

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

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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 1996-2005 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 that Lincoln Electric performed significantly better in countries that allowed unconstrained use of incentive pay-for-performance. Furthermore, we find that in countries with labor market institutions unfriendly to manufacturers, the company was still able to enhance its performance significantly 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 the global strategy field is how multinational firms should navigate their way through multiple and often conflicting host-country institutional environments (Ghoshal and Westney 1992, Morgan et al. 2001). In spite of the fact that most foreign direct investment (FDI) is still conducted by manufacturing companies whose profitability derives in large part from achieving labor productivity, we still know surprisingly little about whether labor market institutions, defined as formal and informal rules governing the labor market, matter for the operating performance of FDI, and if so which ones matter and how much they matter. 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 (see one notable exception by Zaheer, 1995).

The following questions are still largely understudied. Under what conditions should multinational firms simply avoid institutionally incompatible environments when the institutions affect

basic rules of work, and what in fact makes an environment institutionally incompatible? How far should multinational firms go in adapting to different institutional environments? When should a multinational firm hold the line and introduce what at first appears to be an incongruent organizational practice into a host country? Whereas some past studies have examined the likelihood of transfer of organizational practices abroad, remarkably few have examined the effect of strategic adaptation on firm performance. Adaptation is one of the most important strategies in international business (Prahalad and Doz 1987, Ghemawat 2003), and yet a recent literature review shows that little is known about the optimal level of adaptation by multinational firms to *any* local market institutions (Dow 2006).

To answer these questions, we leverage a unique quasi-natural experiment. We emphasize that this is a quasi-natural experiment because Lincoln Electric long ago decided that it needed to be present in nearly every one of the world's largest welding markets; through this decision rule, Lincoln Electric was not more or less likely to enter a specific large market because of its labor market institutions. Lincoln Electric is notable within the welding industry for its investment in a diverse range of the largest 20 markets (in North America, South America, Europe, Asia, and Australia). Yet while Lincoln Electric is unusual even in its industry for its broad global footprint, it is important to point out that it is likely representative of a wider universe of horizontal U.S. multinational enterprises (those producing and selling directly in foreign markets to foreign consumers). Bognanno et al. (2005) show how U.S. MNEs from 1982-1991 would rather avoid host countries with strong unions and work councils but would still enter when the market was large. Our analysis is supported by an effort to control for alternative explanations (including alternative institutional explanations) as well as an effort to correct for serial autocorrelation in performance within countries over time.

Lincoln Electric is one of the most studied companies of all time in MBA programs, and it operates in a representative manufacturing industry where profits have historically derived in large part from labor productivity. Furthermore, Lincoln Electric pioneered a diverse set of incentive practices in the first half of the 20th century, many of which—particularly the discretionary bonus—have been increasingly adopted. One of the reasons that there have been so few studies of multinational firms

interacting with conflicting labor market institutions is that it is costly to go to each country and measure the labor market institutions, and it can be even more costly and often infeasible to interview every operations manager of every host country for even a single multinational firm. We spent parts of the past year interviewing Lincoln Electric managers around the globe, and we have at the same time interviewed local labor market experts and studied local labor laws and regulations around the globe. Together, these efforts have allowed us to implement what is to our knowledge 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 that support manufacturers' interests and in countries that allow unconstrained use of incentive pay-for-performance. Furthermore, we find that in countries with labor market institutions that were unfriendly to manufacturers, the company 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 1992; Ichniowski and Shaw 2003) needs to be made more globally and institutionally contingent. A bundle of managerial practices may complement each other (with the payoffs for each increasing in the presence of the others), but that complementarity may be predicated on the precise characteristics of fundamental institutions of capitalism in the country, such as whether the institutions carry more of a pro-labor or a pro-capitalist orientation. Practices that complement each other in the United States may often not do so in a different institutional environment. While the laws of efficiency do not vary radically across the globe, the optimal bundle of practices may vary to a moderate degree according to the institutional variation across countries. The multinational firm should be cognizant of the effect of labor market institutions on performance, and if the effect is large enough the firm may need to consider moving its resources to friendlier institutional environments. If a firm needs to be in a given market for other reasons (such as market size), the optimal mix of labor market practices is not radically different but needs to be customized in a flexible, intermediate form of adaptation. The optimal mix of labor practices for Lincoln Electric was often different in each country, and successful adaptations were based on

managers optimizing between the bundle of practices that worked most efficiently in Lincoln's flagship Cleveland, Ohio operation and the practices that could work best in each host institutional environment.

We proceed as follows. First, we discuss past research on labor market institutions and their effect on strategic choice and performance. Most such studies look at a single country rather than studying the global firm encountering multiple institutional environments. Second, we briefly introduce Lincoln Electric and its business strategy. Third, we discuss our method for implementing the quasi-natural experiment. Fourth, we discuss the data we have collected. Fifth, we discuss our results, and finally we conclude by relating how our study can inform future research.

2. Labor Market Institutions and Strategy

Most prior research in this area has looked at firms within a single country and shows that pro-labor oriented institutions result in lower company profitability and/or job growth (i.e., Clark 1984, Leonard 1992, Frank 2007). Absent productivity benefits, unions have been shown in single-country studies to decrease firm profits with their higher wages and work restrictions (Hirsch 2004). The evidence of the productivity benefit in these single-country studies is largely absent. The average effect of unions on productivity is very close to zero, with results just as likely to show small positive as small negative effects (Doucouliagos and Laroche 2003; Hirsch 2004). However, the result that unions are associated with lower profits is uncontroversial (Freeman and Medoff 1984; Hirsch 2004).

Surprisingly, there has been no work to our knowledge that has sought to explain multinational firms' performance as a function of labor market rules and regulations in each host country. One study looks at the presence of unions across a multinational firm's 31 plants and finds that the negative effect of unions on performance can potentially be counteracted but at the cost of retraining the management and shifting away from labor-oriented production (Mefford 1986). Moreover, while there has been a great deal of work within the international human resource management and international business literatures using rich qualitative case studies to study why and how Japanese and other multinational firms' labor practices are transferred abroad (e.g., Elger and Smith 1994, Morgan et al. 2001), there has been little past

work using econometric techniques and a diverse range of control variables to explain how labor market institutions affect the multinational firm's strategic choices across multiple host nations.

The literature seems sharply divided between those authors who hypothesize that multinational firms should adapt as little as possible to local labor market institutions, and those authors who hypothesize that multinational firms should maximally adapt to the full range of local institutions. Actual empirical tests of the effect of adaptation on performance are few and far between (Dow 2006).

Among those who advocate maximum adaptation to local labor market institutions, the main arguments were inspired by neo-institutionalization theory. Kostova (1999) defines institutional distance based on three dimensions from institutionalization theory – regulatory, cognitive, and normative – and goes on to argue that if an organizational practice was in conflict with local laws and regulations, then the foreign employees would not be willing to take the risk of instituting the practice. Earlier work by Rosenzweig and Singh (1991) makes a related argument, namely that legal requirements in the host countries are a strong adaptation constraint because they represent a form of “coercive isomorphism” (DiMaggio and Powell 1983). Rosenzweig and Nohria (1994) argue that of all organizational practices, labor practices are the most likely to be adapted to the local environment, given that they are often mandated by local laws and regulations or else enforced by informal norms and conventions. Moreover, if the practice were in conflict with the cognitive and normative institutions in the local environment, then local employees would have difficulty understanding, interpreting, and judging the practice correctly (1994: 315). Multinational firms would likely face resistance if the practice violated the different assumptions and value systems of the local culture (Beechler and Yang 1994).

