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CHANGING INTER-FIRM RELATIONS IN THE EUROPEAN AUTOMOTIVE INDUSTRY:

INCREASED DEPENDENCE OR ENHANCED AUTONOMY FOR COMPONENTS PRODUCERS?



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Abstract

This article explores the extent to which the benefits of new forms of inter-firm partnership within the European automotive industry have been shared between assemblers and component producers. It first considers the changing nature of the buyer-supplier relationship from the viewpoint of different parties and as part of a process of restructuring within the *filière*. Then it documents patterns of performance, comparing samples of five European vehicle assemblers and ten component firms from 1987 to 1996.

Evidence is presented on R&D and capital investment expenditures, inventory levels and work-in-progress, and profitability. It is concluded that leading component manufacturers proved more resilient and adaptable than the assemblers during the early 1990s. This is explained in terms of the position of these system integrators with respect to their own suppliers, and the differing sectoral and geographical configurations of assembly and leading component firms.

Introduction

It has become commonplace in recent years for automobile industry analysts and managers alike to talk prescriptively about the need for, and mutual benefits of, seemingly ever-closer cooperation between component manufacturer and vehicle assembler. The virtues of cost-cutting 'partnership' within the supply chain between assembler and supplier, as opposed to adversarial price-based competition between suppliers, have been widely proclaimed (see for instance NEDO, 1991; Womack et al., 1990: 138–68). In these new agreements, the assembler devolves considerable responsibility to selected component manufacturers for design and development, in return for longer-term supply contracts. These generate a greater stream of sales for the component manufacturer, which creates an environment conducive to further product development in the supply chain, rather than in-house by the vehicle manufacturer. In this way the costs and risks of technological and other changes are diffused and (from the vantage point of the apex of the production chain) externalized, while from the viewpoint of key component suppliers there is a

prospect of relative stability in the pattern of purchasing flows.

This highly programmatic version of recent trends within the global auto industry has gained widespread credence. For most major component companies, competitive success depends upon establishing such contractual arrangements with one or (preferably) more vehicle assemblers. This has led to intensified reorganization within the component sector, involving merger, acquisition, entry and exit (Amin and Smith, 1991; Sadler and Amin, 1995). Most European and North American assembly firms have been (and are still) engaged in long-term programmes to reduce the number of suppliers from around 1000–2000 to nearer the 300 or so characteristic of Japanese firms in Japan, although a truly worldwide network might require some 600 supplier companies (Lamming, 1990). There has been a separation of functions in which a small number of large, 'first-tier' suppliers assume the role of lead contractor for the development and production of systems of parts (Lamming, 1994), as these key companies have become associated with particular system technologies (for instance GKN with transmissions or T&N with engine

components). Such firms have also recognized the need to internationalize their sphere of operations in order to serve assemblers on a worldwide basis. What is far less clear, however, is the extent to which the 'benefits' of such partnership arrangements between assembler and supplier have been and will be shared between the different parties. What are the costs and benefits to the different parties, in other words, of greater cooperation between supplier and assembler? Following from this, what are the longer-term implications for the automotive industry as a whole, and for those places and regions that produce automobiles and their constituent components? These are the questions which this analysis addresses, focusing on the situation in Europe.

The account first briefly considers the changing nature of the buyer–supplier relationship from the standpoint of vehicle assemblers and as seen from within the component supply chain. A subsequent section provides detailed evidence with which to address the relationship between assemblers and component manufacturers. This documents patterns of performance in terms of research and development and capital investment expenditures, inventory levels and work-in-progress, and profitability, within a sample of five European vehicle assemblers and ten component suppliers over the period from 1987 to 1996. A final section provides possible explanations for the trends identified and outlines some of the longer-term implications for the European automobile production system and its geography as a whole.

Buyer–supplier relations: *filière* approaches and the standpoints of assemblers and component manufacturers

One approach to changing forms of inter-firm relations would seek to situate these within a wider context of the system or *filière* as a whole. Such approaches are concerned with the totality of processes of production (conceptualized in the broadest sense) involved in the realization of a particular commodity (see for instance Nilsson and Schamp, 1996). Within Europe there is a real urgency to these questions, in that one of the key characteristics of the past decade has been an unravelling of the previous highly fragmented

pattern of national production systems. Large firms – or at least some of them – have begun to move towards Europeanization as a strategic goal, in an environment characterized by immense uncertainty.

