Foreign Direct Investment, Management Practices, and Social Capital: New Evidence on the Host Country Effects of Japanese Multinationals*

Peter B. Doeringer
Boston University

David G. Terkla
University of Massachusetts Boston

Special acknowledgement and thanks to Christine Evans-Klock for her field research and for providing the data on employment practices in new factories. Helpful comments were provided by Harry Katz, Kevin Lang, and Eli Berman and by participants in seminars at the W.E. Upjohn Institute, MIT, the Federal Reserve Bank of Boston, the University of Paris, XIII, and Northeastern University. We also thank Jean Poitras for research assistance. We gratefully acknowledge the research support provided by the W.E. Upjohn Institute For Employment Research, the Alfred P. Sloan Foundation, the Georgia Power Company, and the John W. McCormack Institute of Public Affairs at the University of Massachusetts Boston.

There is a long and distinguished history of research on the economic consequences of foreign direct investment (FDI) by multinational firms (Vernon, 1972, 1998; Caves, 1974). A recent meta-analysis of this literature by Lipsey (2002) highlights the range and the complexity of these effects on both home and host country economies, including trades flows and balance of payments, employment gains and losses, wages, and productivity change. This study is focused on the direct contribution of FDI to the economies of host countries in terms of job growth, productivity, and wages.

A broad consensus has emerged, based on studies of both developing and developed countries, that the jobs created in host countries by foreign multinationals pay higher wages and have higher productivity than those of similar domestic firms (Lipsey, 2002), and recent research suggests that the technological "spillovers" from FDI may be much larger than previously thought (Keller and Yeaple, 2003). While many of these differentials diminish when controls are introduced for establishment size (Howenstein and Zeile, 1994), industry and labor market characteristics (Feliciano and Lipsey, 1999), and capital intensity (Howenstein and Zeile, 1994), the wage and productivity advantages of FDI over domestic firms seems to remain even after controlling for hard-to-observe establishment characteristics (Lipsey, 2002).

This study provides a closer look at these issues of employment, wage, and productivity effects of FDI on host countries, and at a wider range of possible "spillover" effects from FDI, using a combination of case studies and econometric analysis. This methodology permits a much richer set of comparisons between foreign-owned and with domestic firms than is generally available in the previous research literature on FDI.

Our case study sample consists of new manufacturing plants owned by Japanese multinationals, which opened in the United States in the late 1970s and 1980s, and a matched "control" group of new branch plants owned by U.S. corporations. We conducted a set of in-depth retrospective case studies of these plants in the early 1990s to determine whether there were differences in the production functions and management practices between FDI plants and their domestic counterparts, as well as traditional measures of employment and wages.

This approach has several advantages. It allows for the collection of establishment-level data that is more detailed than available in most national databases and it provides qualitative information to support econometric analysis. We compiled detailed information on management practices, as well as on wages, employment, and productivity. Restricting our data to new manufacturing plants that use advanced technologies also allows us to control for the vintage of capital and to eliminate possible biases from unobserved differences in productivity that might affect studies of established plants acquired by Japanese multinationals (Harris and Robinson, 2002).

The major finding from these case studies is that there are major differences in the extent to which new Japanese and U.S. plants invest in human capital, adopt management practices that promote productivity, and invest in management "cultures" that foster social capital formation at the workplace. Even though both new Japanese-owned and domestic U.S. plants have technical production functions that are similar and employ similar types of workers, these management differences associated with Japanese FDI result in faster rates of growth in productivity and employment growth. The employment growth effects of Japanese FDI are further confirmed by national data.[1] Contrary to other studies (Howenstine and Zeile, 1994; Doms and Jensen, 1998), we find that new Japanese firms do not pay higher wages than the U.S. plants in our sample, but Japanese-owned plants do provide much greater job security.

While this study of the advantages of FDI is limited to a single source of FDI (Japan) and a single host country (the United States), the limited evidence on the management practices of Japanese multinationals in different countries suggests that our findings are likely to apply in other national settings (Doeringer, Lorenz, and Terkla, 2003, Brannen, Liker, and Fruin, 1999, Sako 1994). In addition, the conclusion that FDI can introduce new managerial "technologies", as well as new production technologies, adds a further dimension to development policy. To the extent that the management technologies represent a supplemental source of economic growth, similar to that of new physical technologies, they should be considered in the design of policies for encouraging FDI.

Benchmarking Japanese FDI to New U.S. Manufacturing Plants

Our study focuses on new Japanese plants that began operation in the United States between 1978 and 1989.This encompasses the period when Japanese investment in non-bank U.S. businesses rose from $600 million a year (1980) to almost $15 billion a year in 1989 (Herr, 1989), exceeding that of traditional leaders such as Great Britain and Canada. In contrast to most foreign

[1] The net effect of FDI on employment growth is typically assumed to be positive, although the employment displacement effects of FDI are rarely measured. We are not aware of studies comparing rates of employment growth in foreign-owned and host country firms.

investment that involves acquisitions, Japanese investments in new manufacturing plants outnumbered acquisitions by two to one (Glickman and Woodward, 1989; MacKnight, 1989). By the end of the 1980s, Japanese multinationals had opened 679 new manufacturing facilities in the United States and generated about 175,000 new manufacturing jobs for the U.S. economy (Howenstine, 1990).

We conducted in-depth case studies of a sample of 28 new Japanese-owned manufacturing plants and 20 new U.S.-owned plants (Table 1). The Japanese sample was randomly drawn from the universe of new U.S. branch plants of Japanese multinationals in three major industries – rubber and plastic products (SIC 30), electrical equipment (SIC 35), and non-electrical machinery (SIC 36) – that were located in five states (Georgia, Kentucky, New York, New Jersey, and Massachusetts). These industries were selected to provide a mix of product lines and technologies ranging from relatively low skilled, labor-intensive, mass production (wire cable assembly), to semi-skilled assembly line technologies (circuit boards and automobile dashboards), to high-skilled, batch production technologies (metal cutting tools). The states were selected to provide regional variation in labor and product markets. A counterpart sample of new branch plants of U.S. corporations was then selected to match the Japanese plants as closely as possible. (See the Appendix for a detailed description of this sample).

The case study plants were visited by one or more members of the research team between 1990 and 1993. Semi-structured interviews were conducted with plant managers, personnel managers, industrial engineers, and union officials and production processes were directly observed during extensive plant tours. We compiled current and retrospective information on technology, management practices, employment, and compensation and follow-up telephone interviews were conducted as needed to clarify or complete the data collection.

Technology and Labor

Our interviews revealed strong similarities between the production functions of matched Japanese and U.S. owned factories. Regardless of the nationality of ownership, the plants in our sample were considered to be “flagship” production facilities by their parent corporations. They universally adopted “next generation” technologies for their industries and typically employed production workers with high school degrees and 5 to 10 years of prior work experience.

Wages and Non-Pecuniary Job Benefits

Wages in all of the new plants were above the average for comparable workers in the same region and almost half (46% of the Japanese-owned plants and 45% of the U.S.-owned plants) had wage rates in the top 20% of their regional wage distribution (Table 2). In order to promote higher productivity, high wages in these plants were often supplemented by performance-based compensation incentives (Table 2). Japanese-owned plants tended to favor group bonus incentives while U.S. owned plants were more likely to use profit sharing incentives, but neither of these differences was statistically significant. Regardless of the nationality of ownership, new plants appear to offer similar wage rates and similar wage incentives, and our interviews show that fringe benefits are also comparable.

There are, however, significant differences in two types of non-pecuniary job benefits. Over eight times the percentage of Japanese-owned plants provide high job security than U.S.-owned plants and special provisions for employee consultation and "voice" are universal among the Japanese-owned plants in our sample, compared to only two out of five of the domestic plants (Table 2).

Management Practices

The more important differences between the Japanese and domestic plants in our sample, however, were in the management practices and management "cultures" used to operate otherwise similar production functions. One set of management differences involves human capital investments. While both types of plants hire similar labor and pay similar wages, new Japanese plants are about 50% more likely than new U.S. plants to provide intensive training to new hires and three times as many Japanese plants train their production workers in multiple skills (Table 3).