Yet there are few empirical tests of these general institutional hypotheses. Beechler and Yang's evidence is based on two plants, and Rosenzweig and Nohria (1994) find only marginal support in their survey of foreign multinational firms operating in the U.S., perhaps because U.S. unions were relatively weaker in pressing their demands for local adaptation than unions in some European countries might be (Rosenzweig and Nohria 1994: 249). In their survey of multinational firms operating in Greece, Myloni,

Harzing, and Mirza (2004) find mixed evidence in support of this hypothesis. Greek unions may have been able to push successfully for local adaptation on some issues but not on others.

Rosenzweig and Singh (1991) posit that market-seeking horizontal MNEs are dependent on local resources and thus have a greater need to gain local legitimacy both to access these local resources and to secure local sales. Thus, local legitimacy depends on adaptation to local organizational practices. Zaheer (1995) hypothesizes that a market-seeking horizontal MNE would see the greatest need to adapt to local practice, because these MNEs compete on a local-for-local basis (i.e., with products produced and sold locally) and therefore have greater need to engage in local isomorphism. Zaheer (1995) in her analysis finds, however, that American MNEs in the foreign exchange trading industry, in spite of being market-seeking, horizontal MNEs, actually benefited by not imitating local Japanese practices of using microcontrols and not using market controls.

Few authors argue, in contrast, that firms should not adapt to local labor institutions. When a firm has a universally superior organizational practice, it can transfer the practice successfully to even institutionally distant countries and produce a performance benefit. Zaheer (1995) shows in the case of foreign exchange trading rooms that market controls were clearly a superior organizational practice.

Even if an organizational practice is not universally superior, it may be successful in a culturally distant market because it allows the firm to operate in a manner that some sector of the local population would prefer. Gamble (2003) describes a UK-based retailer that transferred its flat hierarchy and use of first names to its store in Shanghai, China. These practices actually may have attracted the retailer's desired set of workers and may have facilitated superior performance. Also, using a related logic, Szulanski and Jensen (2006) argue that if the firm does not understand the complexity of interactions among its activities, then it should not "presumptively" adapt to different local conditions.

In summary, past work would suggest that pro-labor-oriented institutions negatively impact firm profitability, but there have been virtually no studies of multinational firms assessing which among the possible set of labor market institutions matter most and how much they matter. We do not know whether multinational firms from countries with institutions favoring firms should systematically avoid countries

with pro-labor-oriented institutions or whether any institutional difference can be bridged through adaptation to local practice. Moreover, we know little about what is the optimal amount of adaptation.

3. Method

One explanation for the paucity of work on labor market institutions, adaptation choices, and multinational firm performance is found in a combination of data constraints. To test for causality, ideally one would hope to have a natural experimental design, in which the same firm interacts with widely varying institutions. Even when one finds a firm that has decided as a decision rule that it needs to be present in all large markets, data availability has been the primary constraint. To measure the interrelationship between institutions, strategic choice, and performance, the preferable method would be to go inside a multinational firm and hand-collect data from across its subsidiaries. We spent parts of the past 12 months collecting such data (which will be described below), and we use the data to estimate the following OLS regression for country-years during 1996-2005:

$$(1) \text{ROA}_{it} = \beta_0 + \beta_1 * \text{Labor Market Institution}_{it} \\ + \beta_2 * \text{GDP Growth Rate}_{it} + \beta_3 * \text{Only Consumables}_{it} \\ + \beta_4 * \text{Only Machines}_{it} + \varepsilon_{it},$$

where subsidiary i 's ROA in year t is determined by the labor market institution of interest, the GDP growth rate, whether the subsidiary only produces consumable welding products in the host market, and whether the subsidiary only produces machine products in the host market. Because the labor market institutions are time-invariant, we cannot use a fixed-effects model. However, we are able to cluster the standard errors by host country and, to account for serial autocorrelation we show that the results are robust to using the Cochrane-Orcutt estimator instead of OLS.

4. A Wider Range of Labor Institutions

While prior studies have focused in large measure on a dummy variable for union strength, we propose to examine a richer variety of labor market institutions that might substantially affect multinational firms' performance abroad. In this study we look at five distinct types of labor institutions.

The first set of institutions focuses on a host country government's attempt to mandate working conditions and to protect workers from disability and other injury incurred in the workplace. Governments enact these mandatory constraints on working conditions in order to protect workers from perceived abuses of employer market power. We focus in this study on legal limits on the number of hours in the workweek and on the law defining who pays for disability insurance (the worker, the employer, or the government itself). We examine whether all mandatory constraints hinder multinational firm performance and whether some government interventions, such as assuming the cost of disability insurance, actually raise multinational firm performance.

A second set of institutions focuses on the ability of workers to join together for collective action. We are interested in institutions such as closed shop rules which make unions more powerful in demanding wage gains and other manufacturer concessions, and we are interested in the percentage of workers in a country that are covered by collective agreements.

The third set of institutions focuses on empowering workers to participate in management. Some countries legally empower workers to participate in management through workers' councils. The effect of these institutions may be to limit management discretion in investment and to constrain flexible work rules on the plant floor. Alternatively, participation may also result in greater long-term worker commitment. The net effect of this set of institutions is unclear and is an empirical question.

The fourth set of institutions focuses on legal rights for workers during a labor dispute, specifically whether workers receive any legal protection during a strike and whether a third-party arbitrator is authorized by law to resolve the dispute. These institutions clearly can serve as an incentive for workers to strike as a means of realizing their demands. Also in this category are institutions that make dismissing workers relatively difficult or easy.

The fifth set of institutions focuses on the ability of companies to use pay-for-performance incentive practices. Whereas the four sets of labor institutions described above have data for the late 1990s compiled by Botero et al. (2004), this latter set of institutions has surprisingly not been the subject of past study or data collection efforts. Hence, we develop our own database and collect data for this set

of labor market institutions. We focus first on companies' ability to use piecework, not because piecework specifically is used by many companies but because piecework is a proxy for overall pay-for-performance incentives. Next, we focus on companies' freedom to pay discretionary bonuses to workers. Some countries actually restrict companies from paying a bonus one year and none the next. In other countries, companies are required to pay out a set percentage of profits to all eligible employees, regardless of individual contributions. The net result is that companies may be limited in their ability to use pay-for-performance incentives in host countries.

5. The Case of Lincoln Electric

Lincoln Electric is a welding manufacturer based in Cleveland, Ohio. Over the past 60 years, the company has been the subject of academic interest for its use of incentives. Lincoln Electric pioneered a set of incentive pay-for-performance practices in the first part of the 20th century, and survey evidence shows that a broad range of U.S. manufacturing industries have come to increasingly rely on using incentive pay-for-performance for their own production workers (i.e., Hay Group, 2004; Mercer Human Resource Consulting, 2006; Watson Wyatt Data Services, 2006). Founded in 1895, Lincoln Electric produces both welding machines and consumable products for those machines. Over the course of the 20th century, Lincoln Electric was able to outlast and defeat a series of significant competitors in its industry, including General Electric and Westinghouse. In 2005, the company had manufacturing operations in 19 countries and \$1.86 billion in revenues.

