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The benefits of youth: the role of Japanese fringe benefit policies in the restructuring of the US motor vehicle industry

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Introduction

As in many US manufacturing industries, US car firms have faced declining profit rates over the last few decades. Like many manufacturing industries, the US motor industry must and is going through a restructuring or rationalisation process which will change its production system, its industrial relations system and its geographical organisation. What shape that restructuring will assume is still pending.

Though many factors have contributed to the disequilibrium which is forcing the restructuring in the industry, competition from Japanese firms is perhaps the most disruptive to the stable oligopoly that has characterised the industry for three decades. Japanese firms have developed a production system now regarded as the standard for the industry—the 'best practice' system. On average Japanese firms build higher quality vehicles at lower cost than US firms. Numerous measures of productivity demonstrate superior static efficiency among Japanese firms and Japanese technological development of product and process has outstripped US firms for nearly a decade.

Japanese firms have challenged US firms in several ways. In the early 1970s, Japanese factor costs were far below those of US firms. The Japanese entered the low end of the US market with small inexpensive imports. By the late 1970s, Japanese productivity was on a par with US producers and the quality gap was closing. When, in 1981, the Reagan Administration negotiated an agreement with Japan voluntarily to restrain Japanese car imports to 1·68 million units a year, Japanese firms were firmly in a position to move upscale in product and challenge US firms on the basis of quality, reliability and innovative technology across a range of products including small and medium size passenger cars, luxury cars, pickup trucks and sport utility vehicles. Several Japanese firms also built North American assembly plants, skirting the restriction imposed on imports by the voluntary restraint agreement.

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US firms face an important choice. On the one hand, they may meet the Japanese competition by reforming or rationalising their production system, possibly becoming more 'Japanese'. This is the more difficult path, entailing a complete reorganisation of the firm, a redefinition of the role of management and probably the consent of the workforce. The workforce plays a substantive role in this rationalisation because the new production process requires constant discretionary input from workers. If US firms reform and rationalise their production system along the lines suggested by their Japanese competitors, they open the possibility of sustained high rates of productivity growth.

Alternatively, US firms can 'sweat' their workers and suppliers. This approach does not require the consent of the workforce. It is based on an intensification of exploitation, with no underlying increase in productivity. In the long run, exploitation is limited by a floor below which wages and supplier prices cannot be pushed without driving them from the market.

Driven by an immediate need for relief as well as a long-term appreciation of the need to rationalise, most firms have chosen some combination of the two strategies, contracting out work to low-cost suppliers, increasing the intensity of work in house while developing programmes to reform and rationalise the organisation of production within the firm and the relationship with outside suppliers. Unfortunately, exploitation attenuates workers' and suppliers' willingness to co-operate in a rationalisation process.

Some authors have argued that, in contrast to imports, Japanese investment in the US has the salutory effect of pushing the US firms towards the high productivity path. Japanese firms, the argument goes, by transferring their superior production system to the United States will demonstrate an alternate production system and train US workers and suppliers in new skills. Ultimately the US firms will either become more Japanese or continue to lose their market share. In either case, the performance of the US industry will improve, regardless of whether production is taking place in facilities of US or Japanese parent firms. Japanese direct investment, so the argument goes, should be encouraged because it displaces imports and transfers superior technology. Robert Reich is an articulate proponent of the position that we should not

> bar foreign firms from operating in the United States—particularly if they'll spend more money training American workers than is spent by American firms in the same industry, pay American workers higher salaries, give them more job security, and make them far more productive than American firms do—even if the country where they have their headquarters prohibits American firms from investing there. Studies have shown that Japanese firms, in particular, fulfill all these criteria (1991, p. 53).

Since most Japanese investment in new productive capacity is in the car industry, Reich is implicitly talking about Japanese car firms.[1] Robert Lawrence of the

[1] It is difficult to estimate what percentage of foreign investment in new productive capacity should be attributed to the car industry. However, figures for the 1988 foreign direct investment position (*Survey of Current Business*, June 1989, Table 4, p. 48) put Japanese foreign direct investment in manufacturing at $12 billion. There are eight Japanese car plants in the US. Each has already or plans soon to invest an average of about $800 million, for a total of $6·4 billion. There are also approximately 300 Japanese parts plants being built. This suggests that new Japanese car capacity represents by far the greatest part of Japanese investment in US manufacturing.

Brookings Institution is even more explicit about Japanese investment in the US motor vehicle industry:

> Japanese-affiliated automakers have transferred production technology and skills to the United States . . . Japanese operations and the responses of some US automakers have allowed the recovery of competitiveness in an industry in which it had seriously eroded.
>
> The new approaches to production technology, buyer–supplier relations and labor–management practices introduced by the foreign-affiliated automakers into their own operations are being diffused to their Big Three competitors. By engaging in joint ventures, US producers have not only learned valuable lessons about building small cars, but also important lessons about labor-management relations. . . . The Japanese emphasis on training has given US workers valuable new skills and experience. Their emphasis on collaborative relationships with suppliers has diffused Japanese know-how to US autoparts makers (1990, p. 1).