There has been considerable debate within this tradition over the implications for particular places and regions of the process of Europeanization within the automotive industry (Bordenave and Lung, 1996; Hudson and Schamp, 1995; Lagendijk, 1997). This debate has concentrated both on patterns of change within the assembly sector and on potential new configurations resulting from the spatial distribution of assembly *and* components production. To a lesser degree, too, there has been a recognition that the component sector has a geography in part of its own, one not just fashioned in response to demands from assemblers but also derived from the evolutionary trajectory of component firms as actors in their own right (Sadler, 1994).

This has been considered, for instance, with respect to the spatial implications of Just-in-Time production, which is a complex issue, made more so by confusion over the precise nature of JIT even as practised in Japan (Mair, 1992). There is an emerging body of evidence, however, which would suggest that early indications of the necessary re-emergence of regional clusters of parts suppliers around assembly plants are at best ill-founded and at worst misleading. Component companies – within Europe in particular – have proved able to adapt to new demands from assemblers via the adoption of new logistical practices (Mair, 1993; Schamp, 1991; Wells and Rawlinson, 1992), without wholesale changes to their spatial pattern of production.

Thus there is a growing body of literature which explores the spatial dimensions of Europeanization within the automotive industry, in terms of the strategy of both assemblers and component manufacturers, and which has begun to consider the geographical implications of new forms of interaction *between* assemblers and component suppliers. This article, however, seeks to take the latter concern further, by examining in more depth the nature and extent of the changes which have taken place to buyer–supplier relationships, thereby shedding more light on their geographical constitution and significance.

A key feature of these new forms of inter-firm relationship is the substitution of price-based

adversarial bargaining with long-term cost-based supply arrangements. This new kind of relationship rests on 'value engineering' – identifying the costs of each discrete stage of component production – and on continuously striving to reduce these costs. The relationship is also built on a high degree of openness between the different parties. This is not necessarily grounded in trust, but rather in a mutual interdependence understood by all sides as part of the agreed 'rules of the game'. Thus a key question for assemblers becomes one of supply chain management. This involves (in part) the development of sophisticated systems for the monitoring and evaluation of supplier performance, and thence for the sharing of achieved cost-reductions. It is through such processes, given explicit form through relations of power, that knowledge about performance is codified, and practical decisions concerning orders, prices and profitability are taken (Sadler, 1997).

It is, however, useful to look in a little more depth at the reasons behind such strategies of 'partnership' on the part of vehicle assemblers. Part of the proclaimed advantage to assemblers lies in the devolution of responsibility for R&D costs. This literally transfers some of the expense of the start-up phase for a new model elsewhere within the supply chain. It also recognizes that the increased technical sophistication of the motor vehicle poses a wholly new set of challenges. A major issue is now the interfacing of technologies in different areas; for instance, suspensions and braking systems for enhanced traction control, or in the development of anti-lock braking systems. While assemblers remain reluctant to lose control of core technologies (such as those involved in the design and production of engines), many competencies can be found elsewhere rather than in-house. This is increasingly the case as the industry faces new demands such as the development of electric vehicles, traffic management systems, different combinations of materials, and increased ease of recycling (Belzer and Dankbaar, 1993).

Closer involvement between assembler and supplier at the design stage carries other advantages for the former. It enables the assembler to simplify both the component production process and the subsequent assembly stage; to 'build-in' ease of manufacture from the first part onwards via the adoption of simultaneous engineering practices. The

achievement of this objective has involved changes within the organizational structure of vehicle assemblers, but these have had a direct pay-off. For instance, earlier involvement of suppliers in the design of the Renault Twingo, a model brought to market in 1993, enabled a reduction against initial estimates for the cost of bought-in parts of 18 percent, reaching 30 percent on some components (Midler, 1995).

It is in this combination of design and production processes that many of the advantages of closer buyer-supplier collaboration can be found, at least when seen from the assembler's viewpoint. There are different ways of conceptualizing this interplay. Richardson (1993) used a transaction costs approach to distinguish between switching, competitiveness and trading costs in the buyer-supplier relationship in Japan. Switching costs such as supplier selection, development, and technology transfer are effectively fixed once the trading relationship is established. They would have to be repeated should the assembler wish to switch suppliers during the lifetime of a product. For simple parts this could be a relatively small cost, but for technically more sophisticated items switching costs would be high. By contrast, competitiveness costs – lost sales resulting from poor quality in components supplied – and trading costs – of coordination, ordering and delivery – are variable. The precise combination of switching, competitiveness and trading costs is of relevance to the assembler's choice between a single-source and a multiple-source strategy.¹ Such a transaction costs framework is of some value in pointing to the different capacities and intentions that coexist within the supply chain.

