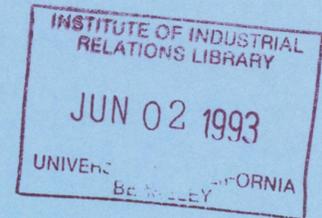


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COLLECTIVE BARGAINING IN THE
AEROSPACE INDUSTRY IN THE 1980S

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This paper examines recent collective bargaining developments in one of the few highly unionized U.S. industries that has maintained a technological edge and remains export-competitive into the 1990s, the aerospace industry. Table 1 presents the union coverage for the companies in this industry with the most production workers represented in major bargaining units¹; these are the bargaining relationships on which this study will focus.

The industry has a pyramid structure, with a few prime contractors at the top, and many sub-contractors and parts manufacturers further down the pyramid; the companies represented in Table 1 are mainly prime contractors, except for two engine manufacturers (United Technologies and General Electric) and one subcontractor (Rohr). While there are many military contractors and parts suppliers, and most of these companies produce products for both the military and commercial sectors, three final assemblers of large commercial transports essentially control the world market, suggesting that the final market for commercial turbojet aircraft is highly oligopolistic.

The industry is also distinguished by the fact that worker representation is essentially split between two major unions, the International Association of Machinists and Aerospace Workers (IAM) and the United Automobile, Aerospace and Agricultural Implement Workers (UAW). These unions, which have different origins and philosophies, can have considerable bargaining power due to the nature of the production process and the output markets.

There has been a shift in the environment of collective bargaining in this industry from "rent sharing" to a more competitive system during the 1980s. The driving forces behind this shift have been fundamental changes in the nature of the product markets: deregulation of the airlines

¹ Defined as more than 1,000 workers.

and the appearance of viable foreign competition on the commercial side and the "end of the cold war," the government budgetary crisis, and tightening of procurement contracting procedures on the military/space side.

With the tightening of these constraints, pattern bargaining has significantly weakened in this industry over the course of the 1980s. The military and commercial sides of the industry have never had coincident business cycles, but this fact was less important when rents were ample; in the 1980s, the widening differences in the fortunes of the companies in a situation of reduced rents contributed to a weakening of the strong intra-industry wage growth pattern that held throughout the post-war period. In addition, the parties have moved away from the inter-industry pattern established in the automobile industry, and with it the stable post-war wage rule of "3% AIF plus COLA,"² for several possible reasons.

Nevertheless, a major premise here is that in order to understand the general trajectory of the aerospace industry as well as the major changes in its collective bargaining practices, one must focus on a single company, Boeing, both because it is the largest and most profitable - also clearly the most viable now in an environment of shrinking military expenditures - and because it has maintained its status as the pattern setter for the industry in its collective bargaining relationship with the IAM (in terms of contract innovations, if not actual growth rates of wages). Of particular import was the 1983 settlement between Boeing and the IAM, which was the first major aerospace contract in the 1980s to contain lump sum bonuses, a weak form of two-tier wage scales, and significant language on technological change.

Beyond the weakening of previous wage rules and patterns and the introduction of lump sums, there has been

² Please note that AIF (= Annual Improvement Factor) and GWI (= General Wage Increase) are used interchangeably in this paper.

little innovation in industrial relations in this industry as a whole compared to other leading unionized industries. It has not developed a widespread lean production system, employment stabilization provisions, or profit sharing or other significant forms of worker participation on a large scale. Attempts to utilize Total Quality Management have had uneven success, and one of the two main unions has openly declared its opposition to team concept programs in principle. In many ways, industrial relations in this industry retains many vestiges of the post-war arms-length system, due to a variety of technological, market, and political factors.

The next section describes the industry and its main segments, as well as the nature of product market competition in these segments. The following section describes the nature of the labor markets as well as the unions and the bargaining structures they have developed with the unionized employers. Next, having laid out this context, the bargaining outcomes of the decade are detailed. A conclusion follows a review of the nature of the domestic non-union sector and workplace level developments.

I. The Industry, Major Employers, Product Markets, and Key External Influences

This study defines the "aerospace industry" as those companies classified in SIC (Standard Industrial Classification) 372, Aircraft and Parts, and SIC 376, Guided Missiles and Space Vehicles.³ In essence, the aerospace industry is defined here as those companies engaged in the

³ Companies that are not primarily classified in these SIC codes are given less emphasis in this study; SIC codes which might be included in a broader definition of the "aerospace industry" are SIC 3663 (Radio and Television Communication Equipment), SIC 3812 (Search, Detection, Navigation, Guidance, Aeronautical and Nautical Systems, Instruments and Equipment), and SIC 3829 (Measuring and Controlling Devices, NEC). This broader definition is used by the Aerospace Industries Association.

production of aircraft, guided missiles, space vehicles and parts, but not defense electronics, avionics, instruments, or related products and services; these neglected industries accounted for 31% of total aerospace employment and 7% of aerospace production workers in 1991 (Aerospace Industries Association[1992:142]).