This argument relies on an industrial organisation explanation for Japanese foreign direct investment. Firms with a competitive advantage based on monopolistic control of a superior technology invest in foreign markets in order to capture the rents which cannot be recovered through exports or licensing. As with trade, according to the theory, there are potential gains from foreign direct investment based on comparative advantage, increasing returns to scale and increasing competition especially in an industry with imperfect product markets. Foreign direct investment may extend the gains from trade where rents cannot be captured through trade. But there are additional potential gains from foreign investment based on externalities. The foreign firm is not always able to capture the full rent. As workers are trained and US managers are exposed to Japanese managerial practices, these superior techniques ultimately filter out to US firms. In time, the US firms will adopt the technology, monopolistic rents will be eroded, vehicle prices will decline and overall efficiency, both technical and allocative, will be improved (Graham and Krugman, 1989).[1]

I will argue that Japanese direct investment in the US does not fit this profile. As it is now practised, Japanese direct investment in the US is not very different from importing. As a consequence, all of the potential costs and none of the salutory effects of FDI are being realised. Furthermore, when Japanese firms assemble vehicles in the US, they capture not only technological rents available through trade but also factor cost-based rents which are largely foreclosed to US parent firms. The rents are a consequence both of the superior production system in Japan and of segmented labour markets in both Japan and the US. Japanese firms, through investment in the US market, have access to a labour market of young, healthy, non-union workers. Through the mechanism of fringe benefits, these workers are very cheap relative to workers in Big Three firms.

Were Japanese foreign direct investment motivated only by technological rent seeking, there would be no real factor cost differences and there would be less potential for competition around labour compensation. Certainly US firms could

[1] Graham and Krugman (1989) survey the theoretical and empirical literature on foreign investment and conclude that industrial organisation explanations are more plausible than cost-of-capital explanations for the rise of foreign investment in the US. Despite the rent-seeking nature of recent investment, they conclude that the gains from inward foreign direct investment outweigh the losses.

cite cost differences to justify requests for concessions in wages and benefits. But in an economic context in which all players seem to be 'on a level playing field', it is more difficult for companies to argue that labour costs are either the problem or the solution. Once labour cost differences exist and are measurable (and the companies *are* measuring them), the option to restructure along the alternative 'easy' path is opened.

Contrary to Graham and Krugman, Reich or Lawrence, who take a sanguine view of Japanese foreign direct investment, I regard it as a Trojan horse, foreclosing the possibility that labour and parts suppliers will be involved in an effort to rationalise the motor vehicle industry.

In what follows I discuss first the disequilibrium in the car industry that is forcing the restructuring, second the alternatives for restructuring, and third the kind of restructuring that Japanese direct investment will lead to, and the effect it will have on wages and benefits in the car industry.

Disequilibrium in the car industry

The golden years before 1967, when profit rates averaged between 30 and 40%, can be attributed to a fortunate combination of social and economic factors. The market was growing at an extraordinary rate, fuelled by the post-war boom and rising average incomes. Labour peace had been bought through innovative agreements carved out in the 1950s in exchange for above average wages, annual increases linked to productivity growth in the economy as a whole (which was less than productivity growth in the industry), generous fringe benefits, including pensions and medical insurance, and programmes to maintain income during downturns.

Both labour and management were able to achieve their objectives through a system of rule-based bargaining (Katz, 1985, ch. 2). By the rules, annual wage increases and protection against inflation could be negotiated and benefits progressively improved, based loosely on the companies' ability to pay. Union leaders preserved internal political peace through their success at the bargaining table and the companies were able to buy protection from disruptive strike activities at an affordable price. Pattern bargaining and virtually universal unionisation in assembly assured equal labour rates across plants and firms. No plant or company could bid down the costs of another.

Several factors account for the decline in profitability after 1967. First, as indicated in Table 1, productivity grew by 43% in SIC 371 (Motor Vehicles and Equipment) over the business cycle between 1958 and 1967, while real average hourly earnings (deflated by the wholesale price index for SIC 371) grew only 6%. Over the next two cycles, 1967–1973 and 1973–1978, real earnings grew more rapidly than labour productivity. It was only after 1978 that the gap again widened between productivity growth and earnings growth. Therefore, between 1967 and 1978, the income share of labour was increasing while the profit share was declining.

Second, during the period following the energy crisis in 1973, the capital–output ratio began to rise. Firms retrofitted plants to increase energy efficiency, but they did not retool plants to fit the changing mix as consumers demanded more fuel-efficient vehicles. After Japanese and European firms began to import small fuel-efficient

Table 1. *Earnings and productivity growth, SIC 371 1958–1985*

	Real average hourly earnings: production workers	Output per production worker hour	Real labour costs[a]
1958	100	100	100
1967	106	143	74
1973	163	176	92
1978	196	202	97
1985	216	252	86

Source: BLS, Employment and Earnings, and BLS, Office of Productivity and Technology, May 1991, unpublished data.
[a]Excluding benefit costs.

vehicles, US firms experienced chronic capacity imbalances as a consequence of their slow adjustment to the new demand mix and loss of market share to foreign competitors. Finally, the stable oligopoly which had characterised the industry throughout the 1960s began to erode and with it the pricing policies. While General Motors maintained price leadership, it had more difficulty maintaining the margins of the golden years in the face of new low-cost entrants.

It is the existence of new entrants which is most crucial both to the erosion of profit margins, and eventually to the destabilisation and restructuring of the industry. New entrants had cheaper and eventually better products. Throughout the 1970s, the Japanese competitors had a cost advantage due to lower labour compensation rates. In 1975, hourly compensation rates in Japan for production workers in motor vehicle manufacturing were 37% of the compensation rates for US production workers. Between 1975 and 1988, although hourly compensation rates for both countries doubled, the devaluation of the dollar relative to the yen had the effect of raising Japanese compensation rates to 70% of US rates (US Department of Labor, Bureau of Labor Statistics, Office of Productivity and Technology, March 1989). Labour costs were still an advantage, but not the overwhelming advantage they had been in the 1970s.

Ultimately more important than hourly labour cost differences was the fact that Japanese competitors introduced a new production system to the industry. By the late 1970s, Japanese firms surpassed the productivity levels of US firms (Japan Industrial Policy Research Institute, 1982). They had developed a system which apparently solved the problem both of control of and co-operation from workers, greatly enhancing the contribution made by management and production workers alike. They solved quality problems which had long been considered intractable by US firms, and they had found a way to elicit co-operation from their suppliers.