An alternative view would, however, stress other, non-cost factors, particularly with respect to innovation, not least because the environment does not comprise perfectly known opportunities (see for instance Sako, 1994). In such conditions, it is argued that buyer-supplier relationships conducive to the diffusion of tacit knowledge are best based on trust and built over time, through careful selection of (and close communication between) partners (see Maskell, 1998). In consequence, so it is argued, firms are better disposed to take the risks necessary for innovation, although it is also accepted that there are inherent problems in creating individual instances of trust in a broader context of highly competitive market conditions.

Within this framework, the following section turns to an analysis of whether changed buyer–supplier relations have impacted differentially on firms within the assembly and components industries. Such issues were arguably of particular importance in the early 1990s, as the auto industry suffered from declining demand after protracted growth in the mid to late 1980s. In theory at least, these market conditions might have been expected to lead to one of three different developments. One interpretation would suggest that supplier profitability might suffer disproportionately from a market downturn, as assemblers sought to compensate themselves for lost sales volume and declining margins by imposing even tighter pressure on component manufacturers. A second is that in the true spirit of partnership, vehicle assemblers would take care not to allow short-term cyclical trends to affect supplier profitability enough to throw into question the apparent new-found commitment to mutual endeavour; rather, it would remain in the best long-term interest of both parties to share the burden of declining returns. There is also a third possibility: that the large component companies, far from occupying a subservient and dependent position in relation to all-powerful vehicle manufacturers (as the relationship was frequently portrayed) would prove to be more resilient and adaptable than appeared at first sight.

Implications of new inter-firm relations for assemblers and suppliers

In order to address the question of whether the costs and benefits of new inter-firm relationships have impacted differentially on assemblers and component suppliers, this section presents the results of an analysis of corporate performance over the ten-year period from 1987 to 1996, focused on the situation in Europe. The evidence presented enables a comparison to be made between a group of leading component firms in Europe and all the major European-owned assemblers. This data-set is in the form of company-level performance indicators, as a series of measures of the summative effects of changes to many different buyer–supplier relationships. As such it may be regarded as indicative of broad trends rather than definitive of particular or individual inter-firm contracts.

The sample of assemblers includes all five major European-owned firms (BMW, Fiat, Peugeot, Renault and Volkswagen). The selection of the sample of component firms was based on the objective of maximizing the coverage of leading firms. An initial list of 25 candidates was compiled from a variety of sources, including Boston Consulting Group/PRS (1990) and Sleigh (1989, 1991). These were the leading firms in terms of global turnover in the late 1980s which had a substantial presence at that time in the European market. The final list of ten firms contains all those among the initial group that were dependent on sales to the automotive industry for one-half or more of their turnover (except for Continental, Goodyear, Mahle and Michelin, which were not included because of lack of data). In this way the analysis excluded major conglomerates such as BTR and Tenneco, which had substantial interests involved in the production of automotive components but only as one small part of a much larger portfolio of operations. Instead, the sample of component firms includes those whose principal business (for most of the period under review) related directly to the automotive industry; not necessarily wholly but certainly with a sufficient degree of magnitude to make automotive buyer–supplier relations a major concern. In practice this group of ten firms represents most of the major independent manufacturers of core electromechanical vehicle systems operating within Europe and headquartered there (BBA, Bosch, GKN, Lucas, Magneti Marelli, Pirelli, T&N, Valeo and ZF) plus one – TRW – based in North America but with a substantial presence in Europe. The sample's parent ownership hence comprised four firms from the UK, two from Germany, two from Italy and one each from France and the USA.

The evidence presented is drawn from corporate annual reports and accounts, supplemented wherever possible and/or necessary with data made available by the companies concerned.² The series covers the period from 1987 to 1996 – a ten-year span of boom, recession and hesitant recovery. This was also a time during which the process of 'partnership' formation between assemblers and suppliers, as described above, should – in theory at least – have been both increasingly prevalent and, in addition, strenuously tested.