The company's historical competitive advantage has stemmed from its industry-leading productivity, which has been attributed largely to the company's management system. The system consists of four main components: the use of piecework, a discretionary annual bonus based on individual and company performance, an individual merit rating used to determine the annual bonus, and a voluntary employee advisory board that works to generate productivity-enhancing innovations. In addition to those four main components, Lincoln Electric uses a number of complementary management practices. It uses few supervisors on the plant floor and attempts to assign a great deal of autonomy to its

factory employees. In Cleveland, the company set 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 occurred in the late 1980s and resulted in initial failure. There were numerous potential explanations for the difficulties faced after this first wave of expansion. The company wanted its new foreign subsidiaries to operate in Lincoln USA's image, and the company's international managers were expected to introduce piecework, a bonus system, and an advisory board (Dawson 1999: 41). Many workers in Western Europe in particular did not want to adopt the company's recommended practices (Hastings 1999). The company was also unlucky in having bought companies in Europe just prior to a global economic downturn. Past case histories of Lincoln Electric's experience during this period of time hypothesized that the company's strategic success was incumbent on the host country having pro-capitalist/pro-manufacturer institutions (Chilton 1993a, 1993b, Dawson 1999, Hastings 1999, Maciariello 2000). Still, none of the studies ever tested this hypothesis more than anecdotally.

Starting in 1996, companywide profitability returned, and the company renewed its global expansion. Over the next several years, Lincoln Electric chose to expand to nearly every large welding market in the world. It is because of that decision, and because there is a remarkable diversity of labor market institutions across those markets, that we have a unique quasi-natural experiment to implement.

6. Data

The primary dependent variable is ROA in the host country, measured as operating income divided by total assets. The sample is the entire set of country operations including the U.S. belonging to Lincoln Electric in its welding business in years 1996-2005. A small operation that Lincoln Electric owned in Ireland, but which was an entirely different business line and was managed separately, was purposely excluded from the analysis. Also, Lincoln Electric owned a minority stake in its Taiwanese joint venture partner, but had no say in the Taiwanese company's operation, and thus Taiwan was excluded from the analysis. Lastly, at the very end of the period, Lincoln Electric purchased a plant in Colombia, but since Lincoln Electric had barely closed the acquisition at the end of the period, Colombia is not part of the

sample. The results are substantively similar with or without the small Irish operation. The results are also substantively similar with or without the U.S. operation. The data were given to the authors by the company, and the sample covers years 1996-2005. (As a robustness check, we show in Appendix Table A that the results are similar if we use operating profit per employee instead of ROA.)

As a further robustness check, we will test in Table 9 whether similar results are obtained when we use two alternative proxies for productivity, value-added per employee and quasi-rents per employee (the latter based on Abowd and Lemieux (1993)), as the alternative dependent variable. For value-added per employee, we simply follow the standard convention in dividing the gross margin (in dollars) in each country operation by its number of employees. For quasi-rents per employee, we first use a simple definition. We take the gross margin and subtract from that the average manufacturing wage per hour in that country multiplied by the average number of manufacturing hours worked per year in that country multiplied by the number of workers in the Lincoln Electric operation in that country. We then divide the resulting number by the number of workers to get the quasi-rent per employee. As a further robustness check, we use the preceding definition of quasi-rents per employees with an additional wrinkle. We also test to see that we get the same results even if Lincoln Electric workers complete the same 2000 hours per year across the 16 countries. Next, we take the first definition of quasi-rents-per-worker and additionally subtract out the capital stock for that country operation multiplied by an estimate for the one-year percentage cost rate for employing that capital stock. Because Lincoln Electric had free cash flow to make a long series of foreign investments, we have to estimate the potential market cost for employing that capital stock. We test to see if the result is robust as the estimated cost of employing the capital stock starts at 5 percent and goes over 9 percent (a likely overestimate given Lincoln Electric's historical cost of debt). We run this series of robustness checks because we aim to show that our profitability results are consistent with a productivity story. Data on gross margins and the number of employees are from Lincoln Electric. Data on the average hourly compensation cost are from the Economist Intelligence Unit, and we get substantively similar results if we use the hourly compensation data from the ILO or BLS.

Annual data on the average number of manufacturing hours per worker per year are from the IMD World Competitiveness Yearbook.

The first set of independent variables focuses on labor market institutions in the host country. *b97hours_week* measures the maximum duration of the regular workweek (excluding overtime), normalized from 0 to 1, where higher values mean fewer hours of work (higher protection). If there is no legally mandated limit, the variable equals zero. *b97work_man_c* measures the protection of the workers' right to participation in management in the country's constitution. The variable equals one if there is a right to participation in management expressly granted by the constitution. It equals 0.67 if participation in management is mentioned as a state public policy or public interest (or simply mentioned within the chapter on rights). It equals 0.33 if participation in management is mentioned in the constitution. It equals zero otherwise. *b97index_work_manI* measures the legal rights of workers to participate in the management of the companies. This index is computed as the normalized sum of: (i) worker participation by law; and (ii) right to worker participation in management in the constitution. *Public disability benefits* measures the number of months of contributions or employment required by law to qualify for sickness benefits, normalized from 0 to 1, where higher values mean less contribution (higher protection). Data for these four variables come from Botero et al. (2004).

The next set of variables focuses on what legal protections workers enjoy during a labor dispute. *b97index_arbitr* equals one if compulsory third party arbitration during a labor dispute is mandated by law or if the government is always entitled to impose compulsory arbitration on the parties to a labor dispute. It equals zero otherwise. *b97index_col_displ* measures the level of protection of workers during a collective dispute. The index is computed as the normalized sum of: (i) legal strikes; (ii) procedural restrictions to strikes; (iii) employer defenses; (iv) compulsory third party arbitration during a labor dispute; and (v) right to industrial action in the constitution. *b97index_industrialI* measures the level of protection of industrial (collective) relations laws. The index is computed as the normalized sum of: (i) subindex of collective bargaining; (ii) subindex of worker participation in management; and (iii) subindex of collective disputes. Data for these three variables come from Botero et al. (2004). In a series of

robustness checks not reported here but available upon request, we utilize related variables but from a different data source (alternatively IMD's World Competitiveness Yearbook, Harvard Law School's 2004 Global Labor Survey, and the Fraser Institute). We get similar results with these alternative sources. Also, when we examine productivity as a robustness check, we also test whether a series of related variables on the rights of organized labor are most important in explaining productivity. Two related variables (also from Botero et al. 2004) indicate (a) whether strikes are legal even when a collective agreement is in force and (b) whether closed union shops are legal. We also utilize the Year 2000 data from the Fraser Institute on the share of the labor force whose wage is set by collective bargaining.

Next, we control for the real GDP growth rate. Data come from the Economist Intelligence Unit Country Data, for years 1996-2005. We also control for the product market coverage of Lincoln's local subsidiary. **Only Consumables** is set equal to 1 when the local subsidiary only produces consumable welding products, and is set equal to zero otherwise. **Only Machines** is set equal to 1 when the local country operation only produces welding machines, and is set equal to zero otherwise. In a set of robustness checks, we also test a series of related and collinear business-level variables. We test for Lincoln's prior-year market share, its prior-year share of the "accessible market," its self-evaluation of its product range relative to its best local competitor in machines, and its self-evaluation of its product range relative to its best local competitor in welding consumable products. Data come from Lincoln Electric.