The entry of new competitors threw the oligopolistic structure of the industry into chaos. US firms began to lose their market share, pricing discipline eroded, and excess capacity became commonplace, putting further pressure on firms to discount in order to keep costly plants running near capacity.

Between 1958 and 1967, profit rates[1] in the car industry averaged between 30 and 40% over the business cycle. Beginning in the cycle after 1967, however, the historically high rates began to fall. Between 1967 and 1975, profit rates averaged around 20–25% and since 1978 have averaged 7–10%.

Alternative roads to restructuring

Steadily declining profit rates heralded the inevitable restructuring of the industry. Whether that restructuring will imply rationalisation is another question. Although restructuring involves the construction of new institutions to regulate the economy or the industry in question, it does not necessarily imply rising productivity. For example, a change in the relative power between capital and labour which restores profit rates by reducing the share to labour is a case of restructuring but not of rationalisation.

Rationalisation has a long history in the economics literature going back in its neoclassical variant at least to Marshall, and certainly to Marx.[2] Rationalisation implies an increase in aggregate productivity in the industry or economy. In its static formulation, rationalisation has implied concentration and centralisation to exploit the benefits of increasing returns to scale. The dynamic definition of rationalisation attributed growth to the introduction of new technologies and new industrial processes. Concentration was important because it reduced the risk of investing in new technologies. Opposing sides in the British inter-war debate on rationalisation put greater or lesser emphasis on the static notions of rationalisation associated with scale economies (Shove) as opposed to the dynamic notions (Schumpeter, Hobson and Dobb) associated with new technologies and new industrial structures which would in a 'gale of creative destruction' replace the old. Dobb especially, contributed the notion that intra- and inter-organisation interdependence were important.

Two notions, useful to this analysis, emerge from the rationalisation debate. First, both the static and dynamic concepts of rationalisation emphasise the importance of firm size. Economies of scale require large firms, limited of course by the extent of the market. Development of new technologies and new industrial structures also require large size to overcome uncertainty around the process of restructuring. Second, rationalisation is a learning process in the dynamic model, and learning requires scope and sophistication on the part of the parties involved, and most importantly co-operation.

While rationalisation may involve or be furthered by competition, it does not necessarily imply competition. In fact, one defining aspect of rationalisation has been the removal of many decisions from the sphere of the market, either through internalisation within the firm or through cartelisation between firms. Rationalisation is seen as a solution to the waste of atomistic competition. German and Japanese firms were able to use cartelisation to regulate market forces. US and British firms have

[1] I measure profit rates as income to capital as a percentage of capital stock. Income to capital included before-tax profits, depreciation and amortisation allowances, and property taxes. Capital stock is a perpetual inventory measure net of depreciation assumed to be straight line. All data is from Annual Reports, 10-K Reports or Moody's Industrial Manual.

[2] My discussion of the literature of rationalisation is based on Wright (1991) and Shove (1930).

been obliged to harness the market through increased concentration (Best, 1990, chs 3, 6).

The steadily declining profit rates of the car industry after 1970 indicated the need to restructure its regulatory institutions—the industrial relations system, the production system, the supplier system, etc. Restructuring did not begin with competition from Japan. As soon as profit rates began to fall, US firms sought ways to maintain margins.

The first evidence of restructuring came in the car parts industry. Because there were both union and non-union firms in the parts industry, labour cost-based competition increased during this period. Between 1962 and 1973, the percentage of employment in plants with 500 or more employees declined from 62 to 58%. By 1983, it had declined to 42% (Herzenberg, 1989, Table 46A). Most plants with 500 or more employees are unionised. The unionisation rate in the parts sector declined from 92 to 67% between 1975 and 1985 (Herzenberg, 1989, Table 48). Within companies, one began to see unionised plants in north central urban locations closing while new plants were opened in the southern states, or in Mexico or Brazil. Parts employment in the north central region as a percentage of national employment in parts declined from 73 to 56% between 1974 and 1983 while the percentage in the south increased from 14 to 32% (Herzenberg, 1989, Table 46B).

Then the downturn beginning in late 1978 in the car industry opened up the first possibility of erosion in pattern bargaining in the universally organised assembly sector. As part of its effort to avoid bankruptcy, Chrysler broke both with the pattern set by Ford and General Motors in the 1979 round of bargaining, and with the rules of bargaining maintained since the early 1950s. In three rounds of bargaining between September 1979 and January 1981, the UAW agreed to a total of $600 million in wage and benefit concessions, effectively eliminating percentage wage increases known as 'annual improvement factors' (AIFs) and cost-of-living increases (COLAs) for 1979 to 1982. By 1982, hourly compensation for Chrysler workers was $2.50 below that of Ford and General Motors workers (Katz, 1985, p. 55).

While one may have foreseen future developments in the departure from pattern of the early 1980s, at the time it was viewed as a temporary deviation. By the end of contract negotiations in 1987 the gap had once again been closed. Moreover, although Chrysler wage rates were reduced below those of Ford and General Motors, it must be remembered that this hardly left Chrysler, then on the verge of bankruptcy, with a cost advantage.

As the experience of the 1970s and early 1980s signalled, one path to restructuring could involve the erosion of pattern bargaining and the opening of competition on the basis of labour costs across firms, plants and regions. While eroding wages in the parts sector may have reduced unit costs somewhat, resistance in the assembly sector put a limit on wage erosion as a solution to the problem, at least for the time being.