Table 1 Selected European automobile assembly companies: turnover and employment, 1996

	Turnover (\$b)	Automotive dependence (%)	Employment ('000)
BMW	33.5	90	116
Fiat	50.9	80	238
Peugeot	32.8	95	139
Renault	35.0	95	141
Volkswagen	64.2	100	261
Total	216.4	92	895

Table 2 Selected automotive component companies: turnover and employment, 1996

	Turnover (\$b)	Automotive dependence (%)	Employment ('000)
BBA	1.9	40	12
Bosch	26.4	60	172
GKN	5.7	65	30
Lucas	7.8	85	57
Magneti Marelli	3.8	95	25
Pirelli	6.7	50	37
T&N	3.3	80	34
TRW	9.9	65	65
Valeo	5.5	100	33
ZF	4.9	80	31
Total	75.9	72	496

Turnover and employment

There is a clear discrepancy between assembly and component firms in terms of absolute size (see Tables 1 and 2). The biggest components firm in Europe, Bosch, had a similar turnover in 1996 to that of the smaller mainline vehicle manufacturers, BMW, Peugeot, and Renault. Bosch's 1996 turnover of \$26b was, however, over twice as large as that of its nearest rival in Europe (TRW) and between four and five times greater than most other firms in the sample of component suppliers. The five leading European assemblers had a combined turnover in 1996 of \$216b against \$76b for the ten components firms. Both assemblers and component manufacturers experienced contrasting fortunes from 1987 to 1996 (see Figure 1). High rates of growth occurred from 1987 to 1989, averaging around 15 percent annually. From 1990 to 1993 recessionary conditions predominated, and average annual rates of sales increase fell to 1–2 percent.

Clear overall sales growth resumed in 1994 and was sustained through 1995 and 1996.³ The difference in absolute size between assembler and component supplier was reflected in terms of employment, the five assemblers employing 0.9m in 1996 against the ten component firms' total employment of 0.5m. There were also clear differences in the extent to which the respective parties operated solely within the automotive sector. Assemblers depended on average on the automotive industry for around 90 percent of their sales in 1996, while the selected component firms generated around 70 percent of their turnover in the automotive sector. For most of the assemblers, automobile production was their only major business activity. While the same was true for at least some of the component firms (notably Magneti Marelli and Valeo), most – even among those strongly focused on the automotive sector – operated in a more diversified business environment.



Figure 1 Percentage change in turnover

R&D expenditures

All other considerations being equal, it might be expected that if assembly firms had devolved greater responsibility for product development to their component suppliers during the period under review, this would be reflected in higher rates of growth (or lower rates of decline) in R&D expenditure as a proportion of turnover at component suppliers as opposed to vehicle assemblers.

In fact the evidence on this point is not clear-cut (see Figure 2), although several trends are evident. Among assembly firms, R&D expenditure grew from 3.0 percent of turnover in 1987 to peak at 4.0 percent in 1993, falling to 3.6 percent in 1994 as firms strove to restore balance-sheets after several years of weak demand. A similar picture was evident in the components sector, where R&D to turnover ratios grew from 3.5 percent in 1988 to 4.4 percent in 1993, falling to 4.1 percent in 1994. The difference between R&D/turnover ratios of assemblers and component firms (one measure of whether or not component firms were devoting proportionately more resources to R&D than assemblers) remained within a relatively narrow range of 0.4 to 0.6 percentage points. In other words, while there was no real evidence for greater

rates of growth in R&D/turnover ratios among component firms as opposed to assemblers, component firms expanded their R&D efforts at least as strongly as assemblers, in the process continuing to devote more of their turnover to R&D than assembly firms. While there was little variation between assembly firms, some component firms invested well above the sector average. Bosch and TRW both committed around 6 percent of turnover to R&D over the period 1987–96, two percentage points above the sector average, and Magneti Marelli and Valeo committed around 5 percent. By contrast, three of the four UK-based component firms (BBA, GKN and T&N) along with Pirelli had relatively low R&D/turnover ratios of around 2 to 3 percent.

Hence there is not sufficient evidence to support the initial hypothesis of greater growth in R&D/turnover ratios in the component sector as against assembly. Rather, the component sector as a whole continued to devote greater proportionate resources to R&D than assembly firms, as R&D/turnover ratios grew (at least until 1993) in both branches of the industry. Several component suppliers spent a considerably greater proportion of their turnover on R&D than the industry average.