We also find differences in the use of "high performance" management practices, such as semi-autonomous production teams, rotating job assignments, employee participation in problem-solving "quality circles", and the delegation of quality control to production workers. Many economists believe that these practices serve important efficiency objectives by compensating for various types of market failure (Williamson, 1975, 1985; Milgrom and Roberts, 1990; Lazear, 1998) and the contribution of these practices to improving efficiency has been documented in a number of manufacturing settings (Osterman, 2000; Freeman and Kleiner, 2000; Black and Lynch, 1997, 1999; Ichniowski, Shaw, and Prenushi, 1997; Mohrman, Galbraith and Lawler, 1998).[2] In general,

[2] For a review of this literature, see (Black and Lynch, 1997).

Japanese-owned plants adopt these practices more frequently than U.S.-owned plants and this difference is statistically significant in the case of quality control and employee participation in problem solving (Table 3).

Social Capital Investment

Finally, our interviews revealed major differences between Japanese-owned and domestic managers in their propensity to invest in "social capital" at the workplace. Analyses of social capital often stress participation in group activities that contribute to developing social norms and maintaining societal values (Putnam, 2000). In the context of manufacturing plants, however, social capital formation takes the form of investing in "high productivity" workplace cultures by establishing social norms of employee cooperation and commitment to the goals of the firm and by developing a collective responsibility among employees for achieving efficient production of high quality. While social capital investments are harder to quantify than investments in physical and human capital, our interviews revealed that there is a nearly universal social capital dimension to many of the high performance management practices adopted by Japanese-owned plants. For example, allowing employees to manage their own teams, participate in quality circles, and control quality contributes to a culture of collective responsibility for production efficiency and the commitment by the firm to strong job guarantees is expected to prompt a reciprocal commitment to the firm by its employees.

While similar practices are also found in the U.S. plants in our sample, they are adopted much less frequently and are rarely used deliberately and systematically to foster high productivity workplace cultures. Rather than investing in social capital as a means of promoting efficiency and productivity, managers of domestic startups tend to prefer a "managerial control" culture in which efficiency is seen as a function of managerial expertise, supervisory authority, and the "engineering" of efficiency and quality.

These contrasting management cultures are best illustrated by two examples from our case studies. The first is a new Japanese-owned plant in Massachusetts with 270 employees that manufactures floppy disks using a state-of-the-art highly automated technology. It has adopted a wide range of high performance management practices including flexible work, intensive training, employee involvement, and quality circles, and its wages and benefits are the highest in the area.

Management emphasized the importance of developing employee commitment to raising productivity. After adopting commitment incentives that include an explicit no layoff policy and extensive reliance on quality circles, the plant manager was moving to the "next stage beyond quality circles" by creating self-managed production teams and using small groups of operators, technicians, and engineers to focus on plant-wide efficiency and quality issues. Front-line employees participated in a variety of production decisions and management was replacing managerial supervision with collective "peer" supervision on the shop floor. At the time of our study, the plant had grown rapidly to its full three-shift capacity, had the highest productivity of any plant in the parent company, and was adding additional production capacity.

The second example is a U.S.-owned plant in Georgia with 300 employees that makes internal combustion engines. Like the Japanese diskette manufacturer, it is highly automated, offers the highest wages in the area, and has adopted a wide range of high performance management practices. However, this plant has a distinctly different management culture.

Management's approach to raising productivity in this plant was to "engineer the operator out" and to "methodize" jobs so that they are "foolproof" in terms of human error. There is intensive entry training, but jobs have been designed to be routine and repetitive and there is little subsequent training. The plant has experimented with small production teams, but they are not widely used, and there is no job rotation. The plant manager prefers to use technology, rather than workers, to control quality. Management feels that "workers are not skilled enough to identify problems, let alone solve them" and quality circles exist only to provide one-way communication from management to production workers. There are no guarantees of job security or other commitment incentives to encourage cooperation with high performance management practices and identification with the goals of the company. Nevertheless, the parent company regards this plant as one of its most efficient and the plant has grown steadily since opening.

Management Differences and Employment Growth

Given their more intensive human capital investment, far greater reliance on high performance management practices, and larger investments in social capital, it would seem reasonable to assume that the Japanese-owned plants would out-perform the U.S.-owned plants in our sample. However, there is also the possibility that foreign-owned plants are at a competitive disadvantage because they lack knowledge about U.S. markets that is readily available to new branch plants of domestic companies. In the latter case, Japanese-owned plants could be adopting a larger number of high performance management practices and making more intensive investments in human and social capital in order to compensate for the disadvantages of operating in an unfamiliar economic environment.

We probed these hypotheses carefully during our interviews and encountered no reports of an FDI disadvantage. Instead, managers of both Japanese-owned and domestic plants offered similar productivity explanations for adopting high performance management practices. Furthermore, consistent with other studies of high performance management, the relatively greater use of these practices by Japanese-owned plants is associated with faster rates of employment growth than their U.S. counterparts.[3] Nevertheless, this growth differential could be an artifact of Japanese plants starting from a smaller initial employment base than U.S.–owned plants, or it could be the result of cyclical differences in the timing of startups or the accumulated years of production learning that are correlated with nationality of ownership. A more refined test is, therefore, needed to confirm that the Japanese FDI advantage is caused by differences in management practices and cultures.

Ramp-up Cycles and Ramp-up Production Functions in New Manufacturing Plants

The traditional approach to testing the effects of managerial practices on business performance is to incorporate measures of these practices explicitly as inputs into a standard neo-classical production function. We use a somewhat similar approach, but with a different specification of the production function, since our case study research shows that standard production functions do not accurately characterize the "ramping-up" of production in new plants.

A universal characteristic of the startup process among the firms in our sample is that most of the growth in output is the result of adding to the number of shifts being operated. New plants begin their ramp-up cycles by operating a single shift in order to correct initial manufacturing and quality control problems associated with the new facility. Once problem-solving and learning-by-doing cause productivity to rise sufficiently to meet corporate cost targets on the first shift, these plants go through successive stages of ramping up to full capacity by adding a second, and then a third, shift. Thereafter, further growth in output requires additional capital investment that triggers a new ramp-up cycle. While output grows within each shift as workers learn to operate the technology more efficiently, these output gains are overshadowed by the large increases in output

[3] The average annual increase in employment among the Japanese-owned plants in our sample is 20% compared to only 6% for the domestic plants. As would be expected, employment growth in both types of plants compared favorably with the average employment growth rates for the 2-digit industries represented in our case study sample, which never exceed 2% during the time period.

that come as the firm moves through the ramp-up cycle from one to two and then to three-shift operation. Employment growth essentially follows a similar pattern to output in that labor inputs rarely change within a shift, but there are large changes whenever a new shift is added or when new investments are made in plant and equipment.[4]

The rate at which startups pass through the stages of the ramp-up process is always conditional upon a new plant achieving, and usually exceeding, efficiency benchmarks (such as "output per employee" or "unit costs") that have been established in the most efficient plants of the parent corporation. Since there was remarkably little technological change in our sample of plants for periods of up to a decade or more, we are confident that the productivity gains required for new plants to move through the ramp-up cycle come almost exclusively from employee learning and problem-solving. The plants with the most effective training and problem-solving practices exhibit the shortest ramp-up cycles whereas those that are unable to meet corporate efficiency standards are not allowed to add shifts or otherwise expand capacity. Continued failure to achieve corporate productivity standards can eventually lead to cutbacks in employment and output because production can be reallocated to more efficient branch plants.[5] These different ramp-up patterns are illustrated graphically in Figures 1 and 2.[6]

We incorporate these relationships among output, employment, and productivity during the ramp-up cycle into a production function where output depends on fixed capital, labor inputs that vary over time as shifts are added, the number of high performance management practices adopted, and investments in social capital cultures, as shown in Equation (1):

$$(1) \qquad Q_t = f\,[K^*, S_tL, e(P, J), E_t(P, J)\,]$$

Q_t is plant output at time t, K* is the fixed plant and equipment, and the total labor input (S_tL) is the product of the fixed labor input required for each shift (L) and the number of shifts (S_t) operating at time t. The functions e(P, J) and $E_t(P, J)$ represent productivity drivers: e(P, J) captures the static improvement in output per worker resulting from the adoption of high performance management

[4] These periodic employment increases as shifts are added involve roughly equal numbers of new workers since each shift uses the same capital equipment and approximately the same complement of production workers, technicians, and direct supervisors. Productivity improvements within a single shift, however, do not affect employment because staffing levels are fixed on each shift.