Next, we examine the effect of specific labor laws and regulations related to piecework and discretionary bonuses. To collect data on these variables, we implemented an extensive survey of local country labor laws in addition to conducting interviews with local lawyers and labor experts. We measure (1) whether the law allows the unrestricted use of piecework and discretionary bonuses as compensation; (2) whether the law allow wages to be paid on a piece-rate (i.e., by the piece, rather than by the hour) basis; (3) whether the law requires companies to meet a minimum wage when paying piecework; (4) whether the law requires that workers being paid piece rate also receive paid vacation; (5) whether the law requires that workers being paid on a piece-rate basis be given the same amount of vacation pay as equivalent workers, based on rank or seniority; (6) whether the use of piecework is

restricted to certain industries; (7) whether the law permits employers to pay discretionary bonuses as the only form of bonus or variable pay; (8) whether the law permits employers to pay discretionary bonuses, but only as a supplement to some other required profit-related bonus or variable pay; (9) whether the country has regulations that prescribe a calculation formula or a lower/upper bound for discretionary bonuses; and (10) 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).

Next, we control for the role of labor costs. We collect data on manufacturing average hourly wage costs by country in U.S. dollars from the KILM data set of the International Labour Organization (ILO). We have hourly wage cost data covering individual years 1996-2005, and as a robustness check we also use the average for the 1996-2005 period. We also test for similar results when we use alternative data on average hourly compensation costs in U.S. dollars from the U.S. Bureau of Labor Statistics and the Economist Intelligence Unit (EIU). The three data sets on hourly compensation are almost perfectly correlated with one another; the only meaningful difference is that the EIU data includes EIU estimates for some missing country-years in the other two data sets. The EIU data therefore covers more country-years and allows for test with greater statistical power. We utilize all three sources to test for robustness.

We also control for the host country's level of development by taking the natural logarithm of GDP in 1996 constant dollars as well as the natural logarithm of GDP per capita. Data come from the Economist Intelligence Unit Country Data and are available for years 1996-2005.

To test for the role of policy instability in influencing FDI flows, we use Henisz's (2000) political constraints index (POLCONIII).¹ This measure estimates the feasibility of policy change (the extent to which a change in the preferences of any one political actor may lead to a change in government policy) by considering each political actor's ideology and veto power. Specifically, we take the squared distance of origin and host country-year observations.

To test for the role of corporate tax differences across countries, we use data on corporate tax rates from the World Tax Database of the University Michigan Office of Tax Policy Research (OTPR).

¹ We downloaded the 2006 release of POLCONIII from <http://www-management.wharton.upenn.edu/henisz/>.

We take the origin country's top corporate statutory tax rate and subtract from it the host country's top corporate statutory tax rate. Desai et al. (2005) use the OTPR data and, in their examination of the impact of taxation on corporate governance, emphasize the role of so-called high statutory corporate tax rates. Because the Michigan corporate tax data is available only through year 2002, we went to the original source of the data, the Center for International Trade and Economics (CITE) at the Heritage Foundation, and were able to augment the Michigan data set with corporate tax rates for 2003-2005.

Next, we control for the rule of law. We take the squared difference between the United States and each host country's scores on the Rule of Law (legality) index for 1998, the latter being an index of perceived compliance with protection of legal entitlements (property and contractual rights), and law and order. Data come from Kaufmann et al. (2003).

Next, to control for the role of geographic distance from the United States, we take the natural logarithm of the great circle distance between capital cities. Because we do not wish to exclude the United States from our data set, and following standard methodological practice in economics, we take the natural log of (great circle distance in kilometers + 1). This allows the U.S. to take a zero value on the natural log measure. We obtain similar results with or without the United States and with or without adding 1 to the great circle distance.²

Next, we examine data on actual adaptation of the Lincoln management system to each host country. We interviewed Lincoln managers across the globe to determine the local use of four major elements of Lincoln systems. We created dummy variables for whether the company uses piecework in its local operation; for whether the company pays discretionary bonuses in its local operation; for whether the company uses individual merit ratings in its local operation; and for whether the company uses an employee advisory board or an equivalent organizational practice. We set dummy variables equal to 1 if the local operation used a particular practice, and zero otherwise. We also used these variables to set up

² Data come from the Gleditsch-Ward Data Set on Great Circle Distance Between Capital Cities, accessed in January 2006 from <http://dss.ucsd.edu/~kgledits/capdist.html>. Distance data for any missing country pairs was accessed in January 2006 from <http://www.airport-accommodation.co.uk/worlddistances.php>.

interaction variables to count the combined use of multiple Lincoln system elements and also separately to measure the combination of specific system elements.

For a final robustness check, we include controls for 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 wages, and the volatility in the host country's foreign exchange rate. **rlint_long** measures the real interest rate, calculated by adjusting the nominal interest rate using a ratio of GDP deflators for the current and succeeding years. **relprcap_n** measures the relative price of capital, defined as the fixed investment deflator divided by the GDP deflator. **rlprfx_cpi_av** measures the real price of foreign exchange, calculated as the average exchange rate (in terms of local currency/US dollars) adjusted by a ratio of U.S. CPI to local-country CPI. The resulting values for each country were then normalized about their (country) means and multiplied by 100. **realwg_pct** measures the percentage change in hourly wages in local currency adjusted for inflation, over the previous year. Finally, we use multiple measures of foreign exchange rate volatility. To do so, first we take the real price of foreign exchange and then calculate the standard deviation of quarter-to-quarter changes in the real price of foreign exchange within each year. We examine the volatility using alternatively either the nominal quarter-to-quarter change in the real price of foreign exchange or the percentage quarter-to-quarter change. As a further robustness check, we confirm that the results are similar whether we use the U.S. CPI or the U.S. PPI to calculate the real price of foreign exchange. Data for the previous five variables come from the Economist Intelligence Unit Country Data, the OECD, and Global Financial Data.

7. Results

Summary statistics are presented in Table 1, and a correlation matrix is presented in Table 2. As shown, a number of the labor institutions are highly correlated with one another. They should therefore be seen as members of an institutional set, and one should be careful in attributing causality to any one specific labor institution. Still, as members of a coherent institutional set, it is clear that some countries create protections for workers that limit the workweek, that empower them to participate in management, that protect workers' interests during a labor dispute, and that provide public assistance in case of individual

employee injury. These institutions tend to go together; in other words, a country that limits the workweek also tends to empower workers to participate in company management and also tends to protect workers' interests during a labor dispute. What this means is that 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 pro-labor institutions, it is best not to enter them together into a regression and instead 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 exception to this institutional set is that countries that provide public assistance in case of individual employee injury appear to do so as a means of assisting employers' expenses. These countries are actually less likely to limit the workweek or to empower workers to participate in management.

The results of our initial specification are presented in Table 3. Labor institutions that limit the workweek and that give workers the right to participate in management are negatively associated with Lincoln Electric's country profitability in a statistically significant manner ($p < .05$). More pro-employer rules, including ones that uses public assistance to cover employee injury, are positively associated with Lincoln's country profitability ($p < .01$). 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 empower and protect labor, or else seek to protect companies and labor jointly (as in the case of public disability benefits). We further find that company profitability is aided by the individual country's real GDP growth rate. In some specifications, producing only machines or only consumables appeared suboptimal relative to the joint production of machines and consumables, but this was not a robust result in Table 3.