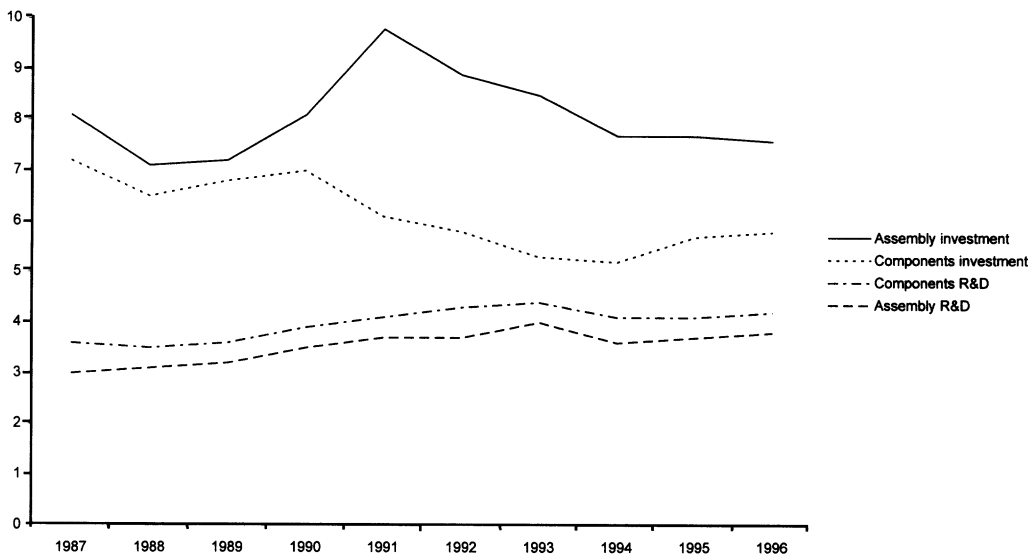


Figure 2 R&D and capital investment as a proportion of turnover

Capital investment

All other considerations being equal, it might be expected that if assembly firms had devolved greater responsibility for product manufacture to their component suppliers during the period under review, this would be reflected in an increase in the proportion of turnover committed to capital investment programmes at component firms relative to the capital investment/turnover ratio at assemblers. In other words, it would be expected that component firms had been required to undertake greater outlays on plant and machinery, enabling them to meet the challenge of delivering both more complex components and more nearly complete subsystems of parts.

The evidence is conclusively at odds with the above assumptions (see Figure 2). Among component firms, capital investment/turnover ratios fell from a level of around 7 percent in the years from 1987 to 1990, to between 5 and 6 percent from 1991 to 1996. At assembly firms by contrast, capital investment/turnover ratios grew from 7 percent in 1988 to 10 percent in 1991, remained at 9 percent in 1992 and 1993, and only fell back to 8 percent from 1994 to 1996. One consequence was that while component and assembly firms had similar capital investment/turnover ratios in the late

1980s, the balance shifted decisively in the early 1990s, so that assemblers had capital investment/turnover ratios between three and four percentage points greater than those found in the components sector. There were some variations within this broad pattern, particularly among component firms. Magneti Marelli, Valeo and ZF were in the 7–8 percent range, compared to a sector average of about 6 percent. Three of the four UK-based firms – BBA, GKN and Lucas – were notable for their relatively low ratios, in the range from 4 to 5 percent.

Such evidence suggests that assembly firms proved less responsive to changed market conditions than those in the component sector during the early 1990s, at least with respect to capital investment. Many long-term large-scale assembly projects continued even as market conditions deteriorated rapidly, while firms in the component sector – perhaps more adaptable, certainly operating on a smaller absolute scale – cut back their financial commitments in tune with changed conditions. Put another way, assembly firms proved to have a longer lag time than those in the supply chain in terms of their responsiveness to broader market changes.

Inventories and work-in-progress

All other considerations being equal, it might be expected that if the buyer–supplier relationship had changed substantially during the period under review to the advantage of the assembly firm, this would be reflected in higher levels of inventory at component firms relative to those held at assemblers; or at the very least in a lesser rate of reduction of inventory levels as a proportion of turnover. Such an interpretation would be consistent with the argument that Just-in-Time production entailed a substantial reallocation of stocks within the supply chain.

The evidence does not support this view, however (see Figure 3). From 1987 to 1996, component firms steadily cut their inventory/turnover ratio, as the sector average fell from 16 to 11 percent. Among the assembly firms, meanwhile, inventory levels as a proportion of turnover were in the 13–14 percent range. In other words, component firms were more successful at reducing inventory levels, so that the difference between them and firms engaged in assembly at first narrowed, and then from 1993 onwards became in their favour. This is an important finding, not least because of the regularity with which component firms first approached and then overtook the assembly sector in the task of

inventory reduction over a ten-year period. It suggests that far from the assemblers redirecting stockholding within the automotive production system, a different set of processes was taking place in which these component manufacturers cut their stocks as a proportion of their turnover at a faster rate than did the assemblers.

