interactions between the parent management z-score and two dummies capturing the dynamics post-acquisition as well as the triple interaction with a dummy equal to one if the management gap is above the median across country pairs. The dummies are equal to one, 1 to 3 years and 4 to 6 years post-acquisition, respectively, and zero otherwise. Robust standard errors in parentheses, clustered at the parent level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 9: Acquisition dynamics - Zephyr-WMS data: heterogeneity by GDP per capita in host country

	(1) $\ln(\text{empl.}_{apjodqt})$	(2) $\ln(\text{sales}_{apjodqt})$	(3) $\ln(\text{l.p.}_{apjodqt})$	(4) $\hat{\mu}_{apjodqt}$	(5) $\ln(\text{v.a.}_{apjodqt})$
$\text{Management}_{pq}^{parent}$	0.0356	0.0017	0.0273	–0.0422	0.0439
$\times \mathbb{1}(\text{takeover}_{\text{1-3 years}}^{post})$	(0.0743)	(0.0885)	(0.0523)	(0.0546)	(0.0899)
$\text{Management}_{pq}^{parent}$	–0.0754	–0.0349	–0.0138	–0.0019	0.2074**
$\times \mathbb{1}(\text{takeover}_{\text{4-6 years}}^{post})$	(0.0946)	(0.1082)	(0.0614)	(0.0406)	(0.0849)
$\text{Management}_{pq}^{parent}$	–0.2706*	–0.0348	0.1646*	0.1589*	0.0720
$\times \mathbb{1}(\text{takeover}_{\text{1-3 years}}^{post})$	(0.1612)	(0.1505)	(0.0959)	(0.0821)	(0.1332)
$\times \mathbb{1}(\text{GDPpc}_d < \text{GDPpc}_{d,med})$					
$\text{Management}_{pq}^{parent}$	–0.1468	–0.2388	0.1767	0.2386**	–0.1046
$\times \mathbb{1}(\text{takeover}_{\text{4-6 years}}^{post})$	(0.2279)	(0.2151)	(0.1576)	(0.1131)	(0.1157)
$\times \mathbb{1}(\text{GDPpc}_d < \text{GDPpc}_{d,med})$					
$\mathbb{1}(\text{Takeover}_{\text{1-3 years}}^{post})$	0.6018**	1.1620***	2.0009***	–0.6636**	–0.0933
	(0.2450)	(0.2079)	(0.1804)	(0.3047)	(0.4035)
$\mathbb{1}(\text{Takeover}_{\text{4-6 years}}^{post})$	1.1304***	–0.1282	4.5560***	1.4227**	–0.2729
	(0.3524)	(0.3324)	(0.1596)	(0.6290)	(0.4092)
Continent FE $\times$ $\mathbb{1}(\text{takeover}_{\text{1-3, 4-6 years}}^{post})$	Yes	Yes	Yes	Yes	Yes
Industry FE $\times$ $\mathbb{1}(\text{takeover}_{\text{1-3, 4-6 years}}^{post})$	Yes	Yes	Yes	Yes	Yes
$\mathbb{1}(\text{GDPpc}_d < \text{GDPpc}_{d,med})$ $\times \mathbb{1}(\text{takeover}_{\text{1-3, 4-6 years}}^{post})$	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Affiliate FE	Yes	Yes	Yes	Yes	Yes
R^2	0.155	0.162	0.212	0.145	0.151
Number of acquisitions	256	241	225	163	132
Observations	1,714	1,685	1,398	1,044	763

Notes: Estimates of equation (6). The unit of observation is an affiliate a in country d, of parent p from country o, industry j, acquired at date q, and the outcome is observed at time t. The dependent variables are the natural logarithm of employment, sales, labor productivity, the Solow residual, and the natural logarithm of value added per employee. The independent variables of interest are the interactions between the parent management z-score and two dummies capturing the dynamics post-acquisition as well as the triple interaction with a dummy equal to one if the real GDP per capita was below the median across countries at the time of the acquisition. The dummies are equal to one, 1 to 3 years and 4 to 6 years post-acquisition, respectively, and zero otherwise. Robust standard errors in parentheses, clustered at the parent level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 10: Acquisition dynamics - Zephyr-WMS data: heterogeneity by parent size