[5] Such cutbacks occurred in about 10% of the plants in our sample.

practices (P) and investments in social capital cultures (J) and $E_t(P, J)$ is the growth in output per worker at time t resulting from these same factors.

L is exogenously determined by the fixed capital and technology embodied in the plant. P and J are parameters chosen by management. S_t is a function of the productivity drivers e(P, J) and $E_t(P, J)$ according to the rule observed in the case studies that the parent corporation will authorize adding a new shift when a target level of productivity is achieved.[7]

Estimating the Productivity Gains From Management Practices and Social Capital

One way of using Equation (1) to test for the productivity effects of high performance management practices and social capital management cultures would be to see if either total factor productivity or output grew faster in plants that adopted such practices and cultures than in those that did not. We were unable to conduct either of these tests because the firms in our sample considered establishment-level data on output and productivity to be proprietary. However, we are able to estimate an alternative specification of Equation (1) by taking advantage of the high correlation between changes in output and changes in employment as corporate efficiency benchmarks are achieved and shifts are added. Given the limits of our sample size, we estimate a simple ramp-up model (Equation 2) that captures the essence of how management practices and cultures affect the speed of the ramp-up cycle by substituting the rate of change in employment for the rate of change in output.[8]

$$(2)\ RAMPUP_i = a + b_1 HIPERFORM_i + b_2 NATJ_i + b_3 IND_i + b_4 STARTSIZE_i + b_5 STARTYEAR_i + u$$

The dependent variable in this model (RAMPUP) is the average annual compound growth rate of employment in establishment i from year of startup to the date the plant interview. HIPERFORM is the number of high performance management practices adopted by plant i and NATJ is a binary variable, which is an instrument for capturing the effects of the social capital cultures of Japanese-owned plants. IND is a vector of industry dummies to control for industry

---

[6] Figure 1 posits linear productivity and output growth within shifts for ease of illustration. The target level of productivity required to trigger an additional shift is shown by the dashed line in Figure 1.
[7] Output per worker is the average of all shifts. Because the incumbent workforce is more productive than the new employees at the time of the addition of each new shift, the weighted average productivity for the plant declines by a smaller amount with each new shift and continuous learning among incumbent employees can accelerate the achievement of target productivity with each additional shift.

differences in growth rates; employment in the base year of operation (STARTSIZE) controls for scale economies and for the algebraic effect of differences in the starting size of establishments on the rate of employment growth; STARTYEAR controls for the effects of accumulated experience and cyclical influences on different cohorts of plants (see Table 4).

We first test for the effects of high performance management practices without including our NATJ measure of management culture. The results are consistent with those of other studies in that high performance practices contribute to higher rates of establishment growth. The point estimate on the coefficient of HIPERFORM implies that each additional high performance practice raises the annual rate of employment growth by about six percentage points (Table 5, col. 1).

We then introduce NATJ to test for any additional effects of Japanese-style social capital cultures (Table 5, col. 2) and find that it has a large and significant influence on the ramp-up rate. The inclusion of NATJ somewhat lowers the estimated effect of high performance management practices, but it still remains statistically significant. A comparison of the estimated coefficient on the NATJ variable with that on HIPERFORM indicates that investing in a social capital management culture is roughly equivalent to adopting two high performance management practices.[9] We can conclude from this analysis that the management cultures and greater use of high performance management practices associated with Japanese FDI in the United States result in faster growth in jobs, output and productivity when compared to counterpart new U.S.-owned manufacturing plants.

Corroborating Evidence From National Data

The combination of case study interviews and econometric analysis provides compelling evidence of the advantages of Japanese FDI in contributing to job growth in its host country, at least for the three manufacturing industries examined. In order to provide a more general test of this Japanese FDI effect, we compiled a national panel database consisting of new branch manufacturing plants in the United States using information from the Small Business Administration's USEEM longitudinal establishment data file. We merged this U.S. data with corresponding information on new Japanese plants in the United States obtained from a national

---

[8] These models are similar to those used by Leonard (1992) in his study of the effects of unions on employment growth.

[9] A second specification of this model was tested using binary variables for different numbers of high performance practices adopted in order to test for non-linear effects of these practices. Firms that adopt one or two high performance practices do not show a statistically significant improvement in their ramp-up rate, but those that adopt three or four practices show significantly faster rates of ramp-up compared to plants that rely exclusively on traditional types of management practices.

directory of Japanese firms issued by the Japan Economic Institute and from our own mail and telephone surveys. Only data on branches and subsidiaries of multi-plant enterprises that opened between 1978 and 1986 and continued in operation through 1988 were included so that the national data would be comparable to the case studies. These national data show that new Japanese-owned plants had annual growth rates averaging 29% compared to 6% for new U.S.-owned plants, an even larger difference than is found in our case study sample.

The size and scope of this national database allows us to control for a wider range of influences on employment growth, but it lacks the detailed information on high performance management practices provided by the case studies. Nevertheless, because our case studies show that the Japanese-ownership is highly correlated with the intensive use of high performance management practices and the development of social capital management cultures, we can use differences in ownership to test for the *combined* effects of differences in management practices and cultures on employment growth in new plants.

The "national" ramp-up model that we estimate (Equation 3) uses the same measures of ramp-up rates (RAMPUP) as in the case study analysis and the same controls for the initial size of establishment (STARTSIZE) and the year the plant opened (STARTYEAR). In the national model, however, NATJ is an instrument for both the higher rates of adoption of high performance management practices and the presence of social capital management cultures that case studies indicate are characteristic of Japanese FDI.

$$(3)\ \mathrm{RAMPUP} = a + b_1\mathrm{NATJ}_i + b_2\mathrm{INDi} + b_3\mathrm{REGi} + b_4\mathrm{STARTYEARi} + b_5\mathrm{STARTSIZE}_i + u$$

In addition, we are able to include an expanded set of controls for industry differences (IND) and for regional variations in cost structures and access to markets (REG), as defined in Table 4.

The empirical results from this model correspond closely to those of the case study analysis. The coefficient on the NATJ variable (Table 6, col. 1) implies that the annual growth rates of new Japanese-owned plants average over 20 percentage points above those of domestic plants. We also find significant industry effects, which caused us to test two further variants of this model to determine whether the Japanese FDI effect was confined to specific industries.

One specification is intended to test for the possibility that the higher growth rates among Japanese plants are being driven special circumstances associated with the growth of the Japanese automobile industry in the United States during the period covered by our data. This model includes a vector of dummy variables for new plants in the specific 4-digit industries that supply parts to the automobile industry ($AUTO_i$) and an interaction term for Japanese FDI in these same auto parts industries ($AUTO_I * NATJ_i$).[10] The second specification tests more broadly for the differential effects of Japanese FDI in specific industries by including an interaction term $NATJ_i * IND_j$.

The results show that new plants that supply the auto industry have significantly higher ramp-up rates than other startups in the same 2-digit industries, regardless of the nationality of ownership, and the independent effect of NATJ also remains very close to that in the initial estimation (Table 6, col. 2). Furthermore, the coefficient on the interaction variable ($AUTO_i * NATJ_i$) is insignificant. These findings lead us to reject the hypothesis that the growth advantage of Japanese FDI is the result of any special auto supplier effect.

In the model that tests for industry differences in the effects of Japanese management practices and cultures (Table 6, col. 3), however, we find that Japanese FDI effects are confined to six industries [furniture (SIC25), rubber and plastics (SIC30), fabricated metals (SIC34), non-electrical equipment (SIC35), electrical equipment (SIC36), and transportation (SIC37)]. The Japanese FDI advantage in these industries is large, ranging from 25 percentage points per year in transportation to 49 percentage points per year in rubber and plastics and non-electrical equipment.[11] This group includes all three of the industries examined in the case studies, which gives us further confidence in drawing the general conclusion that the sources of the growth advantage of Japanese FDI are rooted in a combination of high performance management practices and management cultures that promote social capital formation.

Discussion of Potential Biases in Measuring the Employment Effects of Japanese FDI

All of our evidence points to the conclusion that there are positive host country employment and productivity effects from Japanese FDI, when compared to similar domestic firms, at least in some manufacturing industries. The estimated additional employment effect of FDI by Japanese multinationals is statistically significant and robust across various specifications of the ramp-up

---

[10] The 4-digit SICs included are 3711 automobile assembly, 3714 auto parts fabrication, as well as some automotive related production in plastics and other related industries, such as 3089 (automotive plastic components) and 2399 (seat covers and seat belts).

[11] These industries are mainly in the durable goods sector that manufactures relatively high value-added products with variable demand, exactly the sectors where Aoki (1990) predicts that Japanese-style management is most likely to have an influence on productivity.

model and the qualitative findings from the case studies correspond closely to the econometric evidence.[12] Despite these consistent findings, it is possible that the results are biased in some way.

One possibility is that our relatively simple ramp-up models might omit some important variables that accelerate ramp-up cycles and that are also correlated with Japanese ownership. Some of the most obvious problems of omitted variables have already been eliminated by the unique features of our case study sample. For example, unobserved differences in the vintage of technologies are not an issue because both Japanese and domestic startups adopted the most up-to-date technologies and these technologies remained constant during the period covered by the study. Nor is there evidence of major differences in workforce "quality" between domestic and Japanese owned startups, as measured by age, education, and experience (Doeringer, Evans-Klock, and Terkla 1998). Nevertheless, we briefly examine the most likely sources of bias that might remain -- the effects of pay incentives on worker productivity, the role of import substitution, and possible biases from studying only new plants that "survive" during the period of the study.

Performance Incentives

Many of the plants in the case study sample offer their employees performance incentives, such as profit sharing and productivity bonuses.[13] To test for the possibility that these incentives are driving employment growth, we substituted various measures of performance incentives for high performance management practices in the case study ramp-up model. We also tested a linear measure of the number incentives used and various clusters of incentives. None of these specifications revealed a statistically significant relationship between ramp-up rates and incentives.[14]

Import Substitution

An additional concern is that the high growth rates of Japanese-owned plants could result from substituting production in the United States for imports from Japan. While there is a widespread finding that FDI in general is a complement, rather than a substitute, for imports

---

[12]When the region dummies are omitted from the basic growth model, the estimated coefficient on NATJ is .22, nearly identical to the full model. Similarly, alternative specifications for startup sizes -- using the second year of operation as the base year, dropping all establishments reporting fewer than 20 employees in the first year of operation, and dropping U.S. establishments in firms with fewer than 2500 employees -- left the estimated Japanese growth advantage substantially unchanged. Replacing the cohort dummies with a variable representing the age of the firm also did not change the results. In addition, we independently estimated the starting size of startups and found that there is no statistically significant difference between the starting sizes of Japanese plants and their U.S. counterparts.

[13] For a recent review of the incentives and performance literature, see Prendergast (1999).

[14] This result is contrary to that of Blank and Lynch (1999) who find that profit sharing matters to productivity in their study of established plants.

(Lipsey, 2002), it is also widely-reported that import-substitution has motivated much of the Japanese manufacturing investment in the United States (Kenney and Florida, 1993; Caves, 1993).

While we cannot conclusively refute the thesis that import substitution is the primary source of the Japanese growth advantage, several pieces of evidence suggest that it is unlikely to be the sole consideration. For example, if import substitution is driving the growth in output of Japanese plants, output and employment should be sensitive to changes in exchange rates.[15] We explicitly tested for such exchange rates influences by adding exchange rates as an explanatory variable in the national ramp-up models and found no statistically significant influence of exchange rates on output.[16] Our plant interviews also show that the source of growth in many of the Japanese plants was coming from markets other than those involving import substitution. This is confirmed by the insignificance of the automobile industry interaction term in the national regression, as this industry would be the first to show evidence of a heavy import substitution effect.

Finally, the growth of Japanese plants is being measured against counterpart U.S.-owned branch plants that also have growth opportunities within their corporations that resemble those of import substitution by Japanese-owned branch plants. When new domestic plants meet the internal efficiency criteria of their parent companies they are allowed to expand their output at the expense of less efficient branch plants in much the same way as production by Japanese plants in the United States can substitute for imports produced by other branch plants of Japanese multinationals.[17] There is no *a priori* reason that opportunities for import substitution by efficient U.S. branch plants within Japanese multinationals should differ from supply substitution by efficient branch plants within U.S. corporations.

---

[15] This exchange rate hypothesis is somewhat questionable on theoretical grounds because the positive effect of exchange rates on import-substituting output should be at least partially offset by the negative effect on repatriated profits (McCulloch, 1991).

[16] We looked for the effect of the Japanese/U.S. exchange rate using two different specifications. In one case, we included the percentage change in the exchange rate over the lifetime of the firm interacted with NATJ as an independent variable. This was insignificant and did not substantially change the coefficients in the original regression. We also tried including the interacted exchange rate change without the NATJ variable and this also proved to be insignificant. Exchange rates were taken from Economic Report of the President, 1996.

[17] The allocation of production among branch plants depends on a complicated set of marginal cost calculations and company-specific transfer pricing decisions (Scherer, 1975). Domestic startups have substantial market guarantees by being designed to serve markets already established by less efficient branch plants within the parent company, as well as new markets with high growth potential. Japanese plants that come to the United States for reasons other than export substitution face demand curves that are steeper than export-substituting plants. These plants are analogous to domestic startups that are entering new markets, as opposed to markets previously served by outdated branch plants that they are replacing.

Survivor Bias

A related possibility is that our findings could be biased because both the case study and the national databases include only startup plants that have survived for up to a decade or more. Survivor bias would be a problem if we were trying to estimate *levels* of productivity or employment because we do not take into account the declines in productivity, output, and employment in plants that fail during the period covered by our data. However, we at least partly avoid this problem by looking at *relative differences* in ramp-up rates between Japanese and U.S.-owned plants. In this case, survivor bias could only explain our results if Japanese plants had a lower survival rate than similar domestic plants. Otherwise survival biases would cancel out or favor an observed employment growth advantage among domestic plants. Furthermore, we know from our Japanese panel data that almost all new Japanese-owned plants "survived" during the period of our study.[18]

Summary

Both our case studies and a representative national sample of new manufacturing plants show that new U.S. manufacturing plants owned by Japanese multinationals generate jobs at a far higher rate than counterpart branch plants of U.S. corporations. The case studies show that these new jobs pay similarly high wages in both Japanese-owned and U.S.-owned plants, but that many more of the Japanese-owned plants augment high wages with superior job security and provide greater opportunities for employee "voice."

The case studies further show that the Japanese FDI advantage in job growth is the result of productivity gains from more intensive on-the-job investment in human capital, relatively greater use of high performance management practices, and the development of management cultures that foster investment in social capital, rather than from adopting better technologies or hiring better educated and more experienced workers. The importance of management practices and management cultures has been neglected in previous studies of the host country effects of FDI.

This conclusion is confirmed by econometric analysis of the "ramp-up" process for new plants using detailed plant-level data from the case studies and is further corroborated by a counterpart analysis of national data. The performance advantages from Japanese FDI are robust

[18] There is also a related question of selection bias. It may be that the Japanese multinationals that invest in new plants in United States are among the higher performing plants in Japan and are transferring their successful management practices to their U.S. branches. For our purposes, however, it is sufficient to demonstrate that there is a Japanese FDI

across a number of alternative specifications of the ramp-up model and cannot be satisfactorily explained by alternative hypotheses or biases in the data. These management considerations help to explain the widespread finding in the literature that FDI provides higher wages and greater productivity growth than counterpart investment by host country corporations, at least for the example of Japanese FDI in the United States.

Highlighting the importance of managerial practices and social capital management cultures also broadens the range of considerations that should be considered when developing public policies for attracting FDI. Because FDI in new plants is often likely to incorporate advanced management practices along with advanced technologies, host countries may benefit from the diffusion of productivity-enhancing management practices and management cultures, as well as from the diffusion of new technologies. This can be seen in the growing prevalence of Japanese-style management practices in the United States in the last decade (Osterman, 2000). Another example is that the management practices that Japanese multinationals transfer to the United States contribute more generally to the development of a workforce that is well-trained and that has problem-solving and team-working skills. These workforce benefits can contribute to the development of labor markets in ways that extend beyond increasing employment at relatively high wages.

A second conclusion for policy is that it may be desirable to take into account differences among industries in management practices and management cultures when offering incentives for FDI. Just as there may be industry differences in the diffusion of production technologies, our study shows that the *effective* transfer of high performance management technologies is limited to certain industries. Further research is needed to determine whether similar differences are associated with FDI of different nationalities and in other national settings.

Finally, the quality of the “match” between foreign management practices and the host country workforce may be an important consideration for development policy. For example, intensive training practices are likely to be transferable across national boundaries, but the specific types of social capital investment that improve the productivity of the U.S. workforce may not be equally effective in other host country settings. There is some evidence that Japanese multinationals alter their management practices in different industrialized countries (Liker, Fruin

---

advantage that is derived from management practices and cultures that are different from those of counterpart U.S.-owned plants.

and Adler, 1999; Doeringer, Lorenz, and Terkla, 2003), but we lack evidence on the employment and productivity effects of these adaptations.

Appendix

Description of Data Sources

The Interview Sample

The field research is based primarily on face-to-face interviews with managers of 48 new manufacturing establishments -- 20 U.S.-owned and 28 Japanese-owned. This sample was restricted to branch plants of large, and typically multinational, corporations in three 2-digit industry groups -- plastic and rubber products (SIC 30), non-electrical machinery (SIC 35) and electrical equipment (SIC 36). Average starting employment among this sample of startups is 236, with 19% having fewer than 50 employees and 12.5% having more than 500 employees.

The plants are located in three regions (Georgia, Kentucky, and a northeast region consisting of New York, New Jersey, and Massachusetts). Georgia is a southern state with a very low rate of unionization and the lowest wages in manufacturing among the three regions. Kentucky is a border region with some tradition of unionization and relatively high wages in manufacturing. New York, New Jersey, and Massachusetts represent the northeast region, which has a long record of militant unionism, high wages in manufacturing, and a well-educated technical workforce.

The universe for the sample of new U.S.-owned plants was the list of plants in state business directories in each of the regions. The sample of Japanese startups was drawn from the universe of Japanese startups listed in the Japan Economic Institute's Directory of Japanese Manufacturing Plants in the United States (MacKnight, 1989). The sample was restricted to plants with startup dates between 1978 and 1989 in order to ensure that they would have been through a substantial ramp-up period by the time of the case studies in the early 1990s.

Both universes of startups were stratified by region and industry and the samples were randomly selected from within each region/industry cell. The few plants that declined to participate in the study were replaced by the same random procedure.

The National Sample

Employment data come from the U.S. Establishment and Enterprise Microdata Files (USEEM), a panel database compiled by the Small Business Administration (SBA) from Dun and

Bradstreet records. An abstract of the USEEM database containing biannual employment, ownership, industry, and location information for individual manufacturing plants established between 1978 and 1988 was obtained from the SBA.

By matching an exhaustive list of Japanese-owned plants in the United States in directories compiled by the Japan Economic Institute (MacKnight, 1989) with the USEEM data, we identified sufficiently complete data for seventy-nine Japanese startups. We supplemented these data with questionnaires mailed to other Japanese plants in the JEI directories and follow-up telephone surveys. Through these direct contacts, responses were obtained for additional twenty-seven plants, bringing the total Japanese sample to one hundred and six.

From the nearly 150,000 startup establishment records in the USEEM data file, 33,541 domestic plants that met our inclusion criteria were selected (Table A-1). This sub-sample of domestic startups is restricted to establishments in the continental United States that report employment continuously from startup through 1988 (in order to avoid problems of differential survival rates between Japanese and domestic firms) and it consists only of plants that are part of multi-establishment enterprises. Establishments in 2-digit SIC industries with fewer than two Japanese startups, and those with missing data, are excluded from the sample. Growth rates reported for domestic establishments are, therefore, not representative of the manufacturing sector as a whole.

Table A-1

Average Annual Compound Growth Rates by Industry: Japanese and Domestic Startups, 1978-88 (National Panel Data 1978-88)

SIC Industry	Domestic # Plants	Domestic Growth Rate	Japanese # Plants	Japanese Growth Rate	Distribution by Industry Domestic	Distribution by Industry Japanese
20 Food Products	3551	4%	11	11%	10.59%	10.38%
22 Textiles	824	7%	1	60%	2.46%	0.94%
23 Apparel	1537	6%	1	0%	4.58%	0.94%
24 Lumber	1340	8%	1	6%	4.00%	0.94%
25 Furniture	830	7%	3	35%	2.47%	2.83%
26 Paper	1202	5%	1	0%	3.58%	0.94%
27 Printing	2989	7%	0	-	8.91%	0.00%
28 Chemicals	2843	4%	5	19%	8.48%	4.72%
30 Rubber and Plastic	1729	10%	8	54%	5.15%	7.55%
32 Stone, Clay, Glass	1761	5%	2	18%	5.25%	1.89%
33 Primary Metals	1171	6%	6	20%	3.49%	5.66%
34 Fabricated Metal	2946	7%	5	50%	8.78%	4.72%
35 Non-Electrical equip.	4321	6%	11	53%	12.88%	10.38%
36 Electrical equip.	2911	8%	26	28%	8.68%	24.53%
37 Transportation	1326	9%	16	28%	3.95%	15.09%
38 Instruments	1406	7%	6	13%	4.19%	5.66%
39 Miscellaneous	854	5%	3	23%	2.55%	2.83%
Overall 2-Digit Average	33541	6%	106	29%	100.00%	100.00%
209 Canned Fruit/Veg	380	7%	6	17%		
307 Plastic Products n.e.c.	1384	10%	5	22%		
331 Steel	371	7%	5	13%		
357 Computers, Office Equip	941	8%	3	66%		
354 Machine Tools	636	5%	3	25%		
365 Radio/TV Receivers	109	7%	7	37%		
367 Electrical Components	945	11%	12	19%		
371 Auto Assembly/Parts	713	8%	13	19%		

Sources: USEEM database; authors' survey

Table 1

Description of Startup Plants in the Sample

SIC	State	Product	Number of Workers	Start Year	Annual Avg. Employment Growth (%)
30*	GA	misc plastic products	129	1980	9.6
30*	GA	tv frames	300	1989	26.0
30*	GA	gaskets	375	1980	11.6
30*	KY	industrial belts	120	1988	18.9
30*	KY	rubber components	100	1988	42.5
30*	KY	auto dashboards	340	1988	8.0
30*	NJ	plastic labels	110	1985	27.6
30*	NJ	plastic labels/seal	39	1986	14.7
30*	NY	auto parts	600	1979	31.4
30	GA	plastic parts	105	1983	9.1
30	GA	auto molding	175	1985	-1.9
30	GA	plastic food packaging	216	1978	8.2
30	KY	plastic parts	77	1987	17.8
30	KY	plastic parts	131	1978	4.6
30	MA	misc. plastic products	50	1978	1.5
30	NJ	plastic bottles	200	1978	-5.0
35*	GA	PC monitors	411	1985	22.4
35*	GA	construction equip.	52	1988	24.0
35*	GA	construction equip.	15	1987	-27.9
35*	KY	machine tools	275	1982	23.1
35*	KY	cutting tools	21	1989	51.4
35*	KY	metal prod centers	25	1987	3.8
35*	MA	personal computers	788	1983	16.5
35*	NJ	textile machinery	27	1988	22.0
35*	NJ	computer peripherals	60	1990	7.1
35	GA	industrial saws	250	1978	2.6
35	GA	motors	350	1983	12.6
35	KY	motor brushes	64	1984	4.2
35	KY	precision mach. parts	70	1984	24.1
35	MA	industrial equip.	65	1990	-16.2
35	MA	industrial equip.	160	1978	9.7

Table 1 (cont.)

SIC	State	Product	Number of Production Workers	Start Year	Annual Avg. Employment Growth (%)
36*	GA	auto & consumer elec.	931	1987	20.3
36*	GA	videocassettes	300	1980	8.8
36*	GA	compact disks	300	1987	37.7
36*	GA	tvs, phones	676	1984	17.6
36*	KY	electronic auto parts	534	1985	19.9
36*	KY	wire assembly	1800	1988	34.5
36*	KY	electronic auto parts	125	1989	46.2
36*	MA	micro diskettes	215	1989	6.1
36*	MA	micro diskettes	350	1989	36.8
36*	NJ	elect. optical instru.	44	1982	7.2
36	GA	circuit boards	350	1989	-11.2
36	GA	elect. auto part	440	1978	9.7
36	GA	wire harnesses	350	1978	7.6
36	KY	truck wire harnesses	134	1985	4.3
36	KY	air condition	300	1978	11.0
36	MA	circuit boards	104	1987	26.8
36	MA	computer equipment	54	1982	0.0

* indicates Japanese ownership

Table 2
Adoption Rates of Compensation Practices:
Japanese-owned and Domestic Startups

Compensation Practice	All Plants	U.S. Plants	Japanese Plants
Earnings			
Above Average Wages	100.0%	100.0%	100.0%
Wages in Top Quintile	45.8	45.0	46.4
Profit Sharing	20.8	25.0	17.9
Group Bonuses	22.9	15.0	28.6
Non-Pecuniary Job Benefits			
Employee Voice	75.0	40.0	100.0**
Job Security	27.1	5.0	42.9**

Source: Authors' Establishment Survey

Significance Test: Significance of Difference Test using Pearson Chi Square with Yates continuity correction. When expected frequency is too small, Fisher's Exact Test is used. Significance of differences is measured between U.S.-owned and Japanese-owned plants. * = 0.05; ** = 0.01

Table 3

Adoption Rates of Selected Management Practices: Japanese-owned and Domestic Manufacturing Plants

Practice	All Plants	U.S. Plants	Japanese Plants
Training			
Intensive Entry Training	79.2%	60.0&	92.9%**
Multi-skill Training	31.3	15.0	42.9*
High Performance Management			
Production Teams	41.7%	35.0%	46.4%
Job Rotation	27.1	15.0	35.7
Problem- solving (Quality Circles)	52.1	35.0	64.3*
Quality Control by Production Workers	58.3	20.0	50.0**
N =	48	20	28

Source: Authors' Establishment Survey

Significance Test: Significance of Difference Test using Pearson Chi Square with Yates continuity correction. When expected frequency is too small, Fisher's Exact Test is used. Significance of differences is measured between U.S.-owned and Japanese-owned plants. * = 0.05; ** = 0.01