This conclusion is, however, only partly supported by evidence on raw materials, supplies and work-in-progress as a proportion of turnover (see Figure 3); that is to say, stripping out the effects of stocks of finished but unsold parts and motor vehicles, and focusing instead on genuine work-in-progress within the system. Here a similar trend was evident as for inventories, but it was slightly less marked. From 1987 to 1996, component firms steadily cut their work-in-progress/turnover ratios from 10 to 7 percent. Over the same period assembly firms made reductions from 6 to 4 percent. A consequence was that the difference in work-in-progress/turnover ratios between component firms and assemblers fell from 4 to 3 percent. In terms of work-in-progress, assemblers remained relatively more 'lean' than their suppliers.

There were some differences between firms with respect to both inventories and work-in-progress. Among assemblers, Fiat performed poorly, having easily the highest ratios on both counts, while BMW

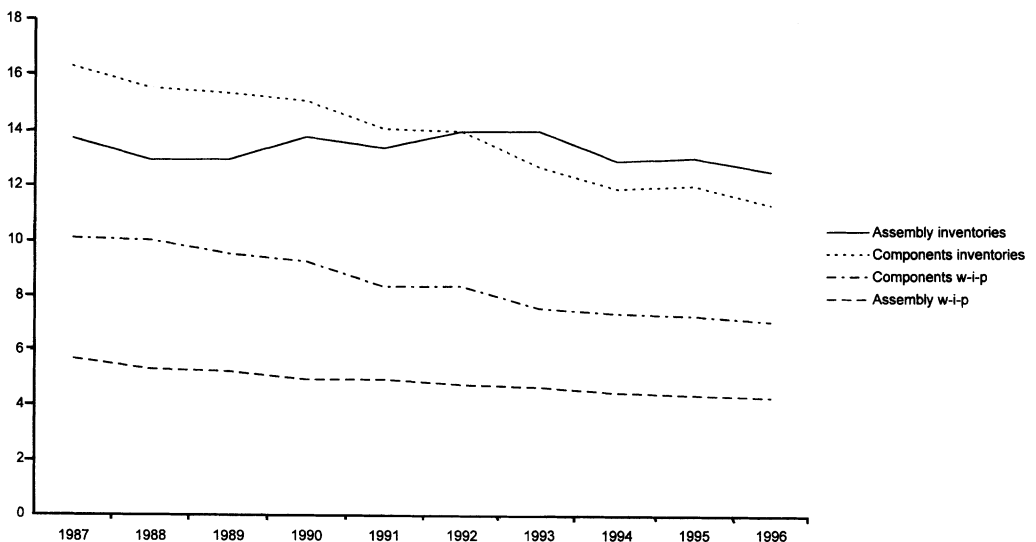


Figure 3 Inventories and work-in-progress as a proportion of turnover

had the lowest. There was also wide variation in performance in the component sector. BBA, Lucas, Pirelli and T&N had very high inventory/turnover ratios – around 17 to 19 percent – although just Lucas and ZF had markedly high work-in-progress/turnover ratios relative to the sector average. TRW and Valeo stood out as probably the ‘leanest’ suppliers, with very low ratios on both counts.

In summary, therefore, there was a trend for component firms to cut back their inventory/turnover ratios faster than assembly firms, eventually overtaking them, and for component firms also to reduce their work-in-progress/turnover ratios slightly more quickly than assemblers, although even at the end of the period component firm work-in-progress/turnover ratios were still 3 percent higher than in the assembly sector. This suggests that assembly firms held considerable stocks of finished vehicles relative to the stockholdings of component firms; but that in terms of work-in-progress, assemblers were relatively more ‘lean’ than component manufacturers, although the gap between them was narrowing.

Operating profit

All other considerations being equal, it might be expected that if the buyer–supplier relationship had changed substantially during the period under review to the advantage of assembly firms, this would be reflected in a growing differential between the profitability of the two parties.

Once again, the evidence does not support this view (see Figure 4). A general trend of high profitability characterized both sectors in the late 1980s. Operating profits as a proportion of turnover peaked in 1989 at about 8 percent. In 1990 and 1991 profitability fell in both sectors, first to 6 and then to 4 percent. Thereafter, however, the relationship shifted in favour of suppliers. The difference grew from practically zero to four percentage points in 1993, narrowed slightly in 1994 then widened again to reach five percentage points in 1996. The most profitable assembler was Peugeot. Among component firms, Magneti Marelli and ZF were notably less profitable, while BBA, GKN, T&N and Valeo had the highest operating profit/turnover ratios. This is further support for the view that component suppliers proved more resilient to the recessionary market conditions of the early 1990s and in the hesitant recovery of the mid-1990s. It is most definitely not consistent with the initial

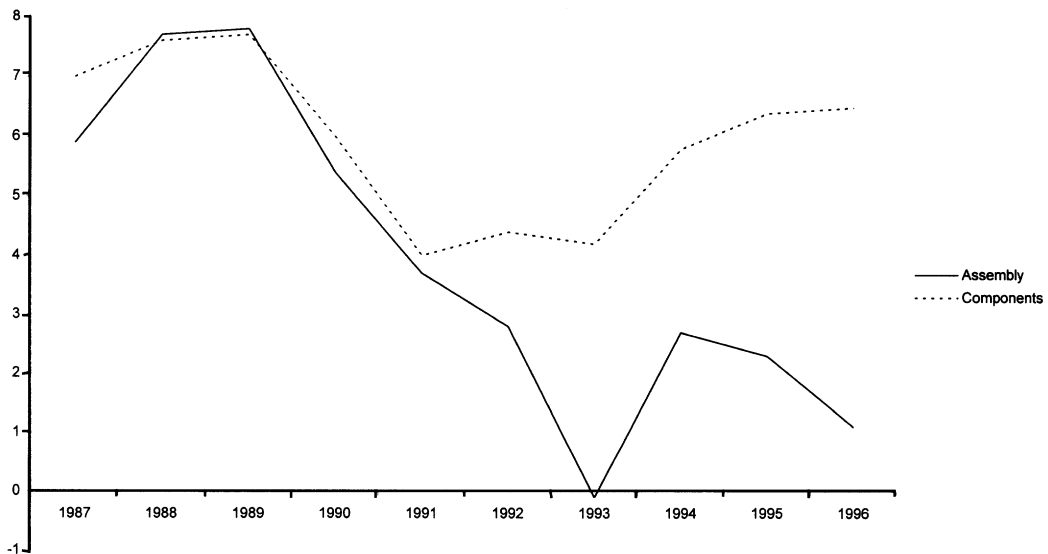


Figure 4 Operating profit as a proportion of turnover

hypothesis that assemblers continuously saw improved relative profitability with respect to that of their suppliers.

Methodological limitations

It is necessary to add a few cautionary remarks concerning these interpretations. First, comparability between companies is hindered by the existence of contrasting national accounting systems. Second, even though such differences have tended to become less significant over time, the trend towards harmonization has in itself resulted in a further source of potential discrepancy, as individual firm records become increasingly subject to restatement and reclassification. The analysis has, however, concentrated on trends within consistent groups of firms, utilizing results as reported in each year, thereby enabling comparisons of these groups to be made over a period of time. Third, no account can be taken of qualitative differences in spending under the headings of R&D and capital expenditure; for present purposes, it has to be assumed that all such investments are equally efficient.

Fourth, the inclusion of a static group of firms does not incorporate the full range of changes potentially taking place. It could be the case that a different route for assemblers to shift the burden of (for example) R&D spending is by progressively sourcing business with a different, more R&D-intensive set of suppliers. Within Europe, some electronics firms such as Siemens expanded their activities in this sector over this period, as did a small number of engineering companies not formerly involved in the auto sector, notably Mannesmann. In other words, it might be that buyer-supplier relations at the level of the production system as a whole have changed, not within existing transactional associations but through the development of wholly new ones. Fifth, in focusing upon leading component manufacturers, it is not possible to investigate the changed nature of buyer-supplier relationships between these firms and their own suppliers.

Summary of results

Contrary to many interpretations of the impact of

restructuring processes within the European auto industry, leading component suppliers proved more resilient than assemblers during the early 1990s, performing more strongly on a range of indicators. Capital investment/turnover ratios fell faster and further, so that the difference between component and assembly firms increased from nothing to between three and four percentage points in favour of suppliers. The difference in operating profit/turnover ratios increased from nothing to five percentage points in favour of suppliers, and that in inventory/turnover ratios changed from three percentage points in favour of assemblers to one percentage point in favour of suppliers. Only two indicators produced less clear-cut findings: there was very little relative change in R&D/turnover ratios, while assembly firms continuously maintained lower levels of work-in-progress as a proportion of turnover.