There are two principal ways to break down the industry into sub-sectors. The first is by the nature of the product, irregardless of the final customer: the three main sectors are Airframes, Aircraft Engines and Parts, and Guided Missiles and Space Vehicles. These are the categories for which employment figures are available: Table 2 gives the total employment and the share of all manufacturing employment in these three sectors from 1968 (the peak of the Vietnam War employment boom) through 1991. The table shows that employment grew both in absolute terms and as a share of all manufacturing employment in all three sectors during the 1980s. By 1991 the industry, as defined here, accounted for 4.5% of all workers in manufacturing, or 838,000 workers. Note as well that employment grew most steeply in Guided Missiles and Space Vehicles, though it dropped in this sector after 1988, and that employment in the aircraft sectors was particularly volatile: Figure 1 shows employment indexes (1980 = 100) for Aircraft and Parts and all manufacturing for the period 1968-1991. This cyclicity will be discussed in more detail below.

Although this division of the industry is the one for which reliable employment figures are available, it is not the most meaningful for examining the nature of product markets, as the classification Aircraft and Parts includes both commercial and military aircraft. For examining product market developments, the more useful distinction is between civil aircraft on the one hand, and aerospace products sold to the U.S. (and, increasingly, foreign) governments on the other hand (military aircraft, guided

missiles, and space vehicles).⁴ Table 3 displays total sales for these sectors from 1974 through 1991, at 1982-84 prices. Commercial sales fluctuated through the 1980s (though they were higher in 1991 than in 1979), while military and space sales nearly doubled (though taken together they fell after 1987).

Table 4 displays industry trade figures from 1970 through 1991, at 1982-84 prices. Note that both imports and exports rose in both the commercial and military sectors over the course of the 1980s. Perhaps most remarkably, aerospace exports accounted for 10.4% of all exports of U.S. merchandise in 1991. The nature of the commercial and military/space segments of the industry and their product markets will now be examined in more detail.

COMMERCIAL

The civil aircraft side of the industry is very concentrated. Though there are a number of general aviation (or small aircraft) companies, among them Cessna (General Dynamics), Beech (Raytheon) and Piper, just three final assemblers of large commercial jet aircraft control 95% of the world market; two of them are located in the United States. The Boeing Company is unambiguously at the top of the commercial pyramid, and is the only company in history to make an overall profit on the production of large commercial transports such as the 747 (MIT Commission on Industrial Productivity[1989]); it is the only prime contractor whose sales are primarily commercial. McDonnell Douglas is the other U.S. integrator of commercial airframes such as the MD-11, but still has most of its sales on the

⁴ Reliable employment figures are not available according to this output-market distinction; at some companies, the same workers work on commercial and military aircraft, and the exact size of employment in some secret programs is not released. More obviously, parts makers can supply the same parts to final assemblers of either commercial or military aircraft.

military side.⁵ Below the final assemblers in this commercial pyramid are subcontractors (such as the non-union, and often prime-contractor, Northrop Corporation for the Boeing 747) and parts suppliers dependent on the fortunes of Boeing and McDonnell Douglas.

The jet aircraft engine portion of the commercial market also has three main competitors, two of them located in the U.S.: United Technologies (Pratt and Whitney), General Electric, and Rolls Royce of Great Britain; together they controlled 67.5% of the civil turbojet engine market in 1991.⁶ They compete with each other to be chosen by the airframe assembler (Boeing, McDonnell Douglas, and Airbus) or the final customer (airlines) for inclusion in the final product.

The nature of product market competition on the commercial side of the industry has changed radically over the course of the last decade. Through the 1970s, the U.S. companies that controlled the vast majority of the non-communist world's market for large commercial transports were all unionized, were within the stable auto-aero-implement collective bargaining pattern (and thus had similar rates of change in their labor cost structures), and sold to the same (mainly domestic, regulated) customers. Analysts tended to conclude that "price turns out to play a relatively minor role [in selling in the aircraft industry] ..., whereas performance, maintainability, and, most importantly, on-time delivery will most often decide who reigns as the current king of the mountain or who drops out of the market completely."⁷

⁵ Lockheed produced a jumbo jet in previous decades (the L-1011, many of which are still in service), but ceased doing so during the 1970s.