There are at least three possible paths for restructuring now open to the US car industry. The first possibility is that Japanese firms with superior production systems, lower costs, higher quality vehicles and deeper pockets will simply drive complacent US firms out of business. In this case, a superior production system used by new firms would replace both the existing production system and existing firms. Alternatively, US firms may respond aggressively to competition from Japanese

firms. Firms which choose the high road strategy would develop or adopt a more efficient and dynamic production system. Their suppliers and employees would be willing participants in the rationalisation of the industry. Firms which choose the low road would seek, through the usual means of concessions and plant relocation, continual reductions in compensation rates and supplier prices.

Technology transfer or social dumping

Reich and Lawrence and other proponents of foreign direct investment would have us believe that Japanese firms, by transferring a superior production system, will set the terms for rationalisation of the industry. What is this system which Reich and Lawrence are so keen to transfer? And precisely what is the incentive to Japanese firms and the mechanism for transferring the Japanese production system to the US?

It seems that much of the enthusiasm for the system is based on interpretation of only part of the system. The Japanese production system is a finely balanced blend of two diametrically opposed incentive systems. One, the system which has enthused western writers, draws on community values and common interests to forge a consensus around corporate strategy. This incentive structure, embedded in large manufacturing firms, appears to depend on a surrounding structure of contingent workers and secondary suppliers whose behaviour is motivated by more traditional economic incentives. Students of Japanese industry have concentrated on the large manufacturing firms (Dore, 1973, 1986, 1987; Aoki, 1990; Abegglen and Stalk, 1985). Less is known about the secondary markets for parts and labour.

The success of the Japanese production system and much of its appeal owes to its superior capacity to contain the destructive competitive forces of the market while promoting the constructive effects of competition. This is apparent in the industrial relations system for large firms, in the relationship between assemblers and first tier suppliers, and in the relationship of large firms to their banks and stockholders. Many of the exchanges which would be mediated by the market in a Western firm seem to be affected through negotiation and mutual agreement in large Japanese firms. Japanese firms, for historically specific reasons, entered into relations with workers, suppliers and financiers that entailed a greater sharing of power than is characteristic of Western firms. The result is an incentive structure better suited to the needs of contemporary markets.

For example, the permanent employment system in large firms, which was initiated in the 1950s to retain scarce skilled labour, is part of an incentive system which now draws a high level of commitment from employees. The technological and commercial dynamism of the system—new products are brought to the market in half the time required of Western firms—is frequently credited to the scope and sophistication of the permanently employed workforce.

The majority of the workers in the top tier firms in the industry face a labour market only for entry-level positions in the firm. Once a worker joins the firm there is virtually no lateral mobility outside the company. Workers expect to spend their lifetime (until 55) in a single firm, and are rewarded through promotion and both group and individual performance-based productivity bonuses. Promotion is based on performance criteria which include some measure of the workers' ability to handle

a broad range of tasks and work collectively in groups. Broadly defined tasks and job rotation relieve the traditional boredom of the assembly line while raising the employees' awareness of the objectives of the firm. Dore, Aoki, Abegglen and Stalk all suggest that this incentive system successfully encourages employees to view their interests in common with the firm.

First tier suppliers are part of the 'team' as well, contributing to the design of the product from the early stages. Unlike Detroit-based firms which traditionally organise relations with suppliers through a competitive bidding process, Japanese firms maintain very long-term, frequently exclusive relations with suppliers. Because suppliers and assemblers often hold stakes in the equity of one another's firm, they are conscious of their common fortune. Consequently, the Japanese assemblers have been able to exploit the design and engineering capabilities of their suppliers. The just-in-time system of inventory and parts delivery and statistical quality control build quality and conservation into the production process without costly inspection.

But the consensus forged from job security and sharing the benefits of prosperity depends on the cost flexibility built into the system through the use of contingent workers and secondary and lower tier suppliers. This is the level of the system where more familiar relations of power between capital and labour and between monopoly or oligopoly capital and competitive capital prevail.

Robert Cole estimates that only about 32% of Japanese employees in all industries enjoy the benefits of lifetime employment (1979, p. 61). In the car industry, it is those working in assembly plants or first tier suppliers that are offered lifetime employment. There are approximately 500,000 people employed in the car parts industry in Japan (JAMA, 1987, p. 18). Using Toyota as an example I have tried to calculate the relative importance of secondary suppliers and the contingent workforce to firm flexibility.

Toyota produces approximately 30% of the vehicles in Japan; assuming Toyota accounts for 30% of parts employment, it accounts for 150,000 car parts jobs. There are 176 firms in the Toyota Group, which includes first and second tier suppliers (Dodwell, 1986, p. 31). In a survey of over 500 Japanese parts suppliers (Cole and Yakushiji, 1984, pp. 157–161), it was found that very large first tier suppliers had average employment of 3000 to 6000, while employment in second tier suppliers averaged 340. Cole shows the employment distribution by firm size of a representative sample of male members of the workforce (employed or looking for work) in Yokohama, a city with an industrial structure comparable to Detroit (1979, p. 79, Table 11).[1] Thirty-nine per cent of the workforce was employed in firms of 1000 or more employees, 5% in firms of 500–999, 13% in firms of 100–499, and 41% in firms with less than 100 employees. The survey of Detroit showed only 25% employed in firms of less than 100 employees and 57% employed in firms with more than 1000 employees. If people employed by Toyota suppliers were distributed across firm sizes in comparable proportions to the distribution of workers in Yokohama, one would find 50,000 people, one-third of Toyota-related parts workers, employed in third and fourth tier supplier firms (Table 2).

In the survey by Cole and Yakushiji it was found that employees in second tier suppliers were paid wages that were 87% of the average in first tier suppliers.

[1] Of course this is only a proxy for comparison of automotive supplier structures.