Conclusions

The evidence presented here suggests that component manufacturers have played a key and often understated role as sophisticated actors in their own right within the European automotive production system. During the early 1990s, assemblers proved less responsive to changed market conditions, or at the least made less effective responses. Such findings have several far-reaching implications.

It is first necessary to consider why it might be that the sample of component firms outperformed European assemblers over this period. There are several possible answers to this question, one of which involves the position of these parts manufacturers within broader supply chains. It could be the case that the leading component firms considered here were effectively transmitting pressures placed on them from the assemblers further down the structure to their own suppliers. In other words, the 'systems integration' function of first-tier suppliers arguably meant that smaller firms became increasingly vulnerable to demands for increased R&D and capital investment effort, held higher stock levels, and were disadvantaged with respect to contractual negotiations such that their profitability was especially challenged. In that sense, a tentative conclusion might be that there are signs

of enhanced autonomy in the supply chain, but only for *some* component producers.

A second and complementary explanation concerns the differences between assemblers and leading component manufacturers in terms of their sectoral and geographical configurations. It has been shown how component firms were less dependent on the automotive industry. They would, as a consequence, be able to even out fluctuations in the business cycle of this one activity, and to bring research capacities from other branches of manufacturing to bear on product development. Additionally, it seems reasonable to suggest that component firms might be more flexible in terms of their spatial distribution of production; a dispersed pattern of component manufacturing across Europe (and even outside Europe) contrasting markedly with the concentration of assembly plant investment at relatively few locations. The extent to which the changes in inter-firm relationships documented here have been due to differing responses to geographical conditions is thus a key question for further investigation (Sadler, forthcoming).

More broadly, the evidence presented points also to a variety of questions in the regulatory environment, particularly with regard to the differing capacities between firms. At the very least, public policy should be encouraged to incorporate a wider view of the enhanced significance of the components industry. This is not just a question of industrial policy – that is to say, part of a search for a stronger automobile industry within Europe – but also of spatial development policy. For regional development agencies seeking selectively to attract certain forms of inward investment in order to encourage the development of regional supply structures, leading component manufacturers might well prove to be an increasingly effective target.

Finally, a broader implication is very effectively highlighted by the *filière* approach: that is, are there limits to the process of out-sourcing by assemblers? Put another way, if assembly firms continue to purchase greater proportions from component manufacturers and if the apparent tendency towards autonomy on the part of leading suppliers continues – then what, ultimately, remains with the assembler? One significant asset is still the brand name – consumers buy Volkswagen or Fiat vehicles rather than collections of Bosch or Magneti Marelli components – but other industries provide a

salutary reminder that there are many possible outcomes to reorganisation within a *filière*, and these have many different geographies. The spatial implications of enhanced autonomy for some component producers, and the geographical constitution of new inter-firm relationships – in particular, the ways in which these are given form in, and thereby help to shape, space – are thus likely to continue to repay close investigation.

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Notes

- ¹ The latter incurs higher overall trading costs, but builds-in the possibility of effective switching so as to alter the assembler's bargaining position with respect to component suppliers, whereas single-sourcing leaves the assembler prone to opportunistic market behaviour on the part of suppliers. In practice it is suggested that Japanese assemblers had adopted 'parallel sourcing', a hybrid form in which two or more suppliers with similar capabilities were concurrently sole-source suppliers for very similar components. This combined the benefits of single-sourcing with the provision of parallel sources of supplier performance information.
- ² A copy of the full data-set is available on request from the author.
- ³ Sales performance is dependent upon both organic growth and changes in firm structure via acquisition or divestment. It is not possible from available evidence to separate organic from overall growth but during this period the following major changes in corporate structure should be noted: (a) in 1994 BMW acquired Rover from British Aerospace; (b) in 1987 T&N acquired AE; (c) in 1992 Pirelli underwent considerable restructuring and changed the basis of consolidation; (d) in 1993 T&N acquired Goetze; (e) in 1994 Magneti Marelli merged

with another company in the Fiat group, Gilardini; (f) in 1996 Lucas merged with Varsity.

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In line with the policy adopted for this journal, this article – by one of the journal's Editors – has been refereed by at least two anonymous referees, and has been amended in the light of their comments.

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