

Labor Market Institutions and Global Strategic Adaptation: Evidence from Lincoln Electric

Jordan I. Siegel, Barbara Zepp Larson

Harvard Business School, Harvard University, Boston, Massachusetts 02163
{jsiegel@hbs.edu, blarson@hbs.edu}

Although one of the central questions in the global strategy field is how multinational firms successfully navigate multiple and often conflicting institutional environments, we know relatively little about the effect of conflicting labor market institutions on multinational firms' strategic choice and operating performance. With its decision to invest in manufacturing operations in nearly every one of the world's largest welding markets, Lincoln Electric offers us a quasi-experiment. We leverage a unique data set covering 1996–2006 that combines data on each host country's labor market institutions with data on each subsidiary's strategic choices and historical operating performance. We find that Lincoln Electric performed significantly better in countries with labor laws and regulations supporting manufacturers' interests and in countries that allowed the free use of both piecework and a discretionary bonus. Furthermore, we find that in countries with labor market institutions unfriendly to manufacturers, Lincoln Electric was still able to overcome most (although not all) of the institutional distance by what we term flexible intermediate adaptation.

Key words: global strategy; institutions; labor market; adaptation; complementarity

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1. Introduction

One of the most significant questions in global strategy is how multinational firms should navigate multiple and often conflicting institutional environments (Ghoshal and Westney 1992, Morgan et al. 2001). Although most foreign direct investment (FDI) is still conducted by companies whose profitability is derived largely from labor productivity, we still know surprisingly little about whether and how much labor market institutions (defined as formal and informal rules governing the labor market) matter for the profitability of FDI. Despite earlier calls for research in this area (Rosenzweig and Singh 1991), there has been little work done on the effect of labor market institutions on multinational firms' strategic choice and performance, and key questions remain understudied. Under what conditions should multinational firms simply avoid institutionally incompatible environments, and what makes an environment institutionally incompatible? How much should multinationals adapt to different institutional environments? Past studies have examined the likelihood of organizational practice transfer abroad, but few have examined the effect of adaptation on multinational performance. Adaptation is a critical international business strategy (Ghemawat 2007), yet a recent literature review shows that little is

known about the optimal level of adaptation by multinationals to *any* local market institutions (Dow 2006).¹

To shed more light on these questions, we leverage a unique quasi-natural experiment. Lincoln Electric long ago decided to be present in nearly all of the world's largest welding markets, regardless of each market's labor institutions. We show that summary statistics of key labor market measures for the countries in which Lincoln Electric operates closely resemble the same statistics for the wider universe of countries. And although Lincoln Electric is unusual for its broad global footprint, it is representative of a wider universe of horizontal U.S. multinational enterprises (those producing and selling in foreign markets to foreign consumers).² Lincoln Electric (hereafter referred to as "Lincoln" or "Lincoln Electric") is a much-studied company operating in a representative manufacturing industry

¹ Prior literature is divided between those studies emphasizing the local pressures to adapt (e.g., Rosenzweig and Nohria 1994, Kostova 1999) and those arguing that multinationals should maintain consistency and not adapt when their firm's practices are superior or complex (e.g., Zaheer 1995, Szulanski and Jensen 2006).

² Bognanno et al. (2005) show how U.S. multinational firms from 1982 to 1991 preferred to avoid host countries with strong unions and work councils but would still enter when the market was large.

where profits have historically been derived largely from labor productivity. Furthermore, Lincoln Electric pioneered many incentive practices—particularly the discretionary bonus—that have been widely adopted by other firms.

One of the reasons for the lack of studies of multinational firms and conflicting labor market institutions is that it is costly to measure each country's labor market institutions, and difficult to interview managers from every host country for even a single multinational firm. Over a two-year period, we interviewed Lincoln Electric managers and local labor market experts around the globe, and studied local labor laws and regulations, which allowed us to implement what we believe is the first quasi-natural experiment on the effect of diverse labor market institutions on a global firm's strategic choices and performance. We find that Lincoln Electric performed significantly better in countries with labor laws and regulations supporting manufacturers' interests and allowing unconstrained use of incentive pay-for-performance. In countries with less friendly labor market institutions, Lincoln was still able to enhance its performance significantly by what we term *flexible intermediate adaptation*.

Together, these findings suggest that the theory of strategic complementarity (Milgrom and Roberts 1995, Ichniowski and Shaw 2003) needs to be made more institutionally contingent. A bundle of managerial practices may be complementary (with payoffs for each increasing in the presence of the others), but complementarity may be predicated on the host country's institutional characteristics, such as a pro-labor or a pro-capitalist orientation. Practices that complement each other in the United States may not do so in a different institutional environment. The multinational should be aware of the effect of labor market institutions on performance, and may need to consider moving its resources to friendlier institutional environments if the effect is large enough. If a firm needs to be in a given market for other reasons (such as market size), the optimal mix of labor market practices needs to be customized in a flexible, intermediate form of adaptation. The optimal mix of labor practices for Lincoln Electric is typically different across countries, and successful adaptations emerge from managers' optimizing between the practices employed in Lincoln's flagship U.S. operation and host-country customary practices.

We proceed as follows. First, we discuss why some societies restrict incentive pay-for-performance, and then we introduce Lincoln Electric and its business strategy, including caselets illustrating Lincoln Electric managers' flexible adaptation to institutional environments. We then discuss our method for the quasi-experiment, followed by description of the data, our results, and conclusions.

2. Labor Power and Why Some Countries Place Constraints on the Use of Incentive Pay

Incentive pay-for-performance can be a highly effective form of compensation benefiting both employer (via increased productivity) and worker (via increased pay) simultaneously (Lazear 2000). Yet, organized labor has traditionally often opposed the unconstrained use of incentive pay-for-performance (Kennedy 1945), both lobbying for formal legal restrictions on specific practices and opposing the unconstrained application of incentive pay inside companies. In this section, we describe the fundamental challenge of pay-for-performance, and organized labor's traditional objections to certain incentive practices. We then use the theory of egalitarianism (Siegel et al. 2008), drawn from political economy and social psychology, to explain why countries vary in their adoption of restrictions on pay-for-performance.

Pay-for-performance can create a prisoner's dilemma between employer and worker (Leibenstein 1987), requiring the worker to reveal information on the best way to do a job and the employer to set and maintain an appropriate incentive rate. The worker should exert effort; the employer should pay the promised incentive and resist the temptation to renegotiate a lower rate once the worker has divulged all information (unless the very nature of the task changes). The semiskilled or skilled worker has superior knowledge about the best way to do a task, resulting in power over the employer during the establishment of the incentive. However, the employer has power to subsequently reset pay (Baldamus 1957). To reach the optimal outcome, worker and employer have to cooperate so that neither takes advantage of the other at the point where each has power. Yet, historically, trust often broke down, with information not fully shared by employees and incentives reduced at the employer's whim (Roy 1952; Dawson 1999, p. 39). Misapplication of incentive pay was a major factor in the rise of labor unions and demands for formal laws limiting the use of these structures (Kennedy 1945, p. 50).³

Unions expect higher transaction costs and increased risk of holdup when firms use incentive pay-for-performance (Kennedy 1945, Leibenstein 1987). Kennedy (1945) notes that unions negotiating time-based compensation know that most issues are settled at contract signing, but with incentive pay, unions must work with many more variables defining and

³ Many of these laws were put into place in the early and mid-20th century, during the rise of organized labor's market power in many countries. For this reason, the literature of that time (roughly 1940–1960) best reflects the issues considered and the role of labor unions in the development of these labor institutions.

measuring a multitude of tasks within the firm. In the terms of transaction cost economics (Williamson 1975, 1985), unions fear that the use of incentive pay-for-performance puts them in a context in which there is asset specificity (specifically, their members' investment in firm-specific human capital, though this investment is somewhat offset by the firm's need for specially trained workers), uncertainty over future events that could result in the need for renegotiation of incentives, and the potential for managerial opportunism in seeking renegotiation.

Incentive pay structures also often conflict with union leaders' interest in maximizing equity across members with varying productivity levels, as incentive pay is associated with higher average pay but also higher dispersion of pay within a firm (Seiler 1984). Another concern may be cohesion of the union itself, because leaders might expect some workers to adopt a more individualistic mindset (Kennedy 1945, p. 65). Unions may also worry about the health and welfare of the worker, with concern that pay-for-performance incentives could lead the worker to overwork himself (Kennedy 1945, Vézina et al. 1989). Finally, the cooperation required to implement incentive-pay practices may simply run counter to the traditionally adversarial position of unions vis-à-vis the firm. Kennedy (1945, p. 149) notes, "Just as soon as they begin to share responsibility for rates and standards, a union committee and officers expose themselves to almost inevitable suspicion, criticism, and disagreement from the membership."

Due to union opposition, some countries have legislation restricting the use of piecework and other incentive pay. However, legislation varies considerably by country, and we argue that this variation is not random. In previous work, Siegel et al. (2008) provided a historically motivated institutional theory of egalitarianism, explaining why some countries give greater priority to the rights of labor than others. As put forward in Siegel et al. (2008), cultural egalitarianism stands for a shared societal view of all people as moral equals, and also relates to a society's intolerance for abuses of market and political power inequality. The authors show how historical shocks such as the nature of wars of state formation dating back to the 19th century, along with societal fractionalization and the content of religious belief at the turn of the 20th century, explain more than half of today's cross-country variation in surveyed levels of egalitarianism. Cultural beliefs about egalitarianism then form the foundation for a society's balance between worker protection and employer operating freedom. Countries higher in egalitarianism are much more likely to select policies enforcing the rights of labor and limiting the prerogative of employers in setting incentives and compensation.

Because of this historical role of culture and accompanying formal legal institutions, today's multinational finds a wide range of policies constraining or enabling pay-for-performance across countries. Williamson (1975, pp. 36–37) discussed how differences in "atmosphere,"—cultural beliefs and sociopolitical institutions—could lead firms to make different optimal transactional choices across locations and noted, "The social context in which transactions are embedded—the customs, mores, habits, and so on—have a bearing, and therefore need to be taken into account, when moving from one culture to another" (Williamson 1985, p. 22). In the present context, differences in egalitarianism that were largely formed a century or more ago led societies to choose regulations on incentive pay-for-performance that often have also been in place for decades, sometimes 50 years or more.⁴ In the current era of globalization, many firms like Lincoln Electric have encountered these multiple, oftentimes conflicting labor market constraints. As previous research has examined the alignment of firm-level transactional choices to variation in the economic environment (Masten et al. 1989, 1991; Masten 1993), we seek to study how the multinational firm should make incentive choices given cross-country differences in labor power and local labor market institutions.⁵

3. Lincoln Electric and Flexible Intermediate Adaptation

Lincoln Electric is a welding manufacturer based in Cleveland, Ohio with a broad global footprint. Founded in 1895, Lincoln Electric produces both welding machines and consumable products for those machines. Over the 20th century, Lincoln Electric outlasted a series of significant competitors in its industry, including General Electric and Westinghouse, and by 2006 the company had \$1.97 billion in annual revenue. Over the past 60 years, the company has gained recognition for its use of incentives and pay-for-performance, practices that have been widely copied by other U.S. manufacturers (Hay Group 2004, Mercer Human Resource Consulting 2006, Watson Wyatt Data Services 2006).

The company's industry-leading productivity has been attributed largely to its management system,

⁴ As seen in EC.1 in the e-companion, those regulations were time-invariant during the sample time period. An electronic companion to this paper is available as part of the online version that can be found at <http://mansci.journal.informs.org/>.

⁵ Because the predictive power of egalitarianism to explain restrictions on the use of incentive pay-for-performance is strong, but certainly not absolute, we will test in this study for the direct role of these legal restrictions. We will also test for the enduring effect of both egalitarianism and the legal restrictions in our quantitative analysis.

which consists of four main components: (a) piecework wages, (b) a discretionary annual bonus based on individual and company performance, (c) an individual merit rating used to determine the annual bonus, and (d) a voluntary employee advisory board that works to generate productivity-enhancing innovations.⁶ Additionally, Lincoln Electric uses a number of complementary management practices, such as minimizing the number of supervisors on the plant floor and assigning a great deal of autonomy to factory employees. In Cleveland, the company sets tens of thousands of piece rates, and workers have been trusted for decades to record their output accurately.

Lincoln began expanding abroad in the 1940s, but its first major foreign investments, made in the late 1980s, initially failed. There were several potential reasons for this initial failure. The company wanted its new subsidiaries to operate in Lincoln USA's image; international managers were expected to introduce piecework, a bonus system, and an advisory board (Dawson 1999, p. 41). Many workers in Western Europe in particular did not want to adopt the company's practices (Hastings 1999). The European acquisitions were also made just prior to an economic downturn. Past case histories of Lincoln Electric during this time period hypothesize that its international results were tied to the level of pro-capitalist/promanufacturer institutions in each host country (Chilton 1993a, b; Dawson 1999; Hastings 1999; Maciariello 2000). Still, none of the studies test this hypothesis more than anecdotally.

Lincoln renewed its global expansion in the mid-1990s, moving into nearly every large welding market in the world, regardless of limits on incentive pay-for-performance. As CEO John Stropki noted, "We're taking the fight to the competition in all regions of the globe" (Lewis 2007). This company decision rule is what gives us a unique quasi-natural experiment. During the sample time period, Lincoln Electric operated in 16 of the 20 largest welding markets: the United States, Canada, Mexico, Venezuela, Brazil, the United Kingdom, France, Germany, Italy, Spain, The Netherlands, Poland, Turkey, Australia, Indonesia, and China. Although there are no published estimates of the welding market by country, internal estimates closely match an ordered ranking of country gross domestic product (GDP). Differences in these orderings arise from intensive spending on infrastructure (the lifeblood of welding companies) in

large emerging markets such as Venezuela.⁷ The few cases in which Lincoln Electric has not entered a large market have involved idiosyncratic constraints. Japan has a dual electronic standard for welding equipment that made the cost of entry prohibitive (Siegel 2007). In Russia, there was a combination of idiosyncratic product standards inherited from Soviet times and continuing through the 2000s, along with a diverse set of structural barriers to entry. Due to India's relatively late economic liberalization, Lincoln was just entering that market at the end of the sample time period (Siegel 2007).

Lincoln Electric's international subsidiaries faced a range of institutional environments, many with legislative restrictions to incentive pay-for-performance.⁸ Ironically, Lincoln Electric had succeeded for decades in creating an "egalitarian" internal culture within its U.S. operation, due to honest and consistent application of its incentive pay-for-performance program. In the United States, Lincoln Electric and its workers had essentially created an infinite-period prisoner's dilemma game with a mutual-cooperation outcome (Leibenstein 1987). This optimal outcome had then led to industry-leading, continuous increases in productivity, firm profits, and pay increases for workers. Yet the firm's core policy for organizing work was constrained outside of the United States due in part to other firms' abuses of incentive pay.

Where Lincoln Electric faced laws constraining its traditional compensation practices, managers had to determine the extent to which the firm should transfer its system. Because there was typically a unique combination of restrictions in each country, with widely varying costs, it was difficult for Lincoln's management to establish universal decision rules. Instead, each country manager had to make a fundamental choice among three options: (a) complete transfer even though the local constraints might impose considerable costs, (b) no transfer ("when in Rome, do as the Romans do"), or (c) intermediate transfer of some subset of practices leading to uncertain efficiencies while fitting local constraints. We were inspired by the work of Ichniowski et al. (1997), and of Ichniowski and Shaw (1999, 2003), showing that a critical managerial decision is whether or not to

⁶ Interestingly, soliciting employee input about productivity improvement has been found by Ichniowski and Shaw (2003) to be an important part of an incentive system. Thus, it is logical that we include the employee advisory board, both because it is an important part of Lincoln Electric's management system and because the measure ties to the prior literature on bundles/systems of incentive practices.

⁷ "Over half of the world's infrastructure investment is now taking place in emerging economies, where sales of excavators have risen more than fivefold since 2000. ... emerging economies are likely to spend an estimated \$1.2 trillion on roads, railways, electricity, telecommunications and other projects this year. . . ." (*The Economist* 2008, p. 88).

⁸ As our consultations with labor lawyers confirmed, exemptions to these restrictive labor codes are virtually impossible to obtain. Furthermore, Lincoln Electric subsidiary managers indicated in interviews that these constraints were operative—they felt themselves being monitored and the constraints being enforced.

adopt bundles/systems of complementary incentive practices. We began by examining whether or not each Lincoln Electric subsidiary chose to adhere to the Lincoln system or bundle of practices. However, we discovered through our fieldwork that this adaptation choice of each subsidiary was not a categorical yes/no decision being made by subsidiary managers. Instead, managers also considered a third option of adopting novel subcombinations of Lincoln system elements that could both fit with country-level institutions and deliver improved productivity and profitability.

Previous literature in the field calls for “case study techniques [to] be combined with more formal-empirical analysis” when examining the impact of institutions on firms (Masten et al. 1991, p. 22). To that end, in the remainder of this section we provide brief descriptions of several Lincoln Electric operations in which new combinations of practices led to significantly improved performance.⁹

3.1. Poland

In Poland, the plant acquired by Lincoln had existed since the Communist era and had a preexisting form of piecework pay that the company could continue to use. Plant management was constrained for almost five years after acquisition, however, by legacy privatization-era agreements that limited the introduction of a formal merit rating system and (together with Polish labor rules) prohibited the introduction of a nonunion employee advisory board.

Lead manager Zbigniew Pawlowski improved on the existing structure by introducing an individual discretionary bonus. The union in this plant had veto rights over all elements of Lincoln’s management system, including the discretionary bonus. Yet Pawlowski was able to add the bonus due to his careful study of how to achieve Lincoln Electric’s goals in an environment in which labor unions had legally defined powers in the workplace. Pawlowski did note that the voluntary employee advisory board would not fit readily with existing institutional structures, despite the practice of formalized boards with worker representation that began with Poland’s entry into the European Union. Although Pawlowski did not plan to implement Lincoln’s employee advisory board and individual merit rating anytime soon, through a flexible intermediate adaptation of Lincoln’s practices, he achieved significant increases in productivity.

3.2. Venezuela

Lincoln Electric acquired its Venezuelan operations after the rise of populist president Hugo Chávez. Yet, the company managed to exceed expectations

despite a highly volatile and challenging labor and political environment. Joaquín Guerra, head of the Venezuela business operation, initially raised eyebrows by appointing a nontechnical person with a human resources background, Ramón Monsalve, as plant manager. Monsalve was further challenged by a coup attempt in April 2002 that occurred just as he began experimenting with new labor practices, and by numerous legislative restrictions on compensation practices. However, in the succeeding years, Monsalve developed a simple but unique combination of practices that led to excellent labor relations and plant productivity.

Monsalve implemented a combination of merit ratings and a voluntary employee advisory committee. Monsalve adapted the merit ratings practice to local mores by publishing each employee’s performance to recognize top performers and to motivate others to work harder. In implementing the employee advisory committee, Monsalve adapted the Lincoln practice by appointing key operators from throughout the plant to the committee. Plant productivity increased by over 50% soon after this combination of practices was implemented. Although there were institutional impediments to the complete installation of the Lincoln system (including piecework and discretionary bonuses), Monsalve was able to implement a combination of practices that delivered significant productivity increases.

3.3. The Netherlands

Lincoln Electric’s operation in The Netherlands saw productivity improvements due in part to changes made by Fred Grifhorst, country manager in the late 1990s. One of the most serious challenges Grifhorst faced when he arrived was absenteeism and lack of employee motivation. In The Netherlands, workers at a large firm like Lincoln Electric could receive up to full salary for extended sick leave. With motivation low, absenteeism had reached as high as 15%. Grifhorst introduced a merit rating equivalent and a connected annual bonus, received by every worker each November. Grifhorst (2006) described, “If you had no illness days and your appraisal was good, you got the highest bonus.” These changes were followed by significant improvement in plant productivity, as absenteeism dropped by one-half. Grifhorst explained that because The Netherlands had a number of formal and informal restrictions on pay-for-performance, he would not consider introducing Lincoln’s traditional piecework pay system. Yet an intermediate combination of Lincoln practices led to a productivity improvement.

3.4. Mexico

In Mexico, managers David LeBlanc and David Owens implemented the broader range of Lincoln

⁹ For confidentiality reasons, we are unable to present subsidiary-level financials or other subsidiary-level raw data.

practices or their equivalents, in keeping with the fact that Mexican laws were friendly to incentive pay. Still, LeBlanc was proud of an innovative variation on piecework based on team performance: “Where [individual levels of output were] interrelated, we tied everyone’s pay to the production of the line. This got people to chip in where the slow guy’s table was located” (LeBlanc 2006). Productivity increased at the company’s Torreón plant immediately after introduction of this pay structure. Lincoln Electric also supported workers applying for first-time home ownership programs, and productivity also increased dramatically as workers saw that a home was within their reach. Although these two innovations were unique to the Mexican operation, and thus cannot be tested in the larger sample, we highlight this case as another example of creative adaptation. By the end of the sample time period, these two managers had received promotions rewarding their creative management.¹⁰

These caselets reflect what we also observed in the larger data set: that adaptation to host-country labor markets took place via the alteration of a bundle of practices and the creation of new subcombinations of Lincoln Electric’s home-country bundle in the countries that either did not welcome the complete bundle or put in place constraints that prevented any of the practices from being transplanted in the short to intermediate term. Few country regimes supported a wholesale adaptation of all Lincoln practices; if the practices were not circumscribed by the law, they were made prohibitively expensive to implement by requirements of union or other approvals, or were simply incongruent with local labor practices. Therefore, in the countries where the labor market did not enable the wholesale transplantation of Lincoln Electric’s management system, these managers turned to the third alternative, flexible intermediate adaptation leading to a customized bundling of practices. Because each country had put in place unique constraints, Lincoln managers had to come up with unique intermediate combinations tailored to the host country’s institutional conditions.

4. Method

The paucity of work on labor market institutions, adaptation choices, and FDI performance can be partly explained by a combination of data constraints. First, it is difficult to find a natural experiment, in

which the same firm interacts with widely varying institutions, that allows for testing of causality. Even when one finds a firm that has entered all large markets, acquiring country-level data requires going inside the firm and hand collecting data across its subsidiaries. With Lincoln Electric, we were able to collect such data (as described below), which we used to estimate a series of profitability and productivity regressions.

We focus first on an examination of the company’s profitability across countries. We start with a simple ordinary least squares (OLS) model in which country-level return on assets (ROA) is regressed on the labor market institution of interest, GDP growth rate, and whether the subsidiary produces only consumable welding products or only machine products. Data cover the years 1996–2006, so we cluster standard errors by host country to address the risk of serial autocorrelation. This method of clustering has been endorsed by leading econometricians as providing the most conservative estimates for a small data set such as ours.¹¹ We next test whether labor input costs influence cross-country profitability, and after showing that they are not a significant factor, we go on to examine which forms of adaptation in fact do drive profitability. We first establish that the transplant of any one specific practice is endogenous to the nature of the local labor market institutions. We also establish that the choice of no adaptation or complete transplantation of all Lincoln components is endogenous to the nature of the local labor market institutions. We then examine and establish, again using our OLS framework with clustering, that there is a form of flexible intermediate adaptation that is

¹¹ We thank Jim Stock and Whitney Newey for helpful conversations and for teaching us the value of clustering in this smallish-sample context. The overall logic in favor of clustering discussed in Stock and Watson (2008), especially at the end of Remark 9 on p. 159, applies both directly and in spirit to our present context. Also, Hansen’s (2007) simulation suggests that clustering can be used with as few as 10 groups, although with 10 groups and time-invariant variables it suggests one would look for *t*-statistics a little bit higher than the usual 2.00 and *p*-values a little bit lower than the usual 0.05 to be assured of statistical significance. We are comforted by the fact that the results for our variables of interest typically clear that hurdle, often by a large amount. In the case of fixed-effects estimation with clustering, which we will also rely on, both Stock and Watson (2008) and Hansen (2007) are strong in providing theoretical support and simulation evidence for the fact that clustering is the most conservative and reliable method in a smallish-sample context and that the usual *t*-statistic values of 2.00 and the usual *p*-values of 0.05 certainly still apply with even 10 or fewer groups. Following what we learned from Jim Stock, we have relegated to the e-companion other heteroskedasticity- and autocorrelation-consistent (HAC) estimators that require more assumptions of the data. Indeed, our results with other HAC estimators are also highly consistent. Of course, although we credit these econometricians with providing us useful methodological advice, any remaining errors in this paper are completely our own.

¹⁰ We note here, as we will also emphasize later in this paper, that the quantitative results in this paper are robust to the temporary exclusion of any single country. Furthermore, the quantitative results pass a robustness check in which the profitability of any single country with flexible intermediate adaptation is temporarily cut by 75% for all available years.

strongly associated with higher profitability and is not an artifact of the labor market institutions themselves. We then run a series of models in which we demonstrate the importance of flexible intermediate adaptation and the nature of local labor market institutions while at the same time controlling for a long list of alternative explanations, including the GDP growth rate and product diversification variables along with measures of political constraint distance, corporate taxation distance, rule of law distance, geographic distance, log GDP per capita, Lincoln Electric's estimated market share in the host country, the log of the estimated Herfindahl market concentration index in the host country, egalitarianism distance as instrumented by historical/exogenous root causes, and labor input costs. We next take the time-varying independent variables from the prior analysis and test in a fixed-effects model whether flexible intermediate adaptation continues to be positively associated with profitability.

Then, having established a series of profitability results, we ask whether Lincoln Electric's adaptation choices lead to improved productivity, implying not only that the company benefits (as with performance measures), but also that a "larger pie" becomes available that can be used to benefit both the company and its workers. We start with a series of OLS regressions in which alternative definitions of productivity value added per worker, quasi-rents per worker, and the log of total factor productivity using Levinsohn and Petrin's (2003) more advanced technique for dealing with unobserved productivity shocks) serve in turn as the dependent variable. Independent variables used to explain productivity include *flexible intermediate adaptation*, the labor market institution of interest, as well as our control variables covering potential alternative explanations. We then use the time-varying independent variables (with flexible intermediate adaptation our variable of interest) and seek to confirm via fixed-effects regression whether flexible intermediate adaptation continues to be associated with higher productivity.

5. Data

The sample is the entire set of country operations belonging to Lincoln Electric's welding business in years 1996–2006. A small operation in Ireland was an entirely different business line and was managed separately, so was excluded from the analysis. Lincoln Electric also owned a minority stake in a Taiwanese joint venture, but had no say in the venture's operation; this was also excluded. Last, Lincoln Electric purchased a plant in Colombia in 2006, which is excluded because the acquisition had barely closed by the end of the period. Results are substantively similar with or without the Irish operation, as well as

with or without the U.S. operation or any other single country. Data were given to the authors by the company. Because the company entered some countries in the middle of the sample time period, the data form an unbalanced panel, with a maximum 152 country-year data points.

The first dependent variable is *ROA in the host country*, measured as operating income divided by total assets. We then examine various proxies for productivity, which are briefly described in Table 1, panel A.

The first set of independent variables focuses on labor market institutions in the host country. Whereas prior studies typically employ a dummy variable for union strength, we examine a richer variety of labor market institutions that enable or constrain Lincoln Electric's subsidiaries, as described in Table 1, panel B. Most unions have long been opposed to the free, unconstrained use by firms of incentive pay-for-performance (Kennedy 1945, Jacoby 1983, Brown and Philips 1986). As discussed in §2 of this paper, unions have lobbied for legal restrictions and constraints on the use of incentive pay-for-performance, and have also put pressure on individual companies in practice to constrain the managerial application of incentive pay (Kennedy 1945, Brown and Philips 1986). Thus, it will be important to look at union power together with formal laws about incentive pay in our analysis of impediments to the free use of incentive pay-for-performance across countries.¹²

The use of a sickness and health benefits index as an explanatory variable for labor market institutions affecting flexible pay schemes may seem surprising. However, our review of the literature indicates that unions have historically worried that incentive pay practices may lead workers to compete themselves out of jobs and in some cases drive themselves to the point of illness or injury (Kennedy 1945, Vézina et al. 1989). Lincoln Electric has an excellent safety record, but where the sickness and health protection of workers is taken out of employers' hands and provided universally by the government, there is likely one less transaction cost in the negotiation of an incentive pay-for-performance arrangement. Not only does the government's safety net begin to alleviate the union's concern about workers' welfare, but the company also stands to benefit if workers use government-provided benefits to have regular physical exams and prevent health problems (related or unrelated to work) from becoming chronic conditions.

As evidence that Lincoln Electric entered markets regardless of labor market institutions, we compared

¹² We confirmed as a robustness check, however, that we get substantively similar results when focusing solely on the formal incentive laws and regulations. Those results can be seen in EC.7 in the e-companion.

Table 1 Variable Definitions

Panel A		
Variable	Definition/Calculation (if applicable)	Data source(s)
<i>Value added per employee</i>	Country gross margin (in USD) divided by number of employees	Archival data from company
<i>Quasi-rents per employee</i> (Following Abowd and Lemieux 1993)	((Country gross profit – (Number of workers * Average hourly wage in that year * Average hours worked per year) – Estimated cost of capital * Subsidiary's capital stock)/Number of workers. Tested low-end (5%) and high-end (10%) values for estimated capital rental cost.	Average hourly wage and average hours worked per year were collected at the subsidiary level through structured interviews with Lincoln managers. All else is archival data from Lincoln Electric headquarters.
<i>Log of total factor productivity</i>	Levinsohn and Petrin (2003) method, using alternatively sales or value added	Same as for <i>quasi-rents per employee</i>
<i>Log of total factor productivity</i>	Wooldridge (2005) variation on the Levinsohn and Petrin (2003) method, using alternatively sales or value added	Same as for <i>quasi-rents per employee</i>
Panel B		
Variable	Description/Source(s)	
<i>Fraser Institute Labor Market Freedom Index^a</i>	Accounts for whether country labor market regulations “infringe on the economic freedom of employees and employers” (Gwartney and Lawson 2006, p. 12). Regulations addressed include minimum wage, dismissal regulations, centralized wage setting, extensions of union contracts to nonparticipating parties, unemployment benefits undermining incentive to work, and conscription. High value on this index indicates less government restriction of labor markets. Captures general freedom given to employers in setting up an incentive system. Index was measured in middle of our time period (2000).	
<i>Legal empowerment of unions to participate in management</i>	Set equal to 1 when workers and/or unions have a right to appoint members to board of directors; 0 otherwise. From Botero et al. (2004) database, measured as of 1997.	
<i>Flexibility in hourly wage contracting environment</i>	Maximum number of work hours allowed per year before overtime required, from Botero et al. (2004). Important because flexible pay arrangements are at least indirectly constrained when overtime pay is required after a small number of work hours.	
<i>Government's role in providing sickness and health benefits for citizens</i>	Sickness and Health Benefits Index from Botero et al. (2004), averaging four normalized variables: (1) months of contributions or employment required for an employee to qualify for sickness benefits; (2) percentage of worker's monthly salary deducted to cover sickness and health benefits; (3) waiting period for sickness benefits; and (4) percentage of net salary covered by the net sickness cash benefit for a two-month sickness spell. Higher values signify greater government-provided protections.	
Panel C		
Variable	Description of the Siegel-Larson Database on Labor Market Institutions	
<i>Both piece rate and discretionary bonus allowed without prior approval or future obligation</i>	This is our primary index, and it equals 1 when management is free to implement both piecework and a discretionary bonus without getting approval from a union, government, or any other third party, and without incurring any future obligation (such as an acquired right to a bonus in future years); equals 0 otherwise.	
<i>Piece rate allowed</i>	Indicates whether law allows wages paid on a piece-rate basis	
<i>Piece rate must meet minimum wage</i>	Indicates whether law requires companies to meet a minimum wage when paying piecework wages	
<i>Piece rate workers must receive paid vacation</i>	Indicates whether law requires that workers receiving piece-rate wages also be given paid vacation	
<i>Vacation pay the same for piece-rate and salaried workers</i>	Indicates whether law requires that workers receiving piece-rate wages be paid the same amount of vacation pay as equivalent salaried workers (e.g., pay based on rank or seniority rather than historical average pay)	
<i>Piecework restricted to or prohibited from specific industries</i>	Indicates whether the use of piecework is restricted to or prohibited from certain industries	
<i>Discretionary bonus payments allowed</i>	Indicates whether the law permits employers to pay discretionary bonuses	
<i>Mandatory bonus to be paid to all workers</i>	Indicates whether the law permits employers to pay discretionary bonuses, but only as a supplement to some other required profit-related bonus or variable pay	
<i>Regulation of bonus calculation and/or amount</i>	Indicates whether country has regulations prescribing a calculation formula or a lower/upper bound for discretionary bonuses	
<i>Regulation of bonus distribution</i>	Indicates whether the law requires a certain distribution of discretionary bonuses (e.g., that bonuses be paid to all if paid to any or that bonuses be paid to all workers in a given type of position)	

Table 1 (Continued)

Panel D		
Variable	Definition/Calculation (if applicable)	Source(s)
<i>Real GDP growth rate</i>	Real GDP growth rate, in %, for years 1996–2006	Economist Intelligence Unit (EIU) Country Data
<i>Product diversification of each Lincoln Electric subsidiary</i>	Dummy variable <i>only consumables</i> equals 1 when subsidiary produces only consumable products, 0 otherwise. Dummy variable <i>only machines</i> equals 1 when subsidiary produces only machines, 0 otherwise.	Structured interviews with Lincoln Electric managers
<i>Labor input costs^b</i>	Hourly labor costs by country, estimated using local managers' available historical information by year (in U.S. dollars)	Structured interviews with Lincoln Electric subsidiary managers worldwide
<i>Labor input costs—three sets of alternative market-level measures (to check robustness of company estimates)</i>	Average hourly compensation costs, by year (in U.S. dollars). The three sets of measures are closely correlated, with the only major difference being the inclusion by the EIU of estimates for some country-years missing in the other two data sets.	Key Indicators of the Labour Market (KILM) data set of the International Labour Organisation, U.S. Bureau of Labor Statistics (BLS), and EIU Country Data
<i>Host country level of development</i>	Natural log of real GDP per capita (in 2005 constant U.S. dollars) by year	EIU Country Data
<i>Influence of policy instability on FDI flows (otherwise known as POLCONIII political constraint distance)</i>	Squared difference between the the U.S. and each host country's scores on the POLCONIII political constraint index; this underlying index measures the feasibility of policy change by examining the number of independent veto-empowered government branches and their ideological alignment.	Henisz (2002). ^c Data are available only for 1996–2004, so tests using this variable cover only these years. (Results are robust with or without this variable.)
<i>Role of corporate tax differences across countries</i>	Signed (algebraic) difference of top corporate statutory tax rates in the origin (U.S.) and host countries. (Desai et al. 2007 focus on this same variable in their examination of the impact of taxation on corporate governance.)	World Tax Database of the University of Michigan Office of Tax Policy Research (OTPR) for 1996–2002. Data for 2003–2006 are sourced from OTPR database's original source, the Heritage Foundation's Center for International Trade and Economics.
<i>Rule of law distance</i>	Squared difference between the U.S. and each host country's scores on the rule of law (legality) index for 1998, an index of (a) perceived compliance with protection of legal entitlements (property and contractual rights) and (b) law and order.	Kaufmann et al. (2003)
<i>Geographic distance between the U.S. and host country</i>	Natural log of (great circle distance in kilometers + 1), which allows the U.S. to take a zero value. Results are similar with or without the U.S. in this measure.	Gleditsch-Ward geographic distance measure from Gleditsch-Ward data set on great circle distance between capital cities ^d
<i>Adaptation of Lincoln management system to host country</i>	Four dummy variables indicate whether each subsidiary over time uses (a) piecework pay, (b) discretionary bonus, (c) individual merit ratings, and (d) employee advisory board or equivalent. Set equal to 1 if practice is used, 0 otherwise.	Interviews with Lincoln Electric subsidiary managers worldwide
<i>Lincoln Electric market share in host country</i>	Historical subsidiary estimates of country market share over time ^e	Structured interviews with Lincoln Electric subsidiary managers worldwide
<i>Log of industry Herfindahl index by country</i>	Calculated based on historical managerial estimate of every industry participant's share by country over time	Structured interviews with Lincoln Electric subsidiary managers worldwide
<i>Role of egalitarianism distance</i>	Squared egalitarianism distance (as instrumented using historical/exogenous causes, specifically, the nature of 19th century wars of state formation, the severity of social fractionalization, and the content of dominant religious belief as of 1900) between the U.S. and each host country	Siegel et al. (2008)

^aIndices of this type (from the Fraser Institute and Botero et al. 2004) typically measure a set of related laws on the books, and then average or normalize the components to generate a composite index of labor market freedom with a precise numerical value. We find consistent results in the main tables and e-companion no matter whether we use these indices or the available component measures that are categorical (0 or 1).

^bBecause the headquarters did not have precise archival records on historical hourly labor input costs for factory workers, we conducted structured interviews and made data requests to Lincoln Electric subsidiaries around the world to establish subsidiary-level estimates of hourly input labor costs and annual hours worked per worker by country and how they changed over the 1996–2006 sample time period. Managers used available historical information at the subsidiary level in making these informed estimates available to us. We were able to cross-check these estimates with managers who had worked in the same parts of the world at overlapping times, and thus we do have considerable confidence in the consistency of these estimates.

^cWe downloaded the 2006 release of POLCONIII from <http://www-management.wharton.upenn.edu/henisz/>.

^dAccessed in January 2006 from <http://dss.ucsd.edu/~kgledits/capdist.html>. Distance data for any missing country pairs were accessed in January 2006 from <http://www.airport-accommodation.co.uk/worlddistances.php>.

^eBecause the headquarters did not have archival records on subsidiary-level market share, we conducted a survey of Lincoln Electric managers around the world to establish historical estimates of Lincoln Electric's and major competitors' market shares by year over the sample time period. We were impressed by the level of precision with which managers could remember "war stories" of market competition in each country. In some cases, more than one manager was based in a given country for an overlapping period of time, and we used those cases to cross-check the managerial estimates. Thus, we do have considerable confidence in the consistency of the managers' estimates.

summary statistics for the 16 Lincoln Electric countries in Table 2 to those for all countries measured by the Fraser Institute and Botero et al. (2004). Summary statistics for the Lincoln Electric sample closely match the Fraser Institute statistics (mean, 5.145; standard deviation, 1.151; median, 4.929; min, 2.854; and max, 8.555). We also see substantive similarity when examining whether workers and/or unions have a right to appoint members to the boards of directors (mean, 0.106; standard deviation, 0.310; median, 0; min, 0; max, 1), the number of work hours in a year before overtime (mean, 2,054.633; standard deviation, 189.007; median, 2,028.167; min, 1,757.500; max, 2,418.000), and sickness and health benefits (mean, 0.641; standard deviation, 0.329; median, 0.768; min, 0; max, 1).

To address the question of whether these core labor market institutions changed at all during our sample time period, we run robustness checks using alternative but closely related measures taken at different times. There is considerable time invariance; the results are presented in EC.2–EC.4 in the e-companion.

The fifth set of institutions addresses the ability of companies to use incentive practices. Whereas the four sets of labor institutions described above are represented by data compiled by the Fraser Institute and Botero et al. (2004), this latter set of institutions is surprisingly not found in prior studies or data collection efforts. Hence, we develop our own database for this set of labor market institutions. We focus first on companies' ability to use piecework pay, not because piecework itself is used by many companies but because piecework is a proxy for overall pay-for-performance incentives. Next, we look at companies' freedom to pay discretionary bonuses to workers. To collect data on these variables, we implemented an extensive review of local country labor laws in addition to conducting structured interviews with local labor law experts. These variables are presented in Table 1, panel C, with more detail available in EC.1.