	(1) $\ln(\text{empl.}_{apjodqt})$	(2) $\ln(\text{sales}_{apjodqt})$	(3) $\ln(\text{l.p.}_{apjodqt})$	(4) $\hat{\mu}_{apjodqt}$	(5) $\ln(\text{v.a.}_{apjodqt})$
$\text{Management}_{pq}^{parent}$	–0.1519	–0.0204	0.1935**	0.1303**	0.2600*
$\times \mathbb{1}(\text{takeover}_{\text{1-3 years}}^{post})$	(0.1436)	(0.1182)	(0.0856)	(0.0562)	(0.1347)
$\text{Management}_{pq}^{parent}$	–0.1724	–0.2532	0.0521	0.1317	0.1461
$\times \mathbb{1}(\text{takeover}_{\text{4-6 years}}^{post})$	(0.2371)	(0.1981)	(0.1490)	(0.1080)	(0.1296)
$\text{Management}_{pq}^{parent}$	0.0961	0.0410	–0.1411	–0.1266	–0.2523
$\times \mathbb{1}(\text{takeover}_{\text{1-3 years}}^{post})$	(0.1755)	(0.1530)	(0.1070)	(0.0875)	(0.1562)
$\times \mathbb{1}(\text{empl}_{poq}^{parent} < \text{empl}_{poq,med}^{parent})$					
$\text{Management}_{pq}^{parent}$	0.0980	0.2665	0.0294	–0.0166	–0.0141
$\times \mathbb{1}(\text{takeover}_{\text{4-6 years}}^{post})$	(0.2724)	(0.2202)	(0.1610)	(0.1333)	(0.1496)
$\times \mathbb{1}(\text{empl}_{poq}^{parent} < \text{empl}_{poq,med}^{parent})$					
$\mathbb{1}(\text{Takeover}_{\text{1-3 years}}^{post})$	0.4255**	0.9481***	1.9943***	–0.5605**	0.0322
	(0.2033)	(0.2023)	(0.1448)	(0.2538)	(0.3617)
$\mathbb{1}(\text{Takeover}_{\text{4-6 years}}^{post})$	0.3927	–0.5987	4.5936***	1.3480**	–0.3980
	(0.4024)	(0.3980)	(0.2893)	(0.6527)	(0.4347)
Continent FE $\times$ $\mathbb{1}(\text{takeover}_{\text{1-3, 4-6 years}}^{post})$	Yes	Yes	Yes	Yes	Yes
Industry FE $\times$ $\mathbb{1}(\text{takeover}_{\text{1-3, 4-6 years}}^{post})$	Yes	Yes	Yes	Yes	Yes
$\mathbb{1}(\text{empl}_{poq}^{parent} < \text{empl}_{poq,med}^{parent})$	Yes	Yes	Yes	Yes	Yes
$\times \mathbb{1}(\text{takeover}_{\text{1-3, 4-6 years}}^{post})$					
Time FE	Yes	Yes	Yes	Yes	Yes
Affiliate FE	Yes	Yes	Yes	Yes	Yes
R^2	0.137	0.149	0.214	0.137	0.158
Number of acquisitions	256	241	225	163	132
Observations	1,714	1,685	1,398	1,044	763

Notes: Estimates of equation (6). The unit of observation is an affiliate a in country d, of parent p from country o, industry j, acquired at date q, and the outcome is observed at time t. The dependent variables are the natural logarithm of employment, sales, labor productivity, the Solow residual, and the natural logarithm of value added per employee. The independent variables of interest are the interactions between the parent management z-score and two dummies capturing the dynamics post-acquisition as well as the triple interaction with a dummy equal to one if the parent employment was below median across parents in the Zephyr-WMS data. The dummies are equal to one, 1 to 3 years and 4 to 6 years post-acquisition, respectively, and zero otherwise. Robust standard errors in parentheses, clustered at the parent level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 11: Manager from parent country post acquisition - Zephyr-WMS data

	(1)	(2)
	$\mathbb{1}$(manager from parent cty$^{post}_{apjodq}$)	
Mean of dep var	0.79	
Management$^{parent}_{pq}$	0.0410	
	(0.0410)	
People$^{parent}_{pq}$		0.1085***
		(0.0393)
Continent FE	Yes	Yes
Industry FE	Yes	Yes
Number of managers from Orbis	Yes	Yes
R^2	0.230	0.278
Observations	100	100

Notes: Estimates of equation (7). The unit of observation is an affiliate a in country d, of parent p from country o, industry j, acquired at date q. The dependent variable is a dummy equal to one, if there was a director, manager or advisor from the parent country at the board of the affiliate post-acquisition. The independent variable in column (1) is the parent management z-score and in column (2) is the parent people z-score, which is the average across six questions concerning people management. The regressions control for the number of managers with nationality information post acquisition from Orbis. Robust standard errors in parentheses, clustered at the parent level. * p $<$ 0.1, ** p $<$ 0.05, *** p $<$ 0.01.

7 Online Appendix

World Management Survey country list

Confidential firm-level data are obtained for countries from the World Management Survey (WMS). The data come from survey waves between 2001 and 2014. The following countries are included in the sample:

Argentina, Australia, Brazil, Canada, Chile, China, France, Germany, Great Britain, Greece, India, Italy, Japan, Mexico, New Zealand, Poland, Portugal, Republic of Ireland, Singapore, Spain, Sweden, Turkey, and the United States.

CEPII

Gravity variables such as bilateral distance between countries are retrieved from Centre d'etudes prospectives et d'informations internationales (CEPII) Geodist Dataset and Gravity Dataset.

Centre d'etudes prospectives et d'informations internationales (CEPII) (2017) GeoDist Dataset. Available at `http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=6` (accessed on 11/10/2017).

Centre d'etudes prospectives et d'informations internationales (CEPII) (2017) Gravity Dataset. Available at `http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=8` (accessed on 11/10/2017).

World Bank

GDP per capita, GDP, and credit to GDP data were retrieved from the World Bank database (`https://data.worldbank.org/indicator/`) on 15/11/2017.

Center for Business Taxation, University of Oxford

Statutory corporate tax rates come from the Center for Business Taxation.

Habu, Katarzyna (2017). "Centre for Business Taxation Tax Database 2017." University of Oxford.

Sample questions manufacturing World Management Survey

Example operations practices: Introducing lean (modern) techniques
a) Can you describe the production process for me?
b) What kind of lean (modern) manufacturing processes have you introduced?
How long has this practice been in place? Can you give me specific examples?
c) How do you manage inventory levels? What is done to balance the line?
What is the takt time of your manufacturing process?

Score 1: Other than JIT delivery from suppliers few modern manufacturing
techniques have been introduced (or have been introduced in an ad-hoc manner).
Score 3: Some aspects of modern (lean) manufacturing techniques have
been introduced, through informal/isolated change programmes.
Score 5: All major aspects of modern/lean manufacturing have been
introduced (Just-in-time, autonomation, flexible manpower, support systems, attitudes and behavior)
in a formal way.

Example monitoring practices: performance tracking
a) What kind of KPIs would you use for performance tracking?
b) How frequently are these measured? Who gets to see this KPI data?
c) If I were to walk through your factory could I tell how you were doing against your KPIs?

Score 1: Measures tracked do not indicate directly if overall business objectives are
being met. Tracking is an ad-hoc process (certain processes aren't tracked at all).
Score 3: Most key performance indicators are tracked formally; tracking
is overseen by senior management.
Score 5: Performance is continuously tracked and communicated, both
formally and informally, to all staff using a range of visual management tools.

Example targets practices: Time horizon of targets
a) What kind of time scale are you looking at with your targets?
b) Which goals receive the most emphasis?
c) Are long term and short term goals set independently?
d) Could you meet all your short-run goals but miss your long-run goals?

Score 1: Top management's main focus is on short-term targets.
Score 3: There are short-term and long-term goals for all levels of
the organization. As they are set independently, they are not necessarily linked to each other.
Score 5: Long term goals are translated into specific short term
targets so that short term targets become a "staircase" to
reach long term goals.

Example people practices: Removing poor performers / making room for talent

a) If you had a worker who could not do his job what would you do? Could you give me a recent example?

b) How long would underperformance be tolerated?

c) Do you find any workers who lead a sort of charmed life?

Do some individuals always just manage to avoid being fixed/fired?

Score 1: Poor performers are rarely removed from their positions.

Score 3: Suspected poor performers stay in a position for a few years before action is taken.

Score 5: We move poor performers out of the company or to less critical roles as soon as a weakness is identified.

Definition of the management z-score over time

The World Management Survey is a cross section for most companies in the survey. The construction of the management score over time can be explained by using the example of a firm with two management z-scores in 2006 and 2010.

Table A.1: Defining the management z-score over time

Year	Definition 1 management z-score	Definition 2 management z-score
2007	2006	2006
2008	2006	2006
2009	2006	2010
2010	2010	2010
2011	2010	2010
2012	2010	2010
2013	2010	2010
2014	2010	2010

There are two ways of making the management score consistent with other data varying over time. First, use the most recent interview score until a new interview score is available. In the example, the second interview was held in 2010 and hence the variable changes in 2010. Alternatively, the time difference between the year of the interview and the corresponding year of ownership and financial information is minimized. Then, the management variable takes the interview score in 2010 already from 2009 as the time difference is one and smaller than the time difference of three between 2006 and 2009. The reported estimates throughout the paper are based on definition 1 in Table A.1, but the results are robust to using the other definitions.

Table A.2: Parent investment flows robustness conditional logit - Orbis-WMS data

	(1)
	$\mathbb{1}$(Pos. investment flow$_{pjod}$)
Mean of dep var	0.049
$\mathbb{1}$(Positive management gap$_{od}$)	0.9776***
	(0.2212)
$\mathbb{1}$(Tax rate$_o$ >Tax rate$_d$)	0.0178
	(0.2174)
ln(Distance$_{od}$)	–0.4572***
	(0.1207)
$\mathbb{1}$(Common language$_{od}$)	0.9407***
	(0.2871)
$\mathbb{1}$(Colonial link$_{od}$)	–0.0227
	(0.2385)
$\mathbb{1}$(Contiguous countries$_{od}$)	0.2469
	(0.2962)
Destination Country FE	Yes
Industry FE	Yes
Observations	4,488

Notes: Estimates of equation (4). The unit of observation is a global ultimate owner p from country o in industry j. Columns (1) estimates equation (4) using a conditional logit grouping by parent. The dependent variable is a dummy which is equal to one if the global ultimate owner from country o invested in country d in 2008. The regressions control for bilateral distance, common language, contiguity, colonial relationship, and a dummy equal to one if the tax rate country was lower in the destination country than in the source country. The independent variable of interest is a dummy equal to one if the management gap is positive, as defined in (2). The sample is restricted to the country pairs in the WMS. Robust standard errors in parentheses, clustered at the parent level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.3: Source-country management variation - Orbis-WMS data

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	management z-score$_{pjot}$							
Sample period	2007	2008	2009	2010	2011	2012	2013	2014
Source-country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.141	0.141	0.138	0.129	0.103	0.129	0.123	0.136
Observations	475	488	487	453	433	403	402	382

Notes: The unit of observation is a global ultimate owner p from country o in industry j at time t. The dependent variable is the management z-score of the global ultimate owner. The specification includes source-country fixed effects.