⁶ Source: Aerospace Industries Association. Pratt and Whitney and General Electric are also the primary suppliers of jet engines for military aircraft produced in the U.S.

⁷ Bluestone, Jordan and Sullivan[1981], p. 9. While some analysts, notably Carroll[1975] put more emphasis on the

Yet, by the end of the decade, a new study of the commercial aviation industry by the MIT Commission on Industrial Productivity[1989] concluded that the "particular constellation of factors" allowing for performance-based rather than price-based competition "has gone forever" and that new developments in the product markets have fundamentally "shifted customer relationships away from engineering and toward finance."⁸

There were two key developments in the external environment facing the domestic industry that drove this change. The first was the entry of Airbus Industrie of Europe, now the world's second-ranked integrator of large commercial jets.⁹ Airbus has followed an aggressive strategy of price-based competition and low-interest leasing arrangements made possible, the U.S. companies argue, by subsidies and inducements from the European governments.¹⁰ Figure 2, which displays the world market share of large commercial transports from 1970 to 1991, indicates that Airbus' share of the world market for large commercial transports rose from zero in the early 1970s to over 20% in 1991. Airbus also, obviously, has different unit labor cost structures than the U.S. companies; while unit labor costs are not necessarily lower in Europe, the entry of Airbus puts wages back into competition compared to the

importance of price competition, it was nevertheless true that wages were "out of competition."

⁸ MIT Commission on Industrial Productivity[1989], p. 1. This view is also expressed in Schwartz. et. al. [1987].

⁹ The four partners in Airbus are Deutsche Aerospace, a subsidiary of Daimler-Benz A.G., with a 37.9% stake; the French state-owned Aerospatiale, which also has a 37.9% stake; British Aerospace, with a 20% stake; and the Spanish state-owned Construcciones Aeronauticas S.A., with a 4.2% stake (NY Times 1/7/93)). Majumdar[1987] provides an analysis of the new competitive environment facing the airframe manufacturers with the entry of Airbus.

¹⁰ See Tyson[1993] for an analysis of industrial policies toward the aerospace industries in the U.S. and Europe; she notes that a key difference is that European government support has generally been more commercially motivated.

previous situation when the world's main commercial producers were within the same collective bargaining pattern.

A further complicating factor is that there is also significant cross-continental subcontracting and strategic partnering. In addition to the recent discussions of a joint venture among Boeing and the Airbus partners to build a super-jumbo jet, there are more than 400 U.S. suppliers in more than 30 states for Airbus aircraft, and current U.S. content of Airbus aircraft including U.S. engines ranges from 22% for the A340 to 39% for the A330.¹²

The second key development was the deregulation of the domestic airlines by the U.S. Civil Aeronautics Board (CAB). While regulated, the airlines could not compete on the basis of price, and so competed on the basis of product differentiation, including the quality of the aircraft (Carroll[1975]). Once deregulated in 1978, the airlines began to compete among each other more on the basis of price and saw their product market rents evaporate, which plausibly (but arguably) led them to be more concerned with the costs of their airplanes, thereby spurring more competition on the basis of price among the aircraft manufacturers. While it is conceivable that heightened price competition among the airlines might have increased air traffic and thus demand for aircraft, it is also likely that deregulation exacerbated the cyclicalities of air traffic and thus the cyclicalities of aircraft production and employment, to be discussed below.

Nevertheless, it is worth stressing again the continued dominance of Boeing, though its share has slipped over the course of the decade. Boeing continues to control more than half of the world's market for turbojet aircraft (Figure 2), has produced the majority of these aircraft in service in the world airline fleet (excluding those produced in the

¹² Source: IAM.

former communist countries), and is the United States' single largest exporter, accounting for \$17 billion in exports in 1991 (LA Times[3/1/92] and Aerospace Industries Association).¹³ One key result of Boeing's long-term dominance of the commercial industry is that it is closer to the standardized mass production paradigm, with fewer basic configurations for its jets; McDonnell Douglas, on the other hand, is more of a niche player, offering more configurations to meet the specialized needs of its customers (mostly smaller airlines).