In addition to verifying with our legal experts that these incentive pay restrictions were effectively time-invariant during 1996–2006, we also identified alternative labor market institutional measures taken at different times during the 1996–2006 period using alternative methods. We test for robustness using these alternative measures in EC.2–EC.4 and confirm that the nature and effect of labor market institutions is effectively time-invariant in this sample time period.

Finally, as described in Table 1, panel D, we control for other economic, strategic, and institutional factors.

6. Results

Summary statistics and a correlation matrix are presented in Table 2. As shown, a number of the labor

Table 2 Summary Statistics and Correlation Matrix

Variable	Summary statistics					Correlation matrix									
	Mean	Standard deviation	Min	Max	Obs.	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	
[1] ROA (operating income/total assets)	0.093	0.118	-0.295	0.368	152	1									
[2] Fraser Institute Labor Market Freedom Index (measured in 2000)	5.013	1.198	2.854	7.167	152	0.355***	1								
[3] Workers and/or unions have a right to appoint members to the boards of directors	0.092	0.290	0.000	1.000	152	-0.131	-0.473***	1							
[4] Maximum number of hours of work in a year before overtime	2,011.412	147.874	1,808.000	2,296.000	152	0.271***	-0.167**	0.467***	1						
[5] Sickness and health benefits index	0.676	0.208	0.000	0.958	152	0.349***	0.249***	-0.082	-0.040	1					
[6] Both piece-rate and discretionary bonus allowed without prior approval or future obligation	0.461	0.500	0.000	1.000	152	0.344***	0.411***	-0.157*	0.383***	-0.070	1				
[7] Annual GDP growth rate (GDP growth rate from year $t-1$ to t)	3.084	3.300	-13.100	18.300	152	0.204**	0.094	0.029	-0.009	0.120	0.160**	1			
[8] Only consumables (the Lincoln subsidiary produces only consumable welding products)	0.388	0.489	0.000	1.000	152	-0.232***	0.065	-0.114	-0.214***	-0.244***	0.266***	0.129	1		
[9] Only machines (the Lincoln subsidiary produces only machines)	0.105	0.308	0.000	1.000	152	-0.059	-0.500***	0.706***	0.398***	-0.129	-0.317***	-0.086	-0.273***	1	

*Significant at 10%; **significant at 5%; ***significant at 1%.

institutions are highly correlated. They should therefore be seen as members of an institutional set, and one should avoid attributing causality to any one specific labor institution. Still, as members of a coherent institutional set, it is clear that some countries create an environment encouraging incentive pay-for-performance. These countries allow considerable employer freedoms in general employment law, do not empower employees to participate in management, set relatively high trigger points for overtime pay, and more explicitly legislate the unconstrained use of piecework and discretionary bonuses. Interestingly, countries with generous government-provided sickness and health benefits are actually likely to have greater overall freedom in employment contracting. In summary, these pro-labor institutions should be treated as a set of complementary institutions, and causality should be assigned to the set and not to an individual component. Moreover, because of collinearity among these labor institutions, it is best not to enter them together into a regression but rather to enter them one at a time to test their significance, or alternatively, to conduct a principal component analysis and use the first component.

The results of our initial specification are presented in Table 3. The Fraser Institute Labor Market Freedom Index is positively associated with company profitability ($p < 0.05$), and at the same time

laws on the books mandating employee participation in management are negatively associated with company profitability ($p < 0.05$). A more permissive approach to mandating overtime pay is associated with company profitability ($p < 0.05$), and at the same time, more generous government-provided sickness and health benefits are positively associated with company profitability ($p < 0.05$). Finally, the presence of laws allowing free and unlimited use of piecework and discretionary bonuses is positively associated with company profitability ($p < 0.05$). Still, it is important not to assign causality to these individual regulations. They are instead part of a set of labor institutions that either seek to protect labor or else seek to protect companies and labor jointly (as in the case of government-provided sickness and health benefits). We further find that company profitability is aided by the host country's real GDP growth rate. The product-level diversification variables did not rise to the level of statistical significance in Table 3.

In Table 4, we examine whether our results are simply driven by differences in labor costs. We find that hourly labor costs for 1996–2006 are unassociated with company profits, whether we examine managers' estimates of their own hourly labor costs over time or publicly available data from the three other sources. Based on labor costs, we would expect countries such as China and Indonesia to be more

Table 3 Determinants of Subsidiary Profitability

Independent variable	Dependent variable: <i>ROA</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Fraser Institute Labor Market Freedom Index</i> (measured in 2000)		0.039** [0.016]				
<i>Workers and/or unions have a right to appoint members to the boards of directors</i>			-0.072** [0.032]			
<i>Maximum number of hours of work in a year before overtime</i>				2.48E-04** [9.00E-05]		
<i>Sickness and health benefits index</i>					0.151** [0.061]	
<i>Country allows unlimited piecework and discretionary bonus</i>						0.096** [0.041]
<i>Annual GDP growth rate</i>	0.008*** [0.003]	0.007*** [0.002]	0.009*** [0.002]	0.008*** [0.003]	0.007** [0.003]	0.007** [0.003]
<i>Only consumables</i>	-0.071 [0.046]	-0.063 [0.039]	-0.068 [0.046]	-0.062 [0.039]	-0.051 [0.046]	-0.089* [0.044]
<i>Only machines</i>	-0.046 [0.037]	0.032 [0.042]	0.004 [0.045]	-0.090 [0.059]	-0.025 [0.039]	-0.006 [0.026]
Observations	152	152	152	152	152	152
Number of countries	16	16	16	16	16	16
<i>p</i> -value	0.036	0.018	0.003	0.006	0.002	0.014
<i>R</i> -squared	0.123	0.238	0.138	0.203	0.185	0.265

Notes. This table presents the results of OLS regressions in which *ROA* is the dependent variable. Robust standard errors appear below the coefficients in brackets.

*Significant at 10%; **significant at 5%; ***significant at 1%.

Table 4 Noneffect of Hourly Labor Costs

Dependent variable: <i>ROA</i>				
Alternative independent variable	Coefficient	Robust standard error	Obs.	Number of countries
<i>Lincoln Electric managers' estimate of hourly labor cost in U.S. dollars (for 1996–2006)</i>	0.003	0.003	152	16
<i>KILM hourly labor cost in U.S. dollars (available 1996–2006)</i>	0.001	0.003	126	12
<i>Average for years 1996–2006 of KILM hourly labor cost in U.S. dollars</i>	6.08E–05	0.003	126	12
<i>EIU hourly labor cost in U.S. dollars (available 1996–2006)</i>	0.001	0.003	147	16
<i>EIU hourly labor cost in U.S. dollars with further Brazil estimates (available 1996–2006)</i>	0.002	0.002	151	16
<i>BLS hourly labor cost in U.S. dollars (available 1996–2006)</i>	0.001	0.003	127	13

Notes. This table shows the results of OLS regressions in which *ROA* is the dependent variable and alternative definitions of input labor costs serve as the independent variable.

*Significant at 10%; **significant at 5%; ***significant at 1%.

profitable; in fact, countries with relatively high labor costs, such as the United States and Germany, are among the most profitable. This may be evidence that plant productivity is primarily responsible for performance, a finding consistent with Cushman's (1987) earlier evidence that productivity, not unit labor costs, was most important for attracting U.S. foreign direct investment during 1963–1981.

We then examine whether the transfer of specific Lincoln management system components is essential to company profitability. At first glance in panel A of Table 5, the transfer of specific Lincoln components is positively associated with profitability. But when labor institutions are included as a further control variable in panel B, the statistical significance goes away. This suggests that the transfer of any particular practice is endogenous to the labor market institutions. We conduct a principal component analysis using labor institutions analyzed in Table 3, including the index measure of the unlimited ability to use piecework and discretionary bonuses plus the more narrow regulations presented in EC.1. We use the first principal component, which is equivalent to taking a weighted average of the various labor institutions.¹³ A higher value on the first component signifies stronger labor protections, and a lower value reflects a proemployer set of labor institutions.

We find that labor market institutions are fundamental factors driving both the transfer of specific management system components as well as overall company profitability. The same practices that appear statistically significant in panel A of Table 5 become insignificant when controlling for labor market institutions in panel B. As described in §3, we discov-

ered through our interviews that the various Lincoln subsidiaries have implemented various intermediate combinations of Lincoln practices best suited for the local environment. In the preceding analysis of the data, we then show that the other two more extreme choices (zero adaptation or complete adaptation) are simply endogenous to the labor market institutions and have no robustness once labor market institutions are controlled for. We thus find that flexible intermediate adaptation is the choice that can help Lincoln Electric managers address the wide and varying range of labor institutions. Not only were these intermediate adaptations not collinear with labor market institutions, but more importantly, as shown in panel B of Table 5, they are strongly associated with company profitability even in the presence of the principal component of labor market institutions. But, as shown in the caselets described, exact combinations of practices differ depending on the nature of the formal and informal constraints imposed by the local labor market. We did examine the content of specific pairings, but did not find evidence for a specific pairing's driving stronger results. We therefore focused on the level of adherence of the Lincoln Electric core bundle of practices.

When we interviewed Lincoln Electric subsidiary managers, we found that they had spent time observing practices and consulting with experts in Cleveland, their host country, and other Lincoln Electric international subsidiaries before deciding on an intermediate set of practices that would provide strong incentives but also operate smoothly in the local institutional environment. What we will find is that these flexible intermediate adaptations serve to strongly compensate for the distance in labor market institutions between the United States and host countries.

As shown in Table 6, with all control variables included, labor market institutions have a powerful effect on company profitability at the country level (typically $p < 0.01$). At the same time, these

¹³ As seen in EC.1, none of the 16 countries enacted a restriction on one specific dimension ("Piecework restricted to or prohibited from specific industries"). Hence, because of the lack of variation on that specific variable, the variable is automatically dropped when calculating the first principal component of labor market institutions.

Table 5 Endogeneity of Exact Transplantation Abroad

Dependent variable: ROA				
Alternative independent variable	Coefficient	Robust standard error	Obs.	Number of countries
Panel A ^a				
<i>Transplant of piecework</i>	0.104**	0.041	152	16
<i>Transplant of discretionary bonus</i>	0.062**	0.029	152	16
<i>Transplant of merit ratings</i>	0.074**	0.028	152	16
<i>Transplant of advisory board or equivalent</i>	0.059*	0.031	152	16
Panel B ^b				
<i>Transplant of piecework</i>	0.055	0.038	152	16
<i>Transplant of discretionary bonus</i>	0.034	0.039	152	16
<i>Transplant of merit ratings</i>	0.047	0.036	152	16
<i>Transplant of advisory board or equivalent</i>	0.007	0.034	152	16
<i>Flexible intermediate adaptation (transfer of any two components)</i>	0.140***	0.033	152	16
Panel C ^c				
<i>Flexible intermediate adaptation (transfer of any two components)</i>	0.141***	0.030	152	16
<i>Zero parts transplanted</i>	0.019	0.036	152	16
<i>One part transplanted</i>	−0.056	0.035	152	16
<i>Three parts transplanted</i>	−0.056	0.038	152	16
<i>Four parts transplanted</i>	−0.049	0.043	152	16
Panel D ^d				
<i>Flexible intermediate adaptation (transfer of any two components)</i>	0.140***	0.039	120	16
<i>Zero parts transplanted</i>	−0.001	0.036	120	16
<i>One part transplanted</i>	−0.015	0.029	120	16
<i>Three parts transplanted</i>	−0.012	0.054	120	16
<i>Four parts transplanted</i>	−0.054	0.033	120	16

^aPanel A reports the results of OLS regressions in which ROA is the dependent variable and alternative definitions of transplantation serve as the independent variable. The annual GDP growth rate as well as whether the subsidiary produces only consumables or produces only machines are included as control variables.

^bPanel B takes the models from panel A and adds the first component of labor market institutions as an additional control variable. Then we look at the robust effect of robust effect for flexible intermediate adaptation.

^cPanel C takes the models from panel A and adds all the main control variables available for the sample time period (the same as those used in Model 11 in Table 6). Here we look at the robust effect for flexible intermediate adaptation and the noneffect for the other adaptation choices.

^dPanel D takes the models from panel A and adds all the control variables introduced in the Data section, including POLCONIII political constraint distance, which is only available for the years 1996–2004. These are the same variables used in Model 12 in Table 6.

*Significant at 10%; **significant at 5%; ***significant at 1%.

customized intermediate adaptations were positively and significantly associated with company profitability (p always < 0.01). As shown in Table 6, although flexible intermediate adaptation helps profitability at the country level, the presence of prolabor institutions at the same time lowers profits. Flexible intermediate adaptation is further shown to be robust when controlling for the GDP growth rate, product-level diversification, political constraint distance, signed corporate taxation distance, rule of law distance, Gleditsch-Ward geographic distance (Gleditsch and Ward 2001), log GDP per capita, Lincoln Electric’s estimated market share, the natural log of the Herfindahl market concentration index, and instrumented egalitarianism distance. The results are again robust to the inclusion of estimated labor input costs. As expected, Lincoln Electric’s country-level profitability is higher when the host economy grows more quickly, higher when the local industry structure is more concentrated, lower when the political constraint distance is higher, and

lower when there is higher egalitarianism distance between the United States and the host country.¹⁴

¹⁴We have also run a series of other robustness checks. In EC.5 and EC.6 in the e-companion, we show that the results are consistent when using alternative HAC estimators. In EC.7 in the e-companion, we show that the full-model results are consistent when focusing on our main measure for the free use of piecework and discretionary bonuses instead of the first principal component. In EC.8 in the e-companion, we use an alternative dependent variable for whether Lincoln Electric managers estimated that the local subsidiary was more profitable than all local competitors in a given country-year. Again, the results are consistent and robust. We have also found that the results are robust to the temporary exclusion of any single country, including the United States. We also confirmed that the full-model results are robust to the inclusion of variables for either the perceived local reliability of the police or the perceived local business costs of crime and violence (each measured by the global executive survey in the World Economic Forum’s 2003 Global Competitiveness Report). Neither of these last two indicators was statistically significant. We also confirmed that the full-model results are robust to the inclusion of multiple alternative proxies for the quality of the educational system (using data from the World Development Indicators). We also confirmed that the results are robust to the addition of the host country’s real interest rate, the host country’s relative price of capital, the real price of foreign exchange, the annual change in real monthly wages, and the volatility in the foreign exchange rate.

Table 6 Profitability Analysis with Both Strategic Adaptation and Labor Institutional Variables

Independent variable	Dependent variable: <i>ROA</i>											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10) Minus POLCONIII political constraint distance, which enables 1996–2006 test	(11) Model 10 with hourly labor costs added	(12) Model 11 with POLCONIII political constraint distance added
<i>Intermediate two-part transplantation</i>	0.140*** [0.033]	0.134*** [0.025]	0.136*** [0.027]	0.139*** [0.024]	0.118*** [0.020]	0.111*** [0.018]	0.127*** [0.024]	0.133** [0.047]	0.147*** [0.036]	0.137*** [0.027]	0.141*** [0.030]	0.140*** [0.039]
<i>Component 1</i>	-0.038*** [0.009]	-0.035*** [0.006]	-0.038*** [0.006]	-0.040*** [0.007]	-0.022*** [0.008]	-0.022*** [0.007]	-0.021*** [0.006]	-0.040*** [0.011]	-0.042*** [0.010]	-0.051*** [0.010]	-0.053*** [0.012]	-0.041*** [0.012]
<i>Annual GDP growth rate</i>	0.006** [0.002]	0.009*** [0.002]	0.006** [0.002]	0.006** [0.002]	0.006** [0.002]	0.009*** [0.002]	0.009*** [0.002]	0.009*** [0.002]	0.009*** [0.002]	0.007*** [0.002]	0.007*** [0.002]	0.009** [0.002]
<i>Only consumables</i>	-0.105*** [0.033]	-0.104*** [0.025]	-0.106*** [0.028]	-0.093*** [0.029]	-0.073** [0.029]	-0.080*** [0.022]	-0.093*** [0.024]	-0.022 [0.041]	0.001 [0.043]	0.035 [0.041]	0.032 [0.038]	0.004 [0.041]
<i>Only machines</i>	0.044 [0.047]	-0.011 [0.029]	0.065** [0.029]	0.043 [0.042]	0.029 [0.030]	-0.030 [0.020]	-0.040** [0.018]	0.017 [0.031]	0.012 [0.029]	0.091*** [0.025]	0.096*** [0.027]	0.009 [0.031]
<i>POLCONIII political constraint distance</i>		-1.384*** [0.257]			-1.435*** [0.395]	-1.435*** [0.395]	-1.598*** [0.346]	-1.103** [0.453]	-1.141** [0.512]			-1.116** [0.518]
<i>Signed corporate taxation distance</i>			-0.004** [0.002]		4.42E-04 [0.002]		-2.38E-05 [0.002]	0.001 [0.003]	0.001 [0.002]	-7.91E-05 [0.003]	-1.39E-04 [0.002]	0.001 [0.002]
<i>Rule of law distance</i>				-0.009* [0.005]		0.003 [0.004]	-0.009 [0.012]	0.015 [0.017]	0.034* [0.019]	0.057*** [0.018]	0.059** [0.021]	0.033 [0.021]
<i>Gleditsch-Ward geographic distance</i>					-0.017*** [0.005]	-0.013** [0.005]	-0.013*** [0.004]	-0.009** [0.004]	-0.008* [0.004]	-0.005 [0.004]	-0.003 [0.006]	-0.009 [0.006]
<i>Log GDP per capita</i>						-0.035 [0.033]		0.074 [0.060]	0.134* [0.069]	0.220*** [0.065]	0.219*** [0.064]	0.137* [0.066]
<i>Lincoln Electric's estimated market share</i>								-0.004 [0.002]	-0.007** [0.003]	-0.008*** [0.003]	-0.009*** [0.003]	-0.007** [0.003]
<i>Log Herfindahl index</i>								0.110** [0.050]	0.143** [0.054]	0.176*** [0.057]	0.174*** [0.055]	0.145** [0.053]
<i>Egalitarianism distance (instrumented)</i>									-0.617** [0.286]	-0.809** [0.288]	-0.862** [0.351]	-0.576 [0.358]
<i>Estimated hourly labor costs</i>											0.001 [0.003]	-0.001 [0.003]
Observations	152	120	152	152	152	120	120	120	120	152	152	120
Number of countries	16	16	16	16	16	16	16	16	16	16	16	16
<i>p</i> -value	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<i>R</i> -squared	0.407	0.571	0.442	0.445	0.468	0.601	0.605	0.642	0.655	0.606	0.606	0.656

Notes. This table shows the results of regressions in which *ROA* is the dependent variable. We cluster the standard errors at the country level to correct for serial autocorrelation. Robust standard errors appear below the coefficients. POLCONIII political constraint distance is not available for years 2005 and 2006, and hence the sample size drops to 120 observations when that variable is included.

*Significant at 10%; **significant at 5%; ***significant at 1%.

Table 7 Fixed-Effects Specification with Profitability as the Dependent Variable

Independent variable	Dependent variable: ROA			
	(1)	(2)	(3)	(4)
<i>Intermediate two-part transplantation</i>		0.195*** [0.017]	0.098*** [0.031]	0.186*** [0.023]
<i>Annual GDP growth rate</i>	0.007** [0.003]	0.007** [0.003]	0.009*** [0.002]	0.007** [0.003]
<i>Signed corporate taxation distance</i>	0.003 [0.002]	0.003 [0.002]	0.003 [0.003]	0.001 [0.002]
<i>Log GDP per capita</i>	-0.158 [0.138]	-0.167 [0.140]	-0.151 [0.180]	-0.385*** [0.116]
<i>Lincoln Electric's estimated market share</i>	-0.007* [0.004]	-0.008* [0.004]	-0.006 [0.004]	
<i>Log Herfindahl index</i>	0.529*** [0.141]	0.574*** [0.124]		0.560*** [0.149]
<i>Estimated hourly labor costs</i>	0.005** [0.002]	0.004* [0.002]	0.008** [0.004]	
Observations	152	152	152	152
Number of countries	16	16	16	16
p-value	0.000	0.000	0.000	0.000
R-squared (within)	0.406	0.448	0.182	0.412

Notes. This table shows the results of fixed-effects regressions in which ROA is the dependent variable and the time-varying independent variables from Table 6 are included on the right-hand side of the equation. Robust standard errors are corrected for clustering at the country level and appear below the coefficients.