Table A.4: Acquisition dynamics - Zephyr-WMS data: controlling for parent size

	(1) $\ln(\text{empl.}_{apjodqt})$	(2) $\ln(\text{sales}_{apjodqt})$	(3) $\ln(\text{l.p.}_{apjodqt})$	(4) $\hat{\mu}_{apjodqt}$	(5) $\ln(\text{v.a.}_{apjodqt})$
$\text{Management}_{pq}^{parent}$	–0.0962	0.0079	0.1133**	0.0600	0.0958
$\times \mathbb{1}(\text{takeover}_{\text{1-3 years}}^{post})$	(0.0787)	(0.0676)	(0.0514)	(0.0419)	(0.0833)
$\text{Management}_{pq}^{parent}$	–0.1178	–0.1036	0.0660	0.1270*	0.1190
$\times \mathbb{1}(\text{takeover}_{\text{4-6 years}}^{post})$	(0.1211)	(0.1057)	(0.0778)	(0.0671)	(0.0735)
$\mathbb{1}(\text{Takeover}_{\text{1-3 years}}^{post})$	0.4343	1.4598***	1.7042***		–0.2621
	(0.3434)	(0.4494)	(0.1974)		(0.4112)
$\mathbb{1}(\text{Takeover}_{\text{4-6 years}}^{post})$	0.5730	0.2478	4.0883***	1.2440**	–0.5310
	(0.7759)	(0.6386)	(0.3271)	(0.5813)	(0.6339)
$\ln(\text{empl.}_{pq}^{parent})$	–0.0015	–0.0639	0.0394*	0.0013	0.0289
$\times \mathbb{1}(\text{takeover}_{\text{1-3 years}}^{post})$	(0.0412)	(0.0594)	(0.0207)	(0.0165)	(0.0330)
$\ln(\text{empl.}_{pq}^{parent})$	–0.0203	–0.1184	0.0450		0.0420
$\times \mathbb{1}(\text{takeover}_{\text{4-6 years}}^{post})$	(0.0774)	(0.1170)	(0.0298)		(0.0752)
Continent FE $\times$ $\mathbb{1}(\text{takeover}_{\text{1-3, 4-6 years}}^{post})$	Yes	Yes	Yes	Yes	Yes
Industry FE $\times$ $\mathbb{1}(\text{takeover}_{\text{1-3, 4-6 years}}^{post})$	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Affiliate FE	Yes	Yes	Yes	Yes	Yes
R^2	0.133	0.149	0.211	0.133	0.150
Number of acquisitions	256	241	225	163	132
Observations	1,714	1,685	1,398	1,044	763

Notes: Estimates of equation (6). The unit of observation is an affiliate a in country d, of parent p from country o, industry j, acquired at date q, and the outcome is observed at time t. The dependent variables are the natural logarithm of employment, sales, labor productivity, the Solow residual, and the natural logarithm of value added per employee. The independent variables of interest are the interactions between the parent management z-score and two dummies capturing the dynamics post-acquisition. The dummies are equal to one, 1 to 3 years and 4 to 6 years post-acquisition, respectively, and zero otherwise. Robust standard errors in parentheses, clustered at the parent level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.5: Acquisition dynamics - Zephyr-WMS data: pre-determined parent management scores

	(1) $\ln(\text{empl.}_{apjodqt})$	(2) $\ln(\text{sales}_{apjodqt})$	(3) $\ln(\text{l.p.}_{apjodqt})$	(4) $\hat{\mu}_{apjodqt}$	(5) $\ln(\text{v.a.}_{apjodqt})$
$\text{Management}_{pq}^{parent}$	–0.0432	0.0221	0.0967**	0.0463	0.0483
$\times \mathbb{1}(\text{takeover}_{\text{1-3 years}}^{post})$	(0.0705)	(0.0755)	(0.0449)	(0.0415)	(0.0741)
$\text{Management}_{pq}^{parent}$	–0.1318	–0.1632	0.0410	0.1231*	0.1179
$\times \mathbb{1}(\text{takeover}_{\text{4-6 years}}^{post})$	(0.0968)	(0.1330)	(0.0822)	(0.0650)	(0.0847)
$\mathbb{1}(\text{Takeover}_{\text{1-3 years}}^{post})$	0.4238**	1.0470***	2.0503***	–0.6108**	–0.0639
	(0.1690)	(0.1723)	(0.1234)	(0.2675)	(0.3619)
$\mathbb{1}(\text{Takeover}_{\text{4-6 years}}^{post})$	–0.2788	1.0456***	4.5233***	1.5289**	–0.1571
	(0.2295)	(0.2570)	(0.2105)	(0.6172)	(0.3531)
Continent FE $\times$ $\mathbb{1}(\text{takeover}_{\text{1-3, 4-6 years}}^{post})$	Yes	Yes	Yes	Yes	Yes
Industry FE $\times$ $\mathbb{1}(\text{takeover}_{\text{1-3, 4-6 years}}^{post})$	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Affiliate FE	Yes	Yes	Yes	Yes	Yes
R^2	0.225	0.153	0.194	0.121	0.170
Number of acquisitions	208	194	181	131	105
Observations	1,377	1,356	1,121	820	600