In Table 4, we consider the effect of other variables from Lincoln's internal data on market share and product range relative to the best local competitor in each region. We find that both market share and product range are positively and significantly associated with profitability. Still, the various measures of labor institutions continued to be significant even after controlling for GDP growth and either of the market share or product range measures.

Next, we examine whether our results are simply being driven by differences in labor costs. As shown in Table 5, we find that hourly labor costs averaged for 1996-2001 are unassociated with company profits. Indeed, based on labor costs, we would expect countries such as China and Indonesia to be more profitable; yet in fact, countries with relatively high labor costs such as the U.S. and Germany are among the most profitable. This result may be evidence that productivity in the individual plant and not unit labor costs was primarily responsible for performance, a finding that is consistent with Cushman's (1987) earlier evidence that productivity and not unit labor costs was most important for attracting overall U.S. foreign direct investment during the period 1963-1981.

Next we examine whether company profits depend upon the size or wealth of the host country. We find in the bottom of Table 5 that the log of host country GDP has no significant association with profitability. The log of host country GDP per capita is positive but not statistically significant either.

In Table 6 we examine the effect of institutions that enable or constrain the use of piecework and discretionary bonuses. We find in Model 1 that Lincoln Electric's profitability is significantly greater in countries that allow unrestricted use of piecework and discretionary bonuses as the main form of worker compensation. Interestingly, as shown in Models 2 and 5 of Table 6, it is not enough to have unconstrained use of just piecework or just discretionary bonuses. The one type of specific piecework regulation that is directly tied to country-level profitability is shown in Model 4. Lincoln Electric's profitability is significantly lower in countries that require that vacation pay be given on the same basis for piecework employees as for hourly/salaried workers. Other individual piecework and discretionary regulations are statistically insignificant, and in Model 7 we confirm that it is the unconstrained use of both piecework and discretionary bonuses that remains highly significant even after controlling for public disability benefits (our earlier proxy for the pro-manufacturer nature of overall labor regulations).

We then examine whether the transfer of specific Lincoln management system components is essential to company profitability. At first glance in Panel 1 of Table 7, the transfer of specific Lincoln components is positively associated with profitability. But when labor institutions are included as a further control variable in Panel 2, the statistical significance goes away. We conduct a principal

component analysis of the various labor institutions analyzed individually in this study (those shown in Tables 3 and 6) and use the first component in Panel 2 of Table 7. The first component is the same as taking a weighted average of the various labor institutions. A higher value on the first component signifies stronger labor protections, and a lower value on the first component reflects a pro-employer 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. As shown in Panel 3 of Table 7, if a host country has pro-labor-oriented institutions, Lincoln Electric more often only transplanted either one element of its management system or no elements at all. On the other hand, if a host country has pro-employer-oriented institutions, Lincoln Electric more often transferred all four of the main elements of its management system. What is most interesting is that we discovered through the course of our interviews that multiple Lincoln Electric subsidiaries have implemented interesting intermediate combinations of Lincoln practices best suited for the local host environment. We find in Table 7 that those truly intermediate and customized adaptations involving two of the four Lincoln components were not collinear with pro-labor or pro-employer orientation of the local labor institutions. When we interviewed Lincoln Electric subsidiary managers, we found that they had gone back and forth between Cleveland and their host country before deciding on an intermediate set of practices that would provide strong incentives but also operate smoothly in the local institutional environment.

Furthermore, the results in Table 8 show that these customized intermediate adaptations were positively and significantly associated with company profitability (p always $< .01$).³ Again using the principal component of labor market institutions, we find pro-labor institutions are negatively associated with Lincoln's country-level profitability (p always $< .05$ and often $< .01$). As shown in Table 8, while customized intermediate adaptation helps profitability at the country level, pro-labor institutions at the same time lowers profits. Customized intermediate adaptation is further shown to be robust in Model 10 to the inclusion of variables for all levels of adaptation (with zero adaptation as the reference case).

³ We also find that flexible intermediate adaptation is significant explaining not only ROA, but also operating profit per employee. These results are in Appendix Table A.

We find that the results are not just statistically significant but economically significant as well. Using the final Model 10, a shift from 0 to 1 on the flexible intermediate adaptation variable is associated with an 8.2 percent nominal increase in ROA. The effect of moving from the country with the most manufacturer-friendly labor institutions to the country with the most labor-friendly labor institutions is associated with a 10.7 percent nominal decrease in ROA. A one-standard deviation increase in the pro-labor orientation of local institutions is associated with a 2.9 percent nominal decrease in ROA.

We also run a series of other robustness checks. We find in Table 8 that the results hold even after the inclusion of real GDP growth rate, the earlier business mix variables, Henisz's POLCONIII index used as the distance between political stability in the host country and the U.S., the difference in corporate taxes between home and host countries, the distance in the rule of law between the U.S. and host country, geographic distance, and host-country log of GDP per capita. Finally, we show that our results are not the result of serial autocorrelation. We move from OLS to using instead the Cochrane-Orcutt estimator and show at the end of Table 8 that our main results still stand. Among the control variables, the POLCONIII distance measure was significant but then turns insignificant after implementing the Cochrane-Orcutt estimator. Geographic distance is negatively associated with company profitability and highly significant ($p < .01$) both in OLS and in using the Cochrane-Orcutt estimator.⁴ In a final robustness check not reported here, we find that Model 8 is further 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. Because of high collinearity among those last four control variables, we only include two of them at a time to avoid all of them turning insignificant.

Finally, we run a robustness check to further confirm that the profitability results are in fact consistent with our labor productivity story. In Table 9, we find that our alternative proxies for productivity, which include value-added per employee and quasi-rents per employee, are determined in

⁴ As a robustness check, we find substantively similar results for our main variables of interest when using the alternative Prais-Winsten estimator.

no small part by the same types of labor market institutions and adaptation choices as is ROA. As described early, these productivity measures are based in large part on the size of the company gross margin, and we know that gross margin in this industry is highly correlated with country size and GDP. Hence, we run simple models in which we control for the effect of country size and GDP (and product diversification) and see if the labor market institutions still matter. We find that flexible intermediate adaptation is highly correlated with either proxy for productivity (across a range of definitions for either proxy). In regards to labor market institutions, we find that specific institutions affecting the rights of organized labor are most significant in explaining productivity as the alternative dependent variable.⁵

8. Discussion and Conclusion

In summary, we show in this paper that the global profitability of a major and often-studied multinational manufacturer known for its use of pay-for-performance incentives depends on a combination of factors. Even after controlling for a host of alternative explanations, we find that local labor institutions exercise a direct effect on company profits. Moreover, the company's ability to find an intermediate form of adaptation to a host country institutional environment is positively associated with profitability.

This study suggests that prior studies of FDI performance may have missed an important set of institutional variables related to the labor market. While other 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 increasingly rely on the use of incentive pay-for-performance (i.e., Mercer Human Resource Consulting, 2006). The obvious next step is to look at the effect of labor market institutions on a large sample of multinational firms, both those in manufacturing and those in service industries. We hope to undertake that project next.