*Significant at 10%; **significant at 5%; ***significant at 1%.

We find that the results are not just statistically significant but economically significant as well. Using the results from Model 11 of Table 6 (where we include all available control variables for the entire sample time period, 1996–2006), we find that a two-standard-deviation move in the direction of more restrictive labor market institutions has the effect of reducing company ROA by 0.184 (holding all other variables constant), which is an economically large but realistic value given the sample summary statistics for ROA in Table 2. Interestingly, the adoption of flexible intermediate adaptation has the effect of overcoming just over three-quarters (0.141) of this institutional distance. *Ceteris paribus*, Lincoln Electric is the most profitable in markets that allow the unconstrained use of incentive pay-for-performance, but has been able to overcome the majority of the institutional distance in other countries through flexible intermediate adaptation.

Next, we use the variables from Table 6 that are time varying, leaving out those are time-invariant or nearly time-invariant for our sample and time period, and run a fixed-effects regression model in Table 7. In these models, the time-invariant labor market institutions and all other time-invariant variables are absorbed in the country fixed effects. We find that flexible intermediate adaptation is again positively

and significantly associated with country-level profitability. Among the control variables, the annual GDP growth rate and the natural logarithm of the estimated Herfindahl industry concentration index continue to be positively and significantly associated with ROA even when country fixed effects are included.

Finally, we run a series of productivity analyses to examine whether flexible intermediate adaptation leads to a bigger pie that can potentially be enjoyed by both the company and its workers. Here, as earlier, we start with OLS models that allow for clustering at the country level. In Table 8, we find that our alternative proxies for productivity, which include value added per employee and quasi-rents per employee, are determined in no small part by the same types of labor market institutions and adaptation choices as is ROA. We find that flexible intermediate adaptation is strongly and positively associated with productivity. We also find that specific institutions affecting the rights of labor are most significant in explaining productivity as the alternative dependent variable.¹⁵

Next, we use the time-varying independent variables from the productivity analysis in Table 8 to run a series of fixed-effect regressions in Table 9. We find robust results. Then, we show further robust results using the log of total factor productivity as the dependent variable with the Levinsohn and Petrin (2003) method of controlling for unobserved productivity shocks. In a working paper, Wooldridge (2005) has also proposed his own refinement of the Levinsohn and Petrin (2003) method, and we get substantively identical results using his method of controlling for unobserved productivity shocks.¹⁶ As shown in Table 9, even using the most advanced methods for estimating productivity with fixed effects, we find that flexible intermediate adaptation continues to be significantly associated with higher productivity. This

¹⁵ The institutional variables tested include the extent to which hiring and firing practices of companies are decided by private contract, from the Fraser Institute, and, from Botero et al. (2004), whether there are government-issued priority rules applying to dismissals or layoffs, the generosity of government-provided sickness and health benefits, and whether the law allows closed union shops. We check for robustness with the same control variables from Tables 6 and 7. Most have no prior theoretical connection to productivity and never showed up significant in any productivity specification. *Rule of law distance* sometimes displays significance with a positive sign and often is insignificantly different from zero. Our labor variables of interest are highly robust to the inclusion of *rule of law distance* and the other control variables, as seen in Table 8.

¹⁶ We are grateful to Amil Petrin for sharing Stata code for implementing the Wooldridge (2005) variation on the Levinsohn and Petrin (2003) method.

Table 8 Robustness Checks Using Productivity Indicators

Model 1. DV: <i>value added per worker</i>						
<i>Intermediate two-part transplantation</i>	Fraser Institute: <i>hiring and firing practices</i> (definition: the extent to which hiring and firing practices of companies are decided by private contract) (measured in 2000)	<i>Only consumables</i>	<i>Only machines</i>	<i>Log GDP per capita</i>	<i>Annual GDP growth rate</i>	<i>POLCONIII political constraint distance</i>
48,692.52*** [8,875.18]	11,242.78** [4,897.60]	668.01 [9,168.17]	52,810.37*** [14,615.46]	47,433.05** [19,488.68]	−272.00 [475.79]	116,572.80 [123,693.70]
<i>Rule of law distance</i>	<i>Gleditsch-Ward geographic distance</i>	<i>Lincoln market share</i>	<i>Log Herfindahl index</i>	<i>Egalitarianism distance (instrumented)</i>	<i>Estimated hourly labor costs</i>	
15,226.61* [7,825.36]	564.53 [2,141.50]	−2,286.91** [815.08]	12,639.84 [11,573.23]	−57,049.33 [113,972.30]	1,901.23 [1,178.16]	
	Obs.: 115	Number of countries: 16	<i>p</i> -value: 0.000	<i>R</i> -squared: 0.568		
Model 2. DV: <i>value added per worker</i>						
<i>Intermediate two-part transplantation</i>	<i>There are government-issued priority rules applying to dismissals or layoffs</i> (from Botero et al. 2004 database)	<i>Only consumables</i>	<i>Only machines</i>	<i>Log GDP per capita</i>	<i>Annual GDP growth rate</i>	<i>POLCONIII political constraint distance</i>
26,770.48*** [8,522.05]	−14,963.62** [6,528.60]	18,289.99 [12,802.54]	47,458.76*** [11,154.61]	64,727.06*** [18,913.11]	−337.13 [498.30]	240,220.90* [113,540.30]
<i>Rule of law distance</i>	<i>Gleditsch-Ward geographic distance</i>	<i>Lincoln market share</i>	<i>Log Herfindahl index</i>	<i>Egalitarianism distance (instrumented)</i>	<i>Estimated hourly labor costs</i>	
18,417.97** [6,987.75]	−3,263.72** [1,267.68]	−2,389.13** [823.67]	22,343.13 [13,833.63]	−174,154.40 [117,376.70]	818.59 [907.51]	
	Obs.: 115	Number of countries: 16	<i>p</i> -value: 0.000	<i>R</i> -squared: 0.566		
Model 3. DV: <i>value added per worker</i>						
<i>Intermediate two-part transplantation</i>	Botero et al. (2004): <i>protections accorded workers by government-provided sickness and health benefits</i> . First, Botero et al. locate the share of the worker's monthly salary deducted by law to cover sickness and health benefits. Then they normalize the variable from 0 to 1, where higher values mean lower deductions (higher protection) (from Botero et al. 2004 database)	<i>Only consumables</i>	<i>Only machines</i>	<i>Log GDP per capita</i>	<i>Annual GDP growth rate</i>	<i>POLCONIII political constraint distance</i>
56,004.68*** [16,049.08]	35,467.50*** [9,167.84]	14,202.79 [16,005.58]	50,573.95*** [10,726.39]	44,337.85 [26,909.56]	−398.63 [743.02]	230,632.00 [252,753.10]
<i>Rule of law distance</i>	<i>Gleditsch-Ward geographic distance</i>	<i>Lincoln market share</i>	<i>Log Herfindahl index</i>	<i>Egalitarianism distance (instrumented)</i>	<i>Estimated hourly labor costs</i>	
11,570.08 [8,007.93]	−4,789.03*** [774.57]	−2,462.74** [982.49]	22,600.11 [15,410.82]	−135,673.50 [114,702.60]	879.85 [1,073.36]	
	Obs.: 108	Number of countries: 15	<i>p</i> -value: 0.000	<i>R</i> -squared: 0.498		
Model 4. DV: <i>value added per worker</i>						
<i>Intermediate two-part transplantation</i>	<i>Law allows closed union shops</i> (from Botero et al. 2004 database)	<i>Only consumables</i>	<i>Only machines</i>	<i>Log GDP per capita</i>	<i>Annual GDP growth rate</i>	<i>POLCONIII political constraint distance</i>
37,022.95** [13,227.39]	−18,072.74*** [5,319.33]	13,472.73 [14,732.09]	35,623.35*** [10,884.69]	61,016.07** [21,024.32]	−209.31 [483.52]	197,783.20 [120,420.00]
<i>Rule of law distance</i>	<i>Gleditsch-Ward geographic distance</i>	<i>Lincoln market share</i>	<i>Log Herfindahl index</i>	<i>Egalitarianism distance (instrumented)</i>	<i>Estimated hourly labor costs</i>	
18,225.43** [7,554.41]	−3,745.77*** [966.64]	−2,418.11** [912.32]	17,690.26 [13,673.38]	−254,006.20* [127,256.00]	682.71 [1,015.57]	
	Obs.: 115	Number of countries: 16	<i>p</i> -value: 0.000	<i>R</i> -squared: 0.560		

Table 8 (Continued)