Figure 1

Illustrative Ramp-up of a High Performance Startup

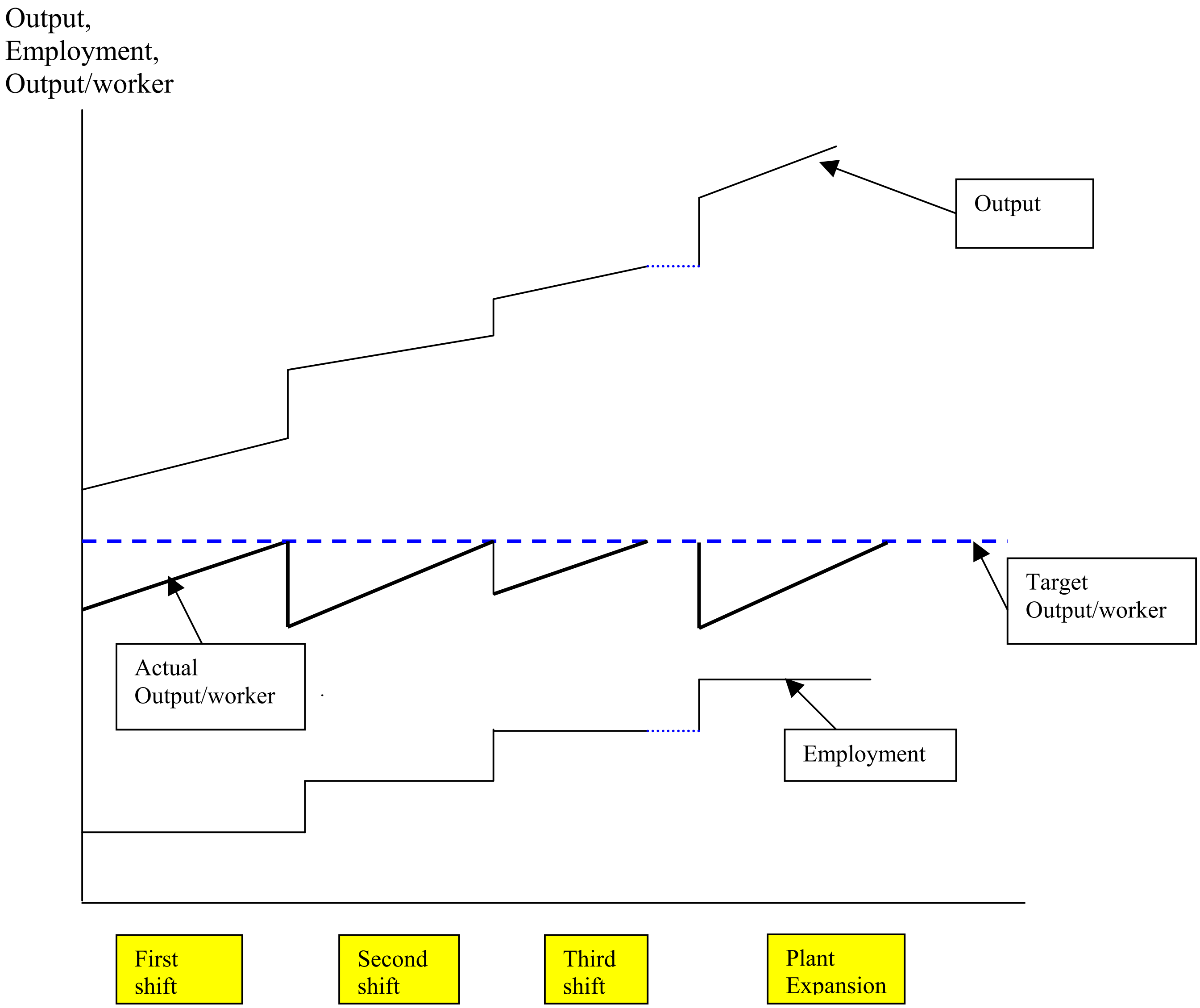

Figure 2

Alternative Ramp-up Paths

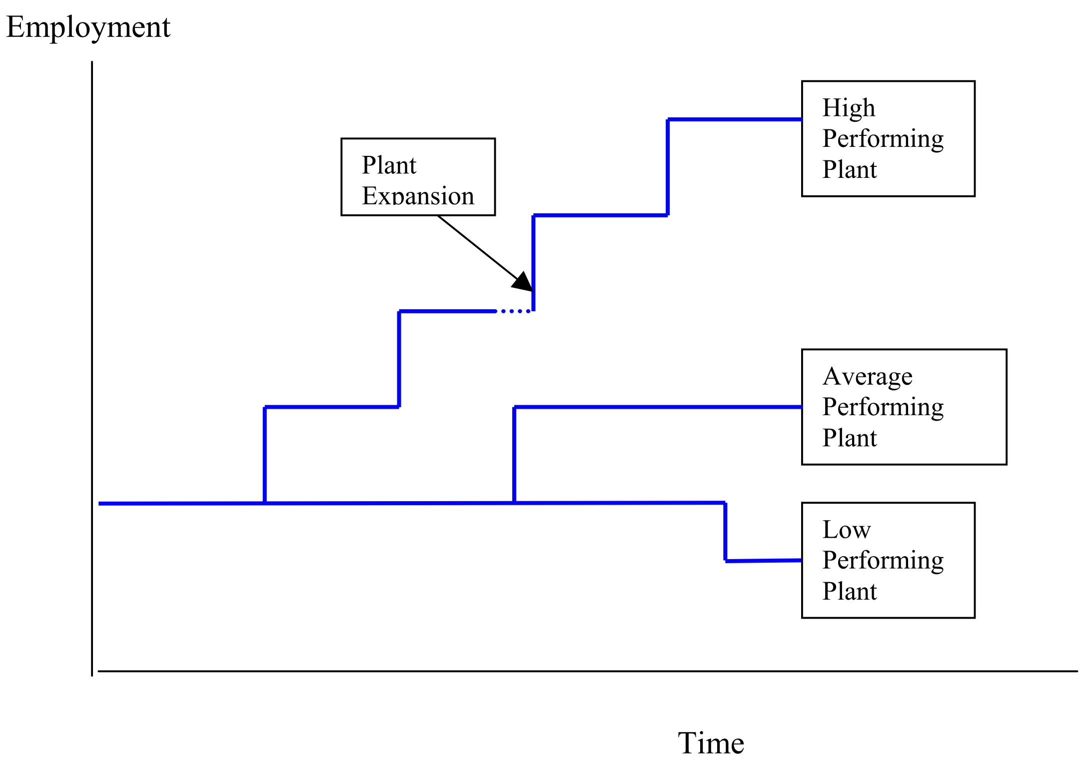

Table 4

Definitions of Variables Used in the Ramp-up Models

$RAMPUP_i$ = Average annual compound growth rate of employment in establishment i from year of startup to final year (1991-92 for case study sample, 1988 for national sample)

HIPERFORM = Number of high performance management practices adopted by establishment i [daily and weekly meetings with employees, employee involvement in managerial decisions (quality circles, peer supervision, quality control by production workers), flexible work practices (teams, job rotation)

$NATJ_i$ = Binary variable; 1 if establishment is Japanese-owned.

$STARTSIZE_i$ = Log of employment in the startup year of establishment i.

IND_i = Vector of binary variables for the two-digit SIC of establishment i.

REG_i = Vector of eight binary variables for regional location of establishment i.

$STARTYEAR_i$ = Vector of binary variables for two-year cohort in which establishment i began production [1988-89 is omitted cohort from case study analysis, 1986-87 is omitted cohort from national panel data]

.

$AUTO_i$ = Binary variable for plant i being in a 4-digit SIC industry supply the automotive industry

$AUTO_i$ * $NATJ_i$ = Binary variable for Japanese–owned plant i being in a 4-digit SIC supplying the automotive industry

$NATJ_i$ * IND_j = Vector of binary variables for Japanese-owned plant i being in the two-digit SIC industry j.

u = Random error term

Table 5
Estimated Effects of High Performance Practices on Ramp-up Rates:
Case Study Sample
(absolute value of t-statistics in parentheses)

Dependent Variable: RAMPUP

Independent Variable	**(1) Without NATJ**	**(2) With NATJ**
Constant	44.80**	36.88**
	(3.66)	(2.95)
HIPERFORM	6.07**	4.77*
	(2.91)	(2.25)
NATJ		10.33*
		(1.95)
STARTSIZE	-6.92**	-6.43**
	(3.40)	(3.25)
PLAS	-4.82	-5.04
	(0.91)	(0.98)
MACH	-8.94	-8.68
	(1.58)	(1.59)
Starting year cohorts		
1978	-9.84	-3.44
	(1.55)	(0.50)
1980	-15.83	-17.17
	(1.71)	(1.92)
1982	-11.13	-8.07
	(1.58)	(1.16)
1984	-6.22	-3.34
	(0.97)	(0.53)
1986	-16.81**	-14.81*
	(2.53)	(2.28)
# of plants	48	48
Adjusted R-square	0.68	0.72
F value	3.70**	3.95**

* significant at the .05 level
** significant at the .01 level
Source: Authors' establishment survey.

Table 6

Estimated Effects of Organizational Regimes On Ramp-up Rates: National Panel Data 1978-88
(absolute value of t statistics in parentheses)

Dependent Variable: RAMPUP

Variable	Basic Model (1)	Basic model with auto interactions (2)	Model with sectoral interactions (3)
Constant	0.20**	0.20**	0.20**
	(25.32)	(25.35)	(25.34)
NATJ	0.24**	0.21**	
	(7.54)	(5.54)	
STARTSIZE	-0.04**	-0.04**	-0.04**
	(38.96)	(38.96)	(38.96)
AUTO		0.02**	
		(2.66)	
AUTO*NATJ		0.11	
		(1.52)	
Industries			
SIC20	-0.01	-0.01	0.00
	(0.81)	(0.80)	(0.75)
NATJ*SIC20			0.08
			(0.85)
SIC22	0.04**	0.04**	0.04**
	(3.59)	(3.56)	(3.57)
NATJ*SIC22			0.52
			(1.69)
SIC23	0.03**	0.03**	0.03**
	(2.94)	(2.84)	(2.97)
NATJ*SIC23			-0.06
			(0.18)
SIC24	0.03**	0.03**	0.03**
	(2.60)	(2.61)	(2.62)
NATJ*SIC24			0.05
			(0.17)
SIC25	0.02	0.02	0.02
	(1.34)	(1.26)	(1.31)
NATJ*SIC25			0.35*
			(1.97)

Table 6 (cont)

Industries	**Basic Model (1)**	**Basic model with auto interactions (2)**	**Model with sectoral interactions (3)**
SIC26	0.02	0.02	0.02
	(1.47)	(1.48)	(1.49)
NATJ*SIC26			0.06
			(0.20)
SIC28	-0.02*	-0.02**	-0.02*
	(2.36)	(2.44)	(2.34)
NATJ*SIC28			0.16
			(1.00)
SIC30	0.05**	0.05**	0.05**
	(5.37)	(5.13)	(5.26)
NATJ*SIC30			0.49**
			(4.11)
SIC32	-0.01	-0.01	-0.01
	(1.19)	(1.34)	(1.18)
NATJ*SIC32			0.16
			(0.74)
SIC33	0.02*	0.02*	0.02*
	(2.02)	(1.98)	(2.09)
NATJ*SIC33			0.11
			(0.88)
SIC34	0.02*	0.01	0.02*
	(2.42)	(1.79)	(2.39)
NATJ*SIC34			0.44**
			(3.13)
SIC35	0.00	0.00	0.00
	(0.15)	(0.14)	(0.07)
NATJ*SIC35			0.49**
			(5.00)
SIC36	0.04	0.04**	0.04**
	(5.11)	(4.89)	(5.15)
NATJ*SIC36			0.19**
			(2.79)
SIC37	0.06**	0.05**	0.06**
	(5.54)	(4.56)	(5.52)
NATJ*SIC37			0.25**
			(2.84)

Table 6 (cont)

Industries	**Basic Model (1)**	**Basic model with auto interactions (2)**	**Model with sectoral interactions (3)**
SIC38	0.02	0.02	0.02
	(1.56)	(1.54)	(1.62)
NATJ*SIC38			0.07
			(0.52)
SIC39	-0.01	-0.01	-0.01
	(0.87)	(0.87)	(0.86)
NATJ*SIC39			0.18
			(1.00)
Regions			
MT	0.01	0.01	0.00
	(0.57)	(0.56)	(0.54)
WNC	-0.01	-0.01	-0.01
	(0.80)	(0.81)	(0.84)
ENC	0.00	0.00	0.00
	(0.19)	(0.34)	(0.25)
NNE	0.00	0.00	0.00
	(0.65)	(0.68)	(0.68)
WSC	0.00	0.00	0.00
	(0.24)	(0.25)	(0.28)
ESC	0.03**	0.03**	0.03**
	(3.98)	(3.89)	(3.88)
SAT	0.02**	0.02**	0.02**
	(3.83)	(3.80)	(3.76)
Starting year cohorts			
1978	-0.04**	-0.03**	-0.03**
	(6.08)	(6.07)	(6.06)
1980	-0.02**	-0.02**	-0.02*
	(3.91)	(3.88)	(3.84)
1982	-0.03**	-0.03**	-0.03**
	(5.16)	(5.14)	(5.13)
1984	-0.02**	-0.02**	-0.02**
	(4.62)	(4.60)	(4.63)
# plants	33647	33647	33647
Adjusted R-square	0.05	0.05	0.05
F value	61.79**	8.15**	41.23**

* significant at the .05 level

** significant at the .01 level

References

Aoki, Masahiko, "Toward and Economic Model of the Japanese Firm", *Journal of Economic Literature*, Vol. XXVII, March 1990, pp 1-27).

Black, Sandra E. and Lisa M. Lynch, "How To Compete: The Impact of Workplace Practices and Information Technology on Productivity", National Bureau of Economic Research Working Paper No. 6120, August 1997.

Black, Sandra E. and Lisa M. Lynch, "What's Driving the New Economy: The Benefits of Workplace Innovation", authors' mimeo, November 1999.

Brannen, M., J. Liker, and W. Fruin, "Recontextualization and Factory-to-Factory Knowledge Transfer From Japan to the United States: The Case of NSK," in Liker, Jeffrey K., W. Mark Fruin and Paul S. Adler, editors, *Remade in America; Transplanting and Transforming Japanese Management Systems* (Oxford: Oxford University Press, 1999).

Caves, Richard E., "Multinational Firms, Competition, and Productivity in Host-Country Markets", *Economica*, Vol. 41, no. 162, May 1974, pp. 176-193.

Caves, Richard E., "Japanese Investment in the United States: Lessons For the Economic Analysis of Foreign Investment", *The World Economy*, Vol. 16, No. 3, May 1993, pp. 279-300.

Doeringer, P.B., C. Evans-Klock, and D.G. Terkla, "Hybrids or Hodgepodges? Workplace Practices of Japanese and Domestic Startups in the United States," *Industrial and Labor Relations Review*, Vol. 51, No 2, January 1998, pp. 171-186.

Doeringer, P.B., N. Lorenz, and D.G. Terkla, "National Differences in High Performance Management: Evidence from Japanese Multinationals in Manufacturing," *Cambridge Journal of Economics*, Vol. 27, No. 2, March 2003, pp. 265-286.

Doms, Mark E. and J. Bradford Jensen, "Comparing Wages, Skills, and Productivity Between Domestically and Foreign-Owned Manufacturing Establishments in the United States", in Robert E. Baldwin et al. (Eds.), *Geography and Ownership As Bases For Economic Accounting*, (Chicago: University of Chicago Press, 1998), pp. 235-258.

Feliciano, Zadia and Robert E. Lipsey, "Foreign Ownership and Wages in the United States", 1987-1992", National Bureau of Economic Research Working Paper No. 6923, January 1999, (mimeo).

Freeman, Richard B. and Morris M. Kleiner, "Who Benefits Most From Employee Involvement: Firms or Workers?", *American Economic Review*, Vol. 90, No. 3, May 2000, pp. 219-223.

Glickman, Norman, J., and Douglas P. Woodward, *The New Competitors*, (New York: Basic Books Inc., 1989).

Harris, Richard and Catherine Robinson, "The Effect of Foreign Acquisitions on Total Factor Productivity: Plant-level Evidence from UK Manufacturing, 1987-1992", *Review of Economics and Statistics,* Vol. 84, No. 3, August 2002, pp. 562-568.

Herr, Ellen M., "U.S. Business Enterprises Acquired or Established by Foreign Direct Investors in 1988", *Survey of Current Business*, May 1989, pp. 22-30.

Howenstine, Ned G., "U.S. Affiliates of Foreign Companies: Operations in 1988," *Survey of Current Business*, Vol. 70, No. 7, July, 1990.

Howenstine, Ned G., and William J. Zeile, "Characteristics of Foreign-Owned U.S. Manufacturing Establishments", *Survey of Current Business*, Vol. 74, No. 1, January 1994, pp. 34-59.

Ichniowski, Casey, Katherine Shaw, and Giovanna Prennushi, "The Effects of Human Resource Management Practices on Productivity: A Study of Steel Finishing Lines", American Economic Review, 87, no. 3 (June 1997), pp. 291-313.

Keller, Wolfgang and Stephen R. Yeaple, "Multinational Enterprises, International Trade, and Productivity Growth: Firm Level Evidence From the United States," National Bureau of Economic Research Discussion Paper 9504, Cambridge, MA, February 2003.

Kenney, Martin and Richard Florida, *Beyond Mass Production: The Japanese System and its Transfer to the U.S*, (New York: Oxford University Press, 1993).

Lazear, Edward P., *Personnel Economics For Managers*, (New York: John Wiley & Sons, Inc., 1998).

Leonard, Jonathan, "Unions and Employment Growth", *Industrial Relations*, Vol. 31, No. 3, Winter, 1992, pp. 80-94.

Liker, Jeffrey W., Mark Fruin, and Paul S. Adler (Eds.), Remade in America, (New York: Oxford University Press, 1999).

Lipsey, Robert E., "Home and Host Country Effects of FDI", National Bureau of Economic Research Working Paper No. 9293, October 2002 (mimeo)

MacKnight, Susan, *Japan's Expanding Manufacturing Presence in the United States: An Update*, (Washington, D.C.: Japan Economic Institute, October 1989).

McCulloch, R., "Why Foreign Corporations Are Buying Into U.S. Businesses," *The Annals of the American Academy on Political and Social Science*, Vol. 516, July 1991, pp. 162-82.

Milgrom, Paul, and John Roberts, "The Economics of Modern Manufacturing: Technology, Strategy, and Organization", *American Economic Review*, June 1990.

Mohrman, Susan A., Jay R. Galbraith, Edward E. Lawler, III, and Associates Tomorrow's Organization (San Francisco: Jossey-Bass Publishing, 1998).

Osterman, Paul, "Work Reorganisation in an Era of Restructuring: Trends in Diffusion and Effects on Employee Welfare, *Industrial and Labor Relations Review*, vol. 53, No. 2, January, 2000, p, 179-196.

Prendergast, Canice, "The Provision of Incentives In Firms", *Journal of Economic Literature*, Vol XXXVII, No. 1, March 1999, pp. 7-63.

Putnam, Robert D., *Bowling Alone: The Collapse and Revival of American Community*, (New York: Simon & Schuster, 2000).

Sako, M. (1994) "Training, Productivity and Quality Control in Japanese Multinational Companies," in M. Aoki and R. Dore (eds.) *The Japanese Firm: Sources of Competitive Strength*, Oxford University Press.

Scherer, F. M., *The Economics of Multi-plant Operation*, (Cambridge, MA: Harvard University Press, 1975).

Vernon, Raymond, The Economic *Environment of International Business*, (Englewood Cliffs, NJ: Prentice-Hall, 1972)

Vernon, Raymond, *In the Hurricane's Eye: The Troubled Prospects of Multinational Enterprises*, (Cambridge, MA: Harvard University Press, 1998).

Williamson, Oliver E., *Markets and Hierarchies, Markets and Hierarchies: Analysis and Antitrust Implications,* (New York: The Free Press, 1975).

Williamson, Oliver E., *The Economic Institutions of Capitalism,* (New York: Free Press, 1985).