⁵ We also ran further robustness checks with the control variables from Table 8. Most have no prior theoretical connection to productivity and never showed up significant in any specification in explaining productivity. The one exception is rule of law distance, which often shows up significant. Our labor market institutions and adaptation variables are highly robust to the inclusion of rule of law distance; in fact they are even somewhat more statistically significant when rule of law distance is included.

This study suggests that intermediate and flexible adaptation is better for multinational firm performance than either wholesale transplantation of home-country practices or a total adaptation to local institutions. In future work we hope to examine how companies find these intermediate and flexible forms of adaptation and whether the lessons from the Lincoln Electric case can be generalized for 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 recalibrated to fit with the relevant local institutions. Our study strongly suggests that the theory of complementarity needs to be made more institutionally contingent. Optimality in a firm's bundle of management practices is likely dependent on the nature of local institutions, and in no small part dependent on the pro-labor or pro-manufacturer orientation of these institutions that vary significantly across countries.

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Table 1. Summary Statistics

Variable	Definition	Mean	Standard Deviation	Min	Max	Obs
ROA	Operating Income/Total Assets	0.091	0.118	-0.295	0.433	136
b97hours_week	This variable measures the maximum duration of the regular workweek (excluding overtime), normalized from 0 to 1, where higher values mean less hours of work (higher protection). If there is no legally mandated limit, the variable equals zero.	0.549	0.273	0	0.87	136
b97work_man_c	This variable measures the protection of the workers' right to participation in management in the country's constitution. The variable equals one if there is a 'right' to participation in management expressly granted by the constitution. It equals 0.67 if participation in management is mentioned as a state public policy or public interest (or simply mentioned within the chapter on rights). It equals 0.33 if participation in management is mentioned in the constitution. It equals zero otherwise.	0.333	0.437	0	1	136
b97index_work_man1	This index measures the legal rights of workers to participate in the management of the companies. This index is computed as the normalized sum of: (I) worker participation by law; and (ii) right to worker participation in management in the constitution.	0.292	0.319	0	1	136
b97index_arbitr	This variable equals one if compulsory third party arbitration during a labor dispute is mandated by law or if the government is always entitled to impose compulsory arbitration on the parties to a labor dispute. It equals zero otherwise.	0.426	0.496	0	1	136
b97index_col_disp1	This index measures the level of protection of workers during a collective dispute. The index is computed as the normalized sum of: (i) legal strikes; (ii) procedural restrictions to strikes; (iii) employer defenses; (iv) compulsory third party arbitration during a labor dispute; and (v) right to industrial action in the constitution.	0.504	0.163	0.217	0.75	136
b97index_industrial1	This index measures the level of protection of industrial (collective) relations laws. The index is computed as the normalized sum of: (i) subindex of collective bargaining; (ii) subindex of worker participation in management; and (iii) subindex of collective disputes.	1.3	0.67	0.25	2.128	136
Public disability benefits	This variable measures the number months of contributions or employment required by law to qualify for sickness benefits, normalized from 0 to 1, where higher values mean less contribution (higher protection).	0.774	0.345	0	1	136
Annual GDP growth rate	GDP growth rate from year t-1 to t	2.85	3.283	-13.127	17.855	136
Only Consumables	The Lincoln subsidiary only produces consumable welding products.	0.382	0.488	0	1	136
Only Machines	The Lincoln subsidiary only produces consumable machines.	0.103	0.305	0	1	136

Table 2. Correlation Matrix

Variable	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
[1] ROA	1										
[2] b97hours_week	-0.306***	1									
[3] b97work_man_c	-0.314***	0.446***	1								
[4] b97index_work_man1	-0.342***	0.319***	0.880***	1							
[5] b97index_arbitr	-0.295***	0.232***	-0.023	-0.074	1						
[6] b97index_col_disp1	-0.303***	0.362***	0.457***	0.372***	0.444***	1					
[7] b97index_industrial1	-0.279***	0.311***	0.673***	0.745***	0.173**	0.822***	1				
[8] Public disability benefits	0.463***	-0.251***	-0.274***	-0.224***	-0.605***	-0.275***	-0.221***	1			
[9] Annual GDP growth rate	0.223***	0.022	-0.073	-0.068	0.149*	-0.078	-0.093	0.042	1		
[10] Only Consumables	-0.258***	-0.149*	-0.070	-0.071	0.178**	-0.048	-0.122	-0.250***	0.075	1	
[11] Only Machines	-0.039	-0.205**	-0.259***	0.146	-0.292***	-0.033	0.216**	0.223***	-0.091	-0.267***	1

Note: *** means significance at the .01 level, ** means significance at the .05 level, and * means significance at the .10 level

Table 3. The Determinants of Subsidiary Profitability

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

DV: ROA

Independent Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Restrictions on hours in the workweek		-0.178 **						
		[0.065]						
Constitution gives worker right to participate in management			-0.102 **					
			[0.043]					
Either statutory law or constitution or both gives worker the right to participate in management				-0.126 **				
				[0.057]				
Law mandates compulsory third-party arbitration for labor disputes					-0.081 *			
					[0.042]			
Overall level of protection of workers during a labor dispute						-0.22 *		
						[0.111]		
Overall level of protection of industrial relations laws							-0.051 *	
							[0.026]	
Public disability benefits								0.151 ***
								[0.028]
Annual GDP growth rate	0.009 ***	0.009 ***	0.007 ***	0.008 ***	0.010 ***	0.008 **	0.008 ***	0.007 **
	[0.003]	[0.002]	[0.002]	[0.002]	[0.003]	[0.003]	[0.003]	[0.003]
Only Consumables	-0.073	-0.095 **	-0.086 *	-0.076	-0.065	-0.077 *	-0.078 *	-0.051
	[0.046]	[0.038]	[0.044]	[0.044]	[0.039]	[0.041]	[0.043]	[0.031]
Only Machines	-0.038	-0.08 *	-0.083 *	-0.02	-0.072 *	-0.044	-0.016	-0.067 *
	[0.036]	[0.041]	[0.040]	[0.027]	[0.039]	[0.030]	[0.028]	[0.035]
Obs	136	136	136	136	136	136	136	136
Number of countries	16	16	16	16	16	16	16	16
p value	0.040	0.003	0.002	0.005	0.011	0.023	0.028	0.000
R-squared	0.135	0.290	0.265	0.248	0.239	0.227	0.213	0.310

Note: *** means significance at the .01 level, ** means significance at the .05 level, and * means significance at the .10 level

Table 4. Further Robustness Checks

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

Variable	(1)	(2)	(3)	(4)
Restrictions on hours in the workweek	-0.132 ** [0.047]	-0.143 *** [0.046]	-0.154 ** [0.058]	-0.154 ** [0.058]
Annual GDP growth rate	0.005 *** [0.002]	0.004 ** [0.002]	0.005 ** [0.002]	0.005 ** [0.002]
Lincoln's Prior Year Market Share	0.592 *** [0.125]			
Lincoln's Prior Year Share of Accessible Market		0.647 *** [0.123]		
Self-evaluation of Product Range relative to Best Local Competitor in Machines			0.045 ** [0.019]	
Self-evaluation of Product Range relative to Best Local Competitor in Consumables				0.045 ** [0.019]
Obs	101	101	99	99
Number of countries	16	16	16	16
p value	0.000	0.000	0.003	0.003
R-squared	0.455	0.461	0.335	0.335

Note: *** means significance at the .01 level, ** means significance at the .05 level, and * means significance at the .10 level

Note: Their self-evaluation of product range relative to best local competitor is the same for machines as it is for consumables.

Table 5. The Non-Effect of Hourly Labor Costs and Country Wealth

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

DV: ROA

Alternative Independent Variable	Coefficient	Robust standard error	Obs	Number of countries
KILM Hourly Labor Cost in U.S. Dollars (available 1996-2004)	0.000	0.004	99	11
Average for Years 1996-2004 of KILM Hourly Labor Cost in U.S. Dollars	0.001	0.004	110	11
Log GDP (available 1996-2005)	0.022	0.027	136	16
Log GDP per capita (available 1996-2005)	0.030	0.018	136	16

Note: The sample size increases to 110 in the second regression above because we use the 1996-2004 average for all country-level observations in years 1996-2005.

Note: *** means significance at the .01 level, ** means significance at the .05 level, and * means significance at the .10 level

Table 6. The Effect of Specific Piecework and Discretionary Bonus Regulations

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

DV: ROA

Independent Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Both piecework and discretionary bonus are allowed without constraints	0.099 ** [0.041]						0.085 ** [0.030]
Ability to pay piece rate wages		0.105 [0.079]					
Requirement for paid vacation when paying on piece rate basis			-0.126 [0.074]				
Requirement for paid vacation to be paid on same basis for piecework employees as hourly/salaried workers				-0.167 *** [0.046]			
Ability to pay purely discretionary bonuses					0.117 [0.086]		
Ability to pay discretionary bonuses in addition to some required bonus						-0.018 [0.064]	
Public disability benefits							0.133 *** [0.037]
Annual GDP growth rate	0.007 ** [0.003]	0.008 ** [0.003]	0.008 *** [0.003]	0.008 *** [0.003]	0.008 ** [0.003]	0.008 *** [0.003]	0.006 ** [0.003]
Only Consumables	-0.091 * [0.044]	-0.075 [0.045]	-0.046 [0.046]	-0.109 ** [0.046]	-0.067 [0.045]	-0.080 [0.054]	-0.069 ** [0.030]
Only Machines	0.003 [0.023]	-0.024 [0.032]	-0.012 [0.035]	-0.074 * [0.037]	0.003 [0.037]	-0.046 [0.047]	-0.029 [0.025]
Obs	136	136	136	136	136	136	136
Number of countries	16	16	16	16	16	16	16
p value	0.008	0.035	0.037	0.001	0.055	0.074	0.001
R-squared	0.285	0.181	0.212	0.272	0.182	0.138	0.419

Note: *** means significance at the .01 level, ** means significance at the .05 level, and * means significance at the .10 level

Table 7. The Endogeneity of Exact Transplantation Abroad

Panel 1

This panel 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 only produces consumables or only produces equipment are included as control variables.

DV: ROA

Alternative Independent Variable	Coefficient	Robust standard error	Obs	Number of countries
Transplant of piecework	0.103**	0.042	136	16
Transplant of discretionary bonus	0.065**	0.029	136	16
Transplant of merit ratings	0.077**	0.029	136	16
Transplant of advisory board or equivalent	0.064*	0.031	136	16

Panel 2

This panel take the models from Panel 1 and adds the first component of labor market institutions as an additional control variable.

DV: ROA

Alternative Independent Variable	Coefficient	Robust standard error	Obs	Number of countries
Transplant of piecework	0.045	0.027	136	16
Transplant of discretionary bonus	0.018	0.043	136	16
Transplant of merit ratings	0.033	0.040	136	16
Transplant of advisory board or equivalent	-0.008	0.040	136	16

Panel 3

This panel reports the results of OLS regressions in which the transplantation of specific Lincoln management practices is the dependent variable and the first component of overall labor institutions in the host country serves as the independent variable.

DV: Transplantation of Lincoln

Incentive System Components

Dependent Variable	Independent Variable	Coefficient	Robust standard error	Obs	Number of countries
Transfer of zero components	Component 1	0.032**	0.015	136	16
Transfer of any one component	Component 1	0.049***	0.011	136	16
Transplant of any two components	Component 1	0.010	0.022	136	16
Transfer of any three components	Component 1	0.014	0.016	136	16
Transfer of all four components	Component 1	-0.097***	0.011	136	16

Note: *** means significance at the .01 level, ** means significance at the .05 level, and * means significance at the .10 level

Table 8. Final Model with Both Strategic Adaptation and Labor Institutional Variables

This table shows the results of regressions in which ROA is the dependent variable. In Models 1 and 3-8, we use OLS regression. In Models 2 and 9-10, we instead use the Cochrane-Orcutt estimator to correct for serial autocorrelation.

DV: ROA

Independent Variable	(1)	(2) with Cochrane-Orcutt estimator	(3)	(4)	(5)	(6)	(7)	(8)	(9) with Cochrane-Orcutt estimator	(10) with Cochrane-Orcutt estimator
Intermediate Two-Part Transplantation	0.128 *** [0.031]	0.069 *** [0.020]	0.110 *** [0.026]	0.121 *** [0.027]	0.126 *** [0.028]	0.112 *** [0.023]	0.093 *** [0.019]	0.106 *** [0.022]	0.085 *** [0.025]	0.082 *** [0.025]
Complete Four-Part Transplantation										-0.021 [0.036]
Three-Part Transplantation										-0.028 [0.024]
One-Part Transplantation										0.012 [0.018]
Component I	-0.024 *** [0.006]	-0.023 *** [0.007]	-0.019 *** [0.005]	-0.023 *** [0.005]	-0.024 *** [0.005]	-0.015 ** [0.005]	-0.009 ** [0.004]	-0.009 ** [0.004]	-0.011 ** [0.004]	-0.015 *** [0.004]
Annual GDP growth rate	0.008 *** [0.002]	0.005 [0.001]	0.010 *** [0.002]	0.007 *** [0.002]	0.008 *** [0.002]	0.008 *** [0.002]	0.010 *** [0.002]	0.010 *** [0.002]	0.005 *** [0.001]	0.005 *** [0.001]
Only Consumables	-0.118 *** [0.038]	-0.064 ** [0.029]	-0.110 *** [0.030]	-0.117 *** [0.035]	-0.112 *** [0.035]	-0.082 ** [0.032]	-0.079 *** [0.024]	-0.088 *** [0.028]	-0.032 [0.026]	-0.040 ** [0.018]
Only Machines	-0.035 [0.024]	0.105 ** [0.045]	-0.077 *** [0.018]	-0.023 [0.017]	-0.040 [0.024]	-0.013 [0.023]	-0.054 *** [0.016]	-0.058 *** [0.018]	0.040 ** [0.016]	0.046 *** [0.019]
PolconIII_Distance			-1.230 *** [0.330]				-1.459 *** [0.416]	-1.539 *** [0.396]	0.194 [0.522]	0.371 [0.473]
Signed corporate taxation distance				-0.003 * [0.002]			0.000 [0.002]	0.000 [0.002]	0.000 [0.002]	0.000 [0.002]
Rule of Law distance					-0.005 [0.006]		0.006 [0.005]	-0.003 [0.010]	0.016 [0.012]	0.017 [0.013]
Gleditsch-Ward geographic distance						-0.016 *** [0.005]	-0.017 *** [0.004]	-0.017 *** [0.004]	-0.019 *** [0.004]	-0.018 *** [0.003]
Log GDP per capita								-0.023 [0.025]	0.030 [0.026]	0.034 [0.027]
Obs	136	120	120	136	136	136	120	120	104	104
Number of countries	16	16	16	16	16	16	16	16	15	15
p value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R-squared	0.421	0.200	0.531	0.440	0.430	0.482	0.595	0.599	0.357	0.368

Note: The PolconIII data is only available through Year 2004. Because Lincoln China only has operating performance for 2004 and 2005, and because the Cochrane-Orcutt procedure drops any country with just one observation, China is thus automatically dropped from Models 9-10. That results in a sample of 15 countries instead of 16 in Models 9-10.