Notes: Estimates of equation (6). The unit of observation is an affiliate a in country d, of parent p from country o, industry j, acquired at date q, and the outcome is observed at time t. The dependent variables are the natural logarithm of employment, sales, labor productivity, the Solow residual, and the natural logarithm of value added per employee. The independent variables of interest are the interactions between the parent management z-score and two dummies capturing the dynamics post-acquisition. The dummies are equal to one, 1 to 3 years and 4 to 6 years post-acquisition, respectively, and zero otherwise. The sample is restricted to acquisitions for which the parent was surveyed not later than the acquisition year q. Robust standard errors in parentheses, clustered at the parent level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.6: Acquisition dynamics - Zephyr-WMS data: minimum of 6 observations per affiliate

	(1) $\ln(\text{empl.}_{apjodqt})$	(2) $\ln(\text{sales}_{apjodqt})$	(3) $\ln(\text{l.p.}_{apjodqt})$	(4) $\hat{\mu}_{apjodqt}$	(5) $\ln(\text{v.a.}_{apjodqt})$
$\text{Management}_{pq}^{parent}$	–0.1130	–0.0264	0.0966*	0.0634	0.0753
$\times \mathbb{1}(\text{takeover}_{\text{1-3 years}}^{post})$	(0.0796)	(0.0712)	(0.0492)	(0.0437)	(0.0689)
$\text{Management}_{pq}^{parent}$	–0.1860	–0.1396	0.0918	0.1258*	0.1598*
$\times \mathbb{1}(\text{takeover}_{\text{4-6 years}}^{post})$	(0.1252)	(0.1241)	(0.0745)	(0.0682)	(0.0852)
$\mathbb{1}(\text{Takeover}_{\text{1-3 years}}^{post})$	0.0898	1.0817***	–0.4052	–0.6132**	–0.1636
	(0.3323)	(0.1844)	(0.2700)	(0.2624)	(0.4092)
$\mathbb{1}(\text{Takeover}_{\text{4-6 years}}^{post})$	–0.5494*	–1.8167***	0.0790	–0.3189	–0.2341
	(0.3265)	(0.3610)	(0.2273)	(0.3219)	(0.5014)
Continent FE $\times$ $\mathbb{1}(\text{takeover}_{\text{1-3, 4-6 years}}^{post})$	Yes	Yes	Yes	Yes	Yes
Industry FE $\times$ $\mathbb{1}(\text{takeover}_{\text{1-3, 4-6 years}}^{post})$	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Affiliate FE	Yes	Yes	Yes	Yes	Yes
R^2	0.188	0.161	0.236	0.103	0.178
Number of acquisitions	156	164	131	101	66
Observations	1,406	1,473	1,125	876	582

Notes: Estimates of equation (6). The unit of observation is an affiliate a in country d, of parent p from country o, industry j, acquired at date q, and the outcome is observed at time t. The dependent variables are the natural logarithm of employment, sales, labor productivity, the Solow residual, and the natural logarithm of value added per employee. The independent variables of interest are the interactions between the parent management z-score and two dummies capturing the dynamics post-acquisition. The dummies are equal to one, 1 to 3 years and 4 to 6 years post-acquisition, respectively, and zero otherwise. The sample is restricted to affiliates with at least six non-missing observations by outcome. Robust standard errors in parentheses, clustered at the parent level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.