Table 2. *Estimated Toyota parts employment by firm size*

Tier	Firm size	Number of firms	Share of employment (%)	Employment
1st	1000+	50	39	58,000
1st	500–999	10	5	7500
2nd	100–499	115	13	19,500
3rd/4th	<100	4000	41	61,500
Total		4176	100	150,000

Source: Compiled by Howes, based on Cole (1979, Table 11, p. 79) and Dodwell (1986, p. 31).

Table 3. *Index of hourly wages in Japanese car parts, 1983*

Tier	Firm size	Index of wage rates
1st	500+	100
2nd	100–499	87
3rd/4th	30–99	67

Source: Compiled from Cole and Yakushiji (1984, p. 160).

Workers' wages in the third tier were 67% of those in first tier suppliers (Table 3). Eleven per cent of the workforce in second tier suppliers was part-time and seasonal, compared to 4·2% in first tier suppliers. Presumably there is an even higher proportion of temporary workers among lower tier suppliers. While 100% of first tier suppliers were unionised with a 95% membership rate, among second tier suppliers, only 50% had unions and only 69% of employees in union firms were members of the union.

There exists an army of third tier suppliers which is never involved in planning, which does not have exclusive relations with any assembler and which wins contracts through a cost-based bidding process. These contingent workers and suppliers build cost flexibility into a system otherwise characterised by high fixed costs. This, too, is a crucial part of the Japanese system.

There is no reason why the creative parts of the system should be transferred and a good reason why the exploitative parts of the system would fit well in the United States. Toyota employs 65,000 people in Japan designing, manufacturing and assembling 3·6 million vehicles (Toyota Motor Corporation, 1987). In addition, it purchases parts from 176 first and second tier suppliers (most of which are more than

50% dependent on Toyota and employ a total of 100,000 people) and from several thousand third and fourth tier suppliers (employing another 50,000 people). Among Toyota's assembly plants are Takaoka which produces the Corolla (the same vehicle as that assembled at NUMMI) and Tsutsumi which assembles the Camry (also assembled in Kentucky). In the US, Toyota ultimately plans to employ approximately 5500 people when it reaches full production of 550,000 cars in the mid-1990s. Each Toyota employee in Japan produces 55 cars annually. Each Toyota employee in the US produces 100 cars annually.

The difference in cars per worker is not a measure of productivity differences. Rather, it is clear evidence of the difference in levels of integration between US and Japanese operations. Japanese assembly workers in the Takaoka plant in Japan and American assembly workers in the NUMMI plant in California both require roughly the same number of hours to assemble a car (Krafcik, 1987). Therefore, for each vehicle produced, there must be substantially more labour involved in the 'system' work—design, engineering, high technology parts fabrication, research and development—in Japan than in the US. The apparent difference in productivity really reflects the difference in the role of Japanese and US production in the Toyota production system. The US operations are branch assembly plants. US production is a marginal part of the 'Toyota production system'. US sales are not a marginal part of Toyota sales.

Toyota can fully realise much of the strength of the Toyota production system, the close relationship between assemblers and suppliers, the team approach to design, the troubleshooting role played by production workers, through its operations in Japan. Since it produces the same vehicles in Japan, it can eliminate any problems in the production process there. If the synergy with suppliers can take place in Japan, and if all the parts are designed there, there is little need for those relations in the US. In fact, if Toyota dismantled its system and moved parts to the US, the system would be weakened.

On the other hand, Toyota can transfer a 'debugged' assembly line to the US and use production workers in fairly traditional ways (as they did at NUMMI). Since the assembly process is among the most mechanised and hence immutable parts of the production process, there is less room for worker input into the production process than in the case of the design process or batch production. If the Japanese assembly workers make necessary changes during the start-up process in the sister plant in Japan, then the work of American production workers can be reduced to that of machine tenders.

Since teams are used, some authors have argued that a transfer is taking place. However, teams serve a range of functions from integrative to supervisory. Teams are still the most cost effective system for monitoring workers. If the reward structure is even partially based on team performance and if workers monitor one another, they can eliminate the need for a supervisor. This does not imply, however, that they have discretionary roles in a constantly evolving production process.

The fact that transplants obtain parts 'just-in-time' from hundreds of US based suppliers is also taken as evidence of a transfer. But in the US, transplants buy low value-added, standardised parts from non-union transplant suppliers who pay an average hourly compensation rate 40% below the average for the car parts sector as a

whole. These are 'third tier' suppliers; they do not work closely with assemblers in the design and development of parts; their function is to absorb the costs and risks of holding inventory and supplying 'just-in-time'.

Despite Reich's claim that there are many studies which show that Japanese firms spend more money training workers than is spent by American firms, pay American workers higher salaries, give them more job security, and make them far more productive than American firms, given closer consideration, these factors to not add up to the transfer of a superior production system to the US.

Japanese investment in the US car industry does not fit the profile of foreign direct investment which has been promoted by Graham and Krugman, Reich and Lawrence. There are unlikely to be positive externalities for the US economy. In fact, the investment practice of Japanese car makers differs little from imports. Japanese firms have circumvented the restrictions of the voluntary restraint agreement without really abandoning integrated production in Japan. The Japanese production system remains in Japan while something very close to the end product is exported to the US.

Furthermore, it appears that Japanese firms do not sacrifice the factor cost advantages associated with the dualistic structure in Japan when they come to the US. In the next section, I show that there are real differences in factor costs facing US and Japanese firms. The factor cost differences are based primarily on benefit cost differences which occur when new greenfield plants are built in an industry which is populated by older plants and an aging workforce. Japanese firms are able to employ a segment of the labour force which is not available to the Big Three. There are additional advantages derived from the tax system and from low wage rates in the secondary sector of the industry.

The pension cost advantage

The cost differences follow from the different structures which prevail in US and Japanese parent car production in the US. US parent assemblers have an older workforce and obtain a higher proportion of parts in house and from unionised parts suppliers. Japanese firms have younger workforces and obtain a large proportion of their parts both from Japan, and from very low-wage non-union Japanese-parent parts suppliers in the US. There is little wage differential at the assembly level, but there is a very large benefit cost differential. At the supplier level, there is a huge differential both in wage rates and benefit costs.

US firms are mostly assembly-centered firms with varying degrees of vertical integration. General Motors produces about 50% of its parts in house, Ford, 40% and Chrysler about 30%. The remainder of the parts are obtained from outside suppliers, located largely in the US. All in-house parts employees are covered under the Big Three contracts, and compensated at the same rate as assembly workers. Only 36% of the workforce of independent (non-Big Three) suppliers were still unionised in 1985 (Herzenberg, 1989, Table 48); the percentage is probably lower in 1991.

The average compensation for workers in the parts sector (including workers in the Big Three) was about $16·88 in 1986, 75% of compensation in the assembly sector;

Table 4. *Hourly earnings and compensation rates in the car industry, 1986*

Sector	Average hourly earnings ($)	Index	Total compensation ($)	Index
Big Three assembly and parts	15·00	100	22·50	100
Transplant assembly	15·00	100	17·50	77
Parts:				
Total	12·69	85	16·88	75
Independents	10·40	69	13·00	58
Transplants	8·00	53	10·00	44

Source: Estimated by Howes from BLS sources and Florida (1988).

average compensation in the independents was about $13.00 or 58% of compensation in the assembly sector (and 77% of the average for the parts sector) (Table 4).[1]

The US parent firms operate approximately 70 assembly plants in the US and Canada, most of which are 30 or more years old. There are about 200 in-house parts operations. The workforce in the Big Three plants, now comprised largely of workers with at least 10 years seniority, averages 45–50 years of age.

Japanese firms now operate 11 North American assembly plants. With the exception of the NUMMI plant (the General Motors–Toyota joint venture) which is a retrofitted post-war General Motors plant, no transplant is more than 10 years old, most being two to three years old. Workers in transplant assembly operations are paid wages comparable to those in Big Three assembly plants (*Automotive News*, 2 July 1990). This is not surprising since three of the plants are organised by the UAW and the rest are trying to avoid unionisation. The average age of the workforce in these plants is 25–30 years (US Internal Revenue Service, Form 5500).

Japanese operations in the US are essentially assembly operations. While the average level of vertical integration for Japanese firms is about 15–20% in Japan,[2] this is not reflected in comparable levels of in house production in US-based plants. A minimum of 50% of the value of parts used in transplants are imported from Japan.[3] US-sourced parts are either purchased from outside suppliers or manufactured within the assembly plant. The vast majority of parts purchased from outside suppliers are purchased from US subsidiaries of Japanese parts manufacturers. These 'transplant suppliers' are exclusively non-union and compensation rates are about 58% of compensation rates for the parts industry as a whole and 44% of compensation rates in Big Three parts plants (Table 4).

[1] Average hourly earnings come from an unpublished 1985 BLS study of average hourly earnings in independent parts suppliers, and published BLS data for average hourly earnings in SIC 3711 (automotive assembly) and SIC 3714 (automotive parts and accessories) in 1986 (BLS, Employment and Earnings). Earnings and compensation for transplant parts come from a survey done by Florida (1988). Average hourly compensation is estimated assuming a 50% roll-up for benefit costs in assembly, 33% in total parts, 25% in independent parts. (See Howes, 1990, p. 33, for assumptions and methodology.)

[2] Calculated by Howes (1991) from company annual report data.

[3] The percentage imported by value is probably even higher, but the Japanese firms report US assembled parts as 100% US content, despite the fact that many of the parts in parts are imported. See Howes (1990) for a discussion of transplant local content.

These structural differences account for the enormous cost differential between US and Japanese firms. Consider the fringe benefit cost differences.[1] The Big Three have defined benefit plans. Each employee is guaranteed a monthly income of $1500 after 30 years of employment. The companies must contribute to the fund whatever amount is necessary both to meet the current obligations and guarantee that the fund will be adequately financed to cover future obligations. As the domestic industry has declined, an ever smaller base of workers has funded, through their hourly compensation, a pension fund which must support an ever larger pool of retirees. The companies did not anticipate in the 1970s that they would be supporting as large a population of retirees as their active workforce by the mid-1980s. As a consequence, the cost of supporting these funds as a proportion of active hourly labour costs has escalated over the last 10 years.[2] In 1987, the Big Three paid between $2300 and $6600 into the pension fund for each hourly worker, the equivalent of $1·10–3·17 per hour, assuming 2080 paid hours per year.

Even if a transplant pays UAW-level assembly base wages, there are tremendous labour cost savings in benefit costs, especially for pension and medical insurance. Take the example of Toyota where employees are covered by a defined contribution pension plan. Under the terms of the plan, the company will match contributions of the employee up to 4% of wages. If the employee contributes 4% of his or her wages, the maximum company contribution per employee will be $1269 a year or 61 cents per hour, roughly 19 to 55% of the hourly pension cost to the Big Three.[3]

The cost of the plan is driven by the savings behaviour of employees but only to the limit of the cap on the contribution by the company. According to Ghilarducci, young workers are not inclined to save under the plan, hence, the cost to the company is probably considerably lower than 61 cents per hour. Unlike the case for defined benefit plans, costs for companies with defined contribution plans are unlikely to escalate unexpectedly. Costs rise only with wage rate increases, improvements in the negotiated benefit or changes in the savings behaviour of employees, all predictable and controllable events.[4]

Mazda, Diamond Star (DSA), Nissan and Honda all have defined benefit plans. Mazda and DSA are both union plants. They have probably negotiated defined benefit plans because of pressure from the unions to adopt plans comparable to those of the Big Three. Honda and Nissan, being the first transplants in the US,

[1] Data on aggregate, per participant, and per active worker pension costs were compiled by Teresa Ghilarducci from the IRS Form 5500s for each firm for 1987. Ghilarducci (1991) presents the data within an analysis of the changing structure of private social insurance.

[2] It is important to note that the hourly labour cost of pensions (and other benefits also paid to retired workers) is partly an accounting artefact. If a large part of the hourly cost of pensions is attributed to the cost of supporting retiree pensions, there is no obvious reason (excepting where increased costs result from bargaining increased benefits for retirees) why this should be part of hourly labour costs, rather than part of the overhead costs of operating the firm.

[3] According to *Automotive News* (2 July 1990), the top wage rates (including COLA) for Toyota production and maintenance workers in 1989 was $14·23 and $16·28, respectively. The average of the production and maintenance wage was $15·25. Four per cent of $15·25 is 61 cents; for employees who work 2080 hours (40 hours per week multiplied by 52 weeks) and contribute 4% of their wages, the company will contribute $1269 per year.

[4] The defined contribution plan is not only less expensive for the employer, but of less value to the employee. If a Toyota employee contributed $1269 annually to his or her retirement fund, matched by a contribution from the company, after 30 years, the fund would be worth about $120,000, which would, at a 7% annual rate, pay out $703 a month.

Table 5. *US motor vehicle assemblers' pension plans, 1987*

Firm	Date	Type	Benefit
Chrysler	1950	DB	32% of preretirement earnings for a 30-year veteran; no deduction for Social Security
Ford	1950	DB	
General Motors	1950	DB	
Honda	1982	DB	2·5% of career average salary for every year of service
Nissan	1983	DB	Maximum 50% of salary (including Social Security) for 30 years of service
NUMMI	1985	DC	(DB beginning in 1989); maximum 3% of salary contributed to match employee's contribution
Mazda	1987	DB	0·9375 of career average salary plus 0·9375 of salary above 1/2 Social Security maximum earnings base. Approximately 1·5% of career average for every year of service
Toyota	1986	DC	Limit 3% of earnings contributed to match employee's contribution
DSA	1989	DB	NA
SIA	1990	DC	NA

Source: Compiled by T. Ghilarducci (April 1991) from 1987 IRS Form 5500 for each company.
NA: not available; DB: defined benefit; DC: defned contribution.

probably adopted defined benefit plans to avoid any obvious differences between compensation packages in their non-union and union plants.

Though the benefits to the workers will be comparable to those in Big Three plants, the cost of funding the plans will be much lower because there are no current obligations to a large pool of retirees. It will be a very long time before these plants see active/retiree ratios comparable to those of the Big Three. All workers now legally vest (have the right to a pension) after 5 years of service, but the level of the benefit and the cost of provision increases with years of service.

NUMMI, Toyota and Subaru-Isuzu (SIA) have defined contribution plans. NUMMI, which began with a defined contribution plan in 1985, switched to a defined benefit plan in 1988. Since Toyota and SIA are latecomers, perhaps they realised the threat of unionisation was fairly minimal, especially after witnessing the repeated failure of drives at Honda and Nissan.

Table 5 lists the main pension plans of US motor vehicle assemblers by date of inception, type of plan, and benefit formula in 1987. Pension costs for the main plan for each firm per worker and per participant are shown in Table 6. Participant/worker ratios differ greatly between firms, especially between transplants and Big Three firms. Participants include all retirees or their survivors, those eligible to receive a pension in the future but no longer working for the company and current workers. Because of the accounting method used which attributes all pension costs, both present and future funding, to the current cost of labour, a large pool of retirees (reflected in high participant worker ratios) implies high pension costs per hour of labour.

Table 6. *Pension cost per hour, 1987*

Firm	Hourly cost per worker ($)	Hourly cost per participant ($)	Ratio participant/ worker
Chrysler	2·90	1·55	1·80
Ford	2·63	1·45	1·81
General Motors	0·95	0·58	1·62
Nissan	NA	NA	NA
Honda	0·50	0·50	1·00
Toyota	0·43	0·43	1·00
NUMMI	0·39	0·39	1·00
Mazda	NA	NA	NA

Source: Based on Ghilarducci (1991, Table 3, p. 10); original source: 1987 IRS Form 5500 for each company. NA: not available.

As Table 6 shows, hourly pension costs for Honda, NUMMI and Toyota in 1987 were 50 cents or less, while Big Three costs ranged from nearly $1 to almost $3. The large difference between General Motors, on the one hand, and Ford and Chrysler, on the other, is in part due to the proportionately smaller pool of General Motors retirees. It may also reflect changes in investment return assumptions which reduce the current liability for the company. NUMMI is an interesting footnote. Although the average age in the plant is probably comparable to the age in a General Motors plant (since most of the workers were drawn from among those employed in the plant when it was a Chevrolet plant), hourly pension costs are low because General Motors absorbed the accrued pension liabilities when it entered into the joint venture with Toyota. For the purposes of pension cost to NUMMI, these workers are 25 to 30 years old.

Health care costs

The costs of funding a large number of retirees from the hourly labour costs of an ever shrinking base of active workers is even more staggering in medical insurance. Pension funds are just that, funds which are in the best of cases pre-financed. But medical insurance is costed on a 'pay-as-you-go' basis. The savings in medical insurance costs associated with a young labour force are spectacular. Even if the transplants have exactly the same medical benefits as a typical Big Three firm, for a workforce with an average age of 25, the cost will be half that for a workforce with an average age of 45.[1] The average age at Honda was 30 years after seven years of operation, the average age at Mazda, less than 30. The average age of the Ford production workforce is 48 years.