Model 5. Alternative DV: <i>quasi-rents per worker</i> (using 5% capital stock rental assumption)						
<i>Intermediate two-part transplantation</i>	<i>Law allows closed union shops</i> (from Botero et al. 2004 database)	<i>Only consumables</i>	<i>Only machines</i>	<i>Log GDP per capita</i>	<i>Annual GDP growth rate</i>	<i>POLCONIII political constraint distance</i>
42,674.70** [15,812.57]	-17,729.10*** [5,384.54]	4,889.01 [17,995.32]	36,920.57*** [11,388.45]	47,904.02* [22,584.27]	541.63 [499.90]	82,325.78 [131,795.90]
<i>Rule of law distance</i>	<i>Gleditsch-Ward geographic distance</i>	<i>Lincoln market share</i>	<i>Log Herfindahl index</i>	<i>Egalitarianism distance</i> (instrumented)	<i>Estimated hourly labor costs</i>	
13,775.58 [8,043.76]	-7,372.16*** [938.68]	-1,913.27** [834.71]	13,779.00 [15,665.14]	-17,034.46 [126,260.30]	-895.02 [1,064.26]	
	Obs.: 111	Number of countries: 16	<i>p</i> -value: 0.000	<i>R</i> -squared: 0.582		
Model 6. Alternative DV: <i>quasi-rents per worker</i> (using 10% capital stock rental assumption)						
<i>Intermediate two-part transplantation</i>	<i>Law allows closed union shops</i> (from Botero et al. 2004 database)	<i>Only consumables</i>	<i>Only machines</i>	<i>Log GDP per capita</i>	<i>Annual GDP growth rate</i>	<i>POLCONIII political constraint distance</i>
40,998.66** [16,251.10]	-18,630.46*** [5,374.18]	7,317.64 [18,370.20]	38,755.09*** [11,495.65]	51,188.48** [22,837.72]	563.23 [505.62]	104,408.20 [133,085.50]
<i>Rule of law distance</i>	<i>Gleditsch-Ward geographic distance</i>	<i>Lincoln market share</i>	<i>Log Herfindahl index</i>	<i>Egalitarianism distance</i> (instrumented)	<i>Estimated hourly labor costs</i>	
14,443.24* [8,164.44]	-7,427.10*** [1,035.87]	-1,973.55** [836.19]	17,103.20 [15,818.94]	-15,837.15 [128,034.20]	-1,064.99 [1,115.10]	
	Obs.: 111	Number of countries: 16	<i>p</i> -value: 0.000	<i>R</i> -squared: 0.578		

Notes. This table shows the results of OLS regressions in which *value added per employee* and *quasi-rents per employee* serve as alternative dependent variables (DVs). Robust standard errors corrected for clustering at the country level appear below the coefficients in brackets. In Models 1–6, the sample size is reduced because POLCONIII political constraint distance is included; thus, years 2005 and 2006 are not available for those models. In Model 3, the labor market variable is available for 15 of 16 countries, and hence the sample is further reduced by several observations. Also, there are five historical country-year data points missing information for employee headcount. Also, when studying *quasi-rents per worker*, there are four other country-year data points missing historical information for annual number of hours worked.

*Significant at 10%; **significant at 5%; ***significant at 1%.

is true even after controlling for country fixed effects and the time-varying controls.¹⁷

7. Discussion and Conclusion

We show in this paper that the profitability and productivity of a major and often-studied multinational manufacturer known for its use of pay-for-performance incentives depends critically on choices made decades ago by each host society on whether to significantly protect the interests of organized labor and limit the use of incentive pay practices. Perhaps more importantly, in addition to showing the influence of specific labor market rules on company profitability

and productivity, we show that companies need not throw up their hands and give up in the presence of institutional distance. We find that Lincoln Electric over a period of time was able to adapt to institutional adversity and to actually make up for a great proportion of this institutional distance through creative management. Of course, institutional distance can and does present a serious managerial challenge for multinational firms (Siegel et al. 2008), but managers have the opportunity to adapt successfully to adverse institutional conditions. Lincoln Electric believes that it needs to be present in nearly all large markets to stay competitive with its other multinational competitors for the long term, and research suggests that there are a number of industries where this is also the case (Bognanno et al. 2005). By arriving at flexible intermediate combinations of its core practices, the company was able to succeed and even thrive in seemingly hostile environments. This is strong and powerful evidence for the idea that companies need not automatically avoid institutionally adverse environments.

¹⁷ We also find substantively similar results using alternative formulations for labor inputs in these specifications, including total estimated worker hours in a year by subsidiary and total compensation costs as recorded by Lincoln headquarters (but the latter include wages plus any productivity bonus and are only available starting from the year 2000 and for 15 of 16 subsidiaries). See EC.9 in the e-companion, Parts 1 and 2, for these encouraging robustness checks.

Table 9 Fixed-Effects Productivity Estimation, Including the Use of the Levinsohn and Petrin (2003) Method for Fixed-Effects Productivity Estimation and Wooldridge's (2005) Proposed Refinement to the Levinsohn and Petrin (2003) Method

<i>Intermediate two-part transplantation</i>	<i>Log GDP per capita</i>	<i>Annual GDP growth rate</i>	<i>Lincoln market share</i>	<i>Log Herfindahl index</i>	<i>Estimated hourly labor costs</i>
Model 1. Fixed-effects productivity estimation using DV: <i>value added per worker</i>					
12,331.05*** [4,153.36]	29,563.65 [53,496.31]	−387.89 [472.79]	−384.49 [994.79]	87,917.17*** [23,773.99]	2,245.70*** [570.92]
Obs.: 143	Number of countries: 16	<i>p</i> -value: 0.001	<i>R</i> -squared (within): 0.356		
Model 2. Fixed-effects productivity estimation using DV: <i>quasi-rents per worker</i> (using 5% capital stock rental assumption)					
18,430.34** [6,834.69]	−31,785.05 [69,974.79]	43.50 [579.06]	521.50 [1,153.67]	107,588.20*** [22,458.74]	−257.84 [1,048.86]
Obs.: 143	Number of countries: 16	<i>p</i> -value: 0.001	<i>R</i> -squared (within): 0.204		
Model 3. Fixed-effects productivity estimation using DV: <i>quasi-rents per worker</i> (using 10% capital stock rental assumption)					
19,608.32** [7,118.36]	−33,827.81 [70,638.09]	76.88 [589.14]	482.98 [1,164.93]	110,368.30*** [22,663.16]	−394.98 [1,113.39]
Obs.: 143	Number of countries: 16	<i>p</i> -value: 0.001	<i>R</i> -squared (within): 0.204		
Model 4. Fixed-effects productivity estimation using the Levinsohn and Petrin (2003) method with DV: <i>log(total factor productivity) using sales</i>					
0.065*** [0.017]	−0.208 [0.203]	0.002 [0.003]	−0.002 [0.003]	0.118* [0.067]	−0.005** [0.002]
Obs.: 143	Number of countries: 16	<i>p</i> -value: 0.013	<i>R</i> -squared (within): 0.189		
Model 5. Fixed-effects productivity estimation using the Levinsohn and Petrin (2003) method with DV: <i>log(total factor productivity) using value added</i>					
0.653*** [0.149]	−0.865 [1.193]	0.066 [0.044]	0.052** [0.025]	0.455 [0.454]	0.014 [0.012]
Obs.: 142	Number of countries: 16	<i>p</i> -value: 0.000	<i>R</i> -squared (within): 0.334		
Model 6. Fixed-effects productivity estimation with robustness check using Wooldridge's (2005) variation on the Levinsohn and Petrin (2003) method with DV: <i>log(total factor productivity) using sales</i>					
0.502*** [0.108]	0.648 [1.070]	0.039* [0.020]	0.038* [0.021]	0.329 [0.324]	0.029*** [0.009]
Obs.: 143	Number of countries: 16	<i>p</i> -value: 0.000	<i>R</i> -squared (within): 0.625		
Model 7. Fixed-effects productivity estimation with robustness check using Wooldridge's (2005) variation on the Levinsohn and Petrin (2003) method with DV: <i>log(total factor productivity) using value added</i>					
0.641*** [0.152]	−0.930 [1.205]	0.066 [0.044]	0.053** [0.025]	0.451 [0.478]	0.014 [0.012]
Obs.: 142	Number of countries: 16	<i>p</i> -value: 0.000	<i>R</i> -squared (within): 0.331		

Notes. This table shows the results of fixed-effects regressions in which productivity is a function of *intermediate two-part transplantation* and other time-varying controls. Robust standard errors are corrected for clustering at the country level and appear below the coefficients in brackets. In Models 1–7, there are five historical country-year data points missing information for employee headcount. Also, when studying *quasi-rents per worker*, there are four other country-year data points missing historical information for annual number of hours worked. The sample size is 142 instead of 143 when examining *log(ValueAdded)* because there is one country-year observation with a negative *value added* value, and a natural logarithm cannot be calculated for a negative real number.

*Significant at 10%; **significant at 5%; ***significant at 1%.

Yet, to succeed under conditions of high institutional distance, companies will have to rely on flexible adaptation that preserves the productivity-enhancing features of their competitive advantage while fitting in with local constraints.

This study suggests that prior studies of FDI performance may have missed an important set of

institutional variables related to the labor market. Although institutions examined in prior studies, such as policy stability and the rule of law, are no doubt important, it should be evident from this study that labor market institutions may have a comparably large effect on FDI performance. We know from recent survey evidence that a broad range of

U.S. manufacturing industries rely on the use of incentive pay-for-performance (e.g., Mercer Human Resource Consulting 2006). Yet an obvious limitation of this study is its use of a one-company sample. We believe this company is likely representative of a large set of multinationals that rely on labor productivity for competitive advantage, and we hope in the future to examine the effect of labor market institutions on the performance and productivity of a larger sample of multinational firms in both manufacturing and service industries.

This study suggests that flexible intermediate adaptation is better for multinational firm performance in the presence of institutional distance than either wholesale transplantation of home-country practices or total adaptation to local institutions. In future work, we also hope to examine how companies identify these intermediate forms of adaptation and whether the lessons from Lincoln Electric can be generalized to the wider population of manufacturing- and service-sector multinational firms.

Finally, this paper focuses on Lincoln Electric, the firm that has been the poster child for teaching the virtues of complementarity (Milgrom and Roberts 1995). Yet we find that there is no universal bundle of practices that is optimal for every institutional environment. Instead, there often is a unique bundle that needs to be calibrated to fit with relevant local institutions. Our study strongly suggests that the theory of complementarity needs to be made more institutionally contingent, and our findings support the notion of complementarity as a social construct that only exists when there is a fit between management practices and both de jure and de facto rules and institutions in the external environment. These findings suggest that multinational managers should not seek out a universal bundle of practices that is highly transferable between countries. Rather, as argued by Ghemawat (2007), managers should view global strategy as often requiring country-specific strategies that match a unique combination of practices to a specific set of local institutional conditions. One of the potential competitive advantages of the multinational is its ability to transfer best practices across countries and identify new combinations of management best practices by comparing experiences across a variety of host markets. However, optimality in a firm's management practice depends on the nature of local institutions and in no small part on the pro-labor or promanufacturer orientation of these institutions.

8. Electronic Companion

An electronic companion to this paper is available as part of the online version that can be found at <http://mansci.journal.informs.org/>.

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