Note: *** means significance at the .01 level, ** means significance at the .05 level, and * means significance at the .10 level

Table 9. Robustness Checks Using Productivity Indicators

This table shows the results of OLS regressions in which Value Added per Employee and Quasi-Rents per Employee serve as alternative dependent variables. Robust standard errors appear below the coefficients in brackets.

DV: Valued Added per Employee

Independent Variables:					
Intermediate Two-Part Transplantation	Strike is Legal Even if Collective Agreement Is In Force	Only Consumables	Only Machines	Log GDP	Log GDP per capita
29996.38*** [9909.31]	-11365.18** [5294.27]	-6708.01 [6755.29]	15308.91 [15068.26]	16773.19*** [3426.07]	4249.55 [2831.81]
Obs 131	Number of countries 16	p value 0.000	R-squared 0.494		

DV: Valued Added per Employee

Independent Variables:					
Intermediate Two-Part Transplantation	Closed Union Shops are Allowed	Only Consumables	Only Machines	Log GDP	Log GDP per capita
27865.53** [9913.11]	-9379.19* [5044.10]	-8466.10 [8668.00]	20717.32 [16094.17]	13885.63*** [3553.23]	5353.88* [2650.34]
Obs 131	Number of countries 16	p value 0.000	R-squared 0.480		

DV: Valued Added per Employee

Independent Variables:					
Intermediate Two-Part Transplantation	Share of labor force whose wage is set by centralized collective bargaining	Only Consumables	Only Machines	Log GDP	Log GDP per capita
17876.78** [8245.19]	-4059.66* [1983.56]	-4781.99 [6334.75]	13156.30 [10503.98]	15349.58*** [3616.94]	5021.17* [2845.02]
Obs 131	Number of countries 16	p value 0.000	R-squared 0.511		

DV: Quasi-Rents per Employee (using country-level data on average hours per week)

Independent Variables:					
Intermediate Two-Part Transplantation	Strike is Legal Even if Collective Agreement Is In Force	Only Consumables	Only Machines	Log GDP	Log GDP per capita
25494.78** [10533.11]	-12057.97** [4429.03]	-7991.02 [5896.47]	7097.54 [11731.09]	13996.35*** [3128.46]	-7380.62** [2702.05]
Obs 120	Number of countries 16	p value 0.004	R-squared 0.331		

DV: Quasi-Rents per Employee (using 2000 hours per year as the baseline across countries)

Independent Variables:					
Intermediate Two-Part Transplantation	Strike is Legal Even if Collective Agreement Is In Force	Only Consumables	Only Machines	Log GDP	Log GDP per capita
23593.01** [10946.93]	-10645.47* [5427.60]	-11614.93* [6306.09]	4027.22 [10591.45]	13180.93*** [3226.76]	-8562.28** [2963.38]
Obs 131	Number of countries 16	p value 0.005	R-squared 0.243		

DV: Quasi-Rents per Employee (using country-level data on average hours per week and subtracting out 5% * capital stock)

Independent Variables:					
Intermediate Two-Part Transplantation	Strike is Legal Even if Collective Agreement Is In Force	Only Consumables	Only Machines	Log GDP	Log GDP per capita
22081.4* [10424.29]	-9359.07** [3915.21]	-9033.46 [5901.14]	10093.58 [12510.26]	12112.37*** [2785.56]	-6272.10** [2218.21]
Obs 120	Number of countries 16	p value 0.004	R-squared 0.316		

DV: Quasi-Rents per Employee (using country-level data on average hours per week and subtracting out 9% * capital stock)

Independent Variables:					
Intermediate Two-Part Transplantation	Strike is Legal Even if Collective Agreement Is In Force	Only Consumables	Only Machines	Log GDP	Log GDP per capita
19350.7* [10616.37]	-7199.95* [4000.94]	-9867.41 [6083.15]	12490.41 [13241.48]	10605.18*** [2916.78]	-5385.29** [2182.13]
Obs 120	Number of countries 16	p value 0.010	R-squared 0.303		

Note: *** means significance at the .01 level, ** means significance at the .05 level, and * means significance at the .10 level

Note: The sample size drops from 131 to 120 in some specification because the country-level data on average hours per week is not available for Year 1996.

Appendix Table A. Robustness Checks Using Operating Profit per Employee

This table shows the results of OLS regressions in which Operating Profit per Employee serves as an alternative dependent variable. Robust standard errors appear below the coefficients in brackets.

	(1) Alternative Dependent Variable: Operating Profit per Employee	(2) Alternative Dependent Variable: Operating Profit per Employee	(3) Alternative Dependent Variable: Operating Profit per Employee	(4) Alternative Dependent Variable: Operating Profit per Employee
Intermediate Two-Part Transplantation	11215.13 *** [3648.96]	6563.79 * [3690.00]	13771.14 *** [2545.62]	11028.59 *** [2607.62]
Component 1	-963.36 [820.64]			
Law mandates compulsory third-party arbitration for labor disputes		-7275.55 ** [3161.73]		
Requirement for paid vacation to be paid on same basis for piecework employees as hourly/salaried workers			-24549.29 *** [6393.03]	
Ability to pay discretionary bonuses in addition to some required bonus				-8752.14 * [4357.16]
Annual GDP growth rate	453.60 *** [151.16]	646.87 *** [183.84]	519.63 *** [161.30]	532.30 *** [152.29]
Only Consumables	-8855.45 * [4421.65]	-7393.98 ** [3469.33]	-13809.68 *** [3847.40]	-11097.04 ** [4454.83]
Only Machines	-4477.14 [3354.39]	-7299.83 * [3922.22]	-12015.13 *** [3838.00]	-7519.91 * [4111.72]
PolconIII_Distance	-31992.80 [59231.30]	-45619.840 [62599]	36997.58 [32384.40]	-49037.41 [63135.75]
Signed corporate taxation distance	147.26 [281.23]	152.38 [268.38]	760.86 ** [309.51]	317.28 [273.00]
Rule of Law distance	-327.32 [1637.54]	-190.23 [1456.23]	-1065.48 [1526.39]	1694.60 [1355.80]
Gleditsch-Ward geographic distance	-3184.60 *** [642.58]	-3411.77 *** [285.67]	-3272.61 *** [328.74]	-3377.34 *** [506.82]
Log GDP per capita	1896.51 [4005.02]	301.81 [4405.49]	409.37 [4082.82]	5337.32 [3474.04]
Obs	115	115	115	115
Number of countries	16	16	16	16
p value	0.000	0.000	0.000	0.000
R-squared	0.568	0.578	0.609	0.582

Note: *** means significance at the .01 level, ** means significance at the .05 level, and * means significance at the .10 level