In 1988, the cost of medical benefits at the Big Three averaged $3–4 per hour. Each firm was spending almost $6000–8000 per year per active employee, or $520–660 per month to cover health insurance for both an older active workforce and a

[1] Personal communication from the UAW Social Security Department.

large population of retirees.[1] A pretty good individual insurance policy for a healthy person now costs about $300 a month. Suppose transplants are spending $300 a month ($3600 per year) on insurance for healthy young workers and a negligible retired population. Their hourly health insurance costs would be approximately $1·75 per hour for a 2080 hour year. Since there are insurance discounts for large institutions, the actual cost would probably be lower.

These estimates are confirmed by an internal Chrysler memorandum comparing the hourly health care costs at NUMMI ($1·70) and Chrysler ($4·20). Health care costs are probably higher at NUMMI than at the average transplant because the workforce is older.

Supplier-related cost advantages

Transplant assemblers enjoy an hourly labour cost advantage of between $2·50 and $5·50 an hour over the Big Three, due to the pension and medical benefit cost advantages of building greenfield plants and using a young labour force.

For the transplants, the benefits of greenfielding do not stop at assembly labour costs. Sixty-five to 80% of the cost of a vehicle is in purchased materials including raw materials—steel, aluminium, iron, fabrics, plastic—and component parts. For transplants the purchased materials share is closer to 85%. At this point, transplants probably enjoy lower purchased materials costs for several reasons. First, about 50% of their purchased components are still imported from Japan where all the cost advantages of the Japanese system, including the use of tertiary suppliers, are operative. Second, those components which are purchased in the US come almost exclusively from Japanese suppliers operating in new greenfield plants themselves. Greenfield suppliers enjoy similar cost advantages to greenfield assemblers—a young workforce and lower benefit costs. As noted earlier, transplant suppliers have labour costs which are 44% of labour costs in Big Three parts plants and 75% of labour costs in the average independent parts supplier.

Suppose, hypothetically, that Big Three firms produced 50% of the parts in house, paying assembler level compensation rates of $22·50 in 1986, obtained 40% of their parts from independents, paying $13·50 per hour, and 10% from overseas where we will assume the same rate as parts from Japan. The weighted average labour costs for all hours of production labour embodied in the vehicle would be $17·20. Suppose that transplant assemblers produced 15% of parts in house, paying $15 an hour in wages and $2·50 an hour in benefit costs. Eighty-five per cent of parts were obtained elsewhere, half from transplant parts suppliers, where average rates are $10 per hour, half from Japan where average hourly compensation costs for the industry were $7·50 in 1986 (US Department of Labor, BLS, March 1989). The weighted average hourly compensation rate for the transplants is $10·06, 58% of the rate paid by the Big Three (Table 7). This is a crude estimate, but the labour cost differential is of such an order of magnitude that any fine tuning would not close the gap significantly. Japanese firms retain a very large labour cost advantage owing to the kind of investment that

[1] I estimated hourly health costs from the fraction of total company health care expense in the US which is attributed to hourly workers, divided by estimated hours. Company health care expenses come from Bernstein Research (1990). The fraction due to hourly workers is estimated from the share of hourly workers in the total labour force.

Table 7. *Average hourly labour costs for all production hours in a vehicle, 1986*

	In-house assembly and parts	Outside domestic	Outside imports	Total weighted average	Index
Big Three vehicle					
Hourly compensation ($)	22·50	13·00	7·50	17·20	100
(weight, %)	50	40	10	100	
Transplant vehicle					
Hourly compensation ($)	17·50	10·00	7·50	10·06	58
(weight, %)	15	42·5	42·5	100	

Source: Compiled by Howes, based on data from BLS, Employment and Earnings; BLS, March 1989; Florida (1988).

they engage in in the US market. In fact, since Japanese car-workers' compensation rates rose to 76% of US rates by 1988, Japanese firms actually widened the gap through transplant investment.

Conclusion: the colonisation of the American production system

Japanese transplants, like the Trojan horse, may look like a gift, apparently providing jobs, new income, transferring a superior technology and revitalising the US motor industry. However, as the Trojan horse was the vehicle for Greek entry into and colonisation of Troy, so may the transplants be the vehicle by which superior Japanese firms transform a weak American production system into an assembly outpost. There is no real transfer of technology, partly because it would undermine the strength of the system in Japan, and partly because it would defeat the role of US operations in the Japanese production system as a whole. US operations are part of the secondary or tertiary, flexible underside of the Japanese system which is so necessary to maintain consensus in the primary sector.

No one's interests (save those of the Japanese firms) are served by the erosion of private benefits. As Ghilarducci has pointed out, this could be part of a trend towards the erosion of the private social insurance system in the US. Certainly, it is the most effective tool yet to erode pattern bargaining in the assembly sector of the motor industry. Once competition around labour costs is possible, US firms have a greater incentive to 'sweat' labour and suppliers, which undermines the co-operative environment necessary to rationalise their productive systems. In the long run, they will run out of options.

Americans cannot remain neutral in the face of incoming foreign investment, especially where it threatens to dismantle strategic industries and reduce the US industrial structure to an assembly outpost. A variety of policies, including trade, investment and tax policies could be designed to promote competition from foreign firms on the basis of superior technology rather than inferior compensation systems. Only if firms, both domestic and foreign, are obliged to retrofit 'brownfield' plants in existing car-producing regions, pay wages and benefits which reflect the industry

standard, and obtain a large proportion of their parts from existing (even upgraded) domestic suppliers will new foreign investment provide the benefits suggested by Reich.

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