The commercial side of the industry is subject to the speculative vagaries of the world commercial airline industry and, increasingly, leasing companies that buy in bulk and make long-term hunches about air traffic demand. Orders and backlogs for aircraft jumped in the mid-1980s, peaking in 1989, but have dropped since as the volume of new orders has fallen precipitously - some of the financially strapped airlines have even canceled previous orders, and as of this writing surplus jets sit in storage in the Mojave Desert in southeastern California (LA Times[11/22/92]). The boom and subsequent drop in orders can be largely attributed to changes in long-run forecasts of world airline traffic; the effect of the business cycle on this part of the industry thus operates through these forecasts as well as through cancellations of existing orders by airlines in distress.

MILITARY AND SPACE

The non-commercial side of the market is much less concentrated, and also accounts for a larger portion of total aerospace sales, though less foreign trade (Tables 3

¹³ It is also the most significant private employer in the Pacific Northwest area: Pascall Pedersen and Conway[1989:7] estimated that in 1989 one out of every six, or 389,000 jobs in Washington State were linked to Boeing, and that the company's operations directly and indirectly supported between 15% and 20% of the state's total economic activity.

and 4). Among the main producers on this side of the market during the 1980s were McDonnell Douglas, General Dynamics, Hughes, Martin Marietta, Lockheed, Rockwell, and Boeing as well as Northrop and Grumman, the principal non-union companies.

Two main changes have affected the nature of market and budgetary pressures on this part of the industry. First, U.S. government procurement contracting has slowly moved from cost-plus to fixed-price policies.¹⁴ Cost-plus contracting, which automatically reimburses all project costs including those for labor, has some technological justification (basically, the inability to precisely calculate costs in advance due to technical uncertainties associated with the start of a new project); it also allowed the companies to directly pass on their costs to the taxpayers, however. Explicit cost-plus contracting was largely gone by the early 1970s, and starting in 1983 the Department of Defense (and, more specifically the Defense Contracts Auditing Agency - DCAA) directly put pressure on the aerospace companies during their negotiations with the unions, threatening to not award contracts to companies granting "excessive" wage increases. Although there is evidence that the DCAA is now taking a less activist role in challenging union-negotiated wage rates (and it is an open question as to whether the earlier pressure had a significant effect on bargaining outcomes), it is nevertheless clear that with fixed-price, competitively bid contracts, labor costs become more of a direct concern for the contractors.

Second, with the "end of the cold war" and the emerging government budgetary crisis, military and space spending, both procurement and research and development, have been shrinking in absolute terms. This, in turn, has led to a

¹⁴ See Leonard and Erickson[1993] for a more detailed discussion of the nature and effect of government procurement policies in the aerospace industry.

crisis atmosphere among the military contractors. As table 4 indicates, one response has been an increased emphasis on sales to foreign governments (along with intensified lobbying of the U.S. government to obtain access to these markets). Another response has been an active environment of mergers and acquisitions¹⁵, suggesting a trend toward increased concentration on the military/space side of the market.

COMMON PRESSURES

The commercial and military/space sides of the market have been subject to some common pressures during the course of the 1980s. The most important have been the growth of strategic joint ventures as well as co-production and offset arrangements with domestic competitors and international interests.¹⁶ The companies enter into joint arrangements with foreign companies and governments as inducements for sales and sources of working capital, and also join forces with competitors to share risks. Obviously, these sorts of arrangements lead to many complicated issues of information sharing and technology transfer.

Joint ventures and subcontracting also allow the unionized companies the opportunity to de-facto operate on a non-union basis by moving production to sites without unions. These arrangements are therefore a subject of

¹⁵ Two recent examples have been General Dynamics selling its missile operations to Northrop and its military aircraft operations to Lockheed, and General Electric selling its military electronics operation to Martin Marietta (NY Times 11/24/92 & 12/10/92)

¹⁶ Some notable recent examples are the Strategic Defense Initiative contract awarded by the Air Force to a team of Rockwell and TRW, over Lockheed and Martin Marietta, and the new military plane F-22 being jointly developed by Lockheed and Boeing (LA Times[12/9/92 & 12/12/92]). Pratt and Whitney and Rolls Royce are both members of the International Aero Engines consortium and McDonnell Douglas has had on-again off-again talks with Taiwan about a partnership to build a new jumbo jet (Air Transport World[Nov. 1992], NY Times[8/11/92]). Perhaps most significantly, Boeing has reportedly entered into an agreement with the Airbus partners to develop a next-generation super-jumbo jet (NY Times[1/6/93]), as mentioned above.

concern for the unions, although they have been unsuccessful in their attempts to bargain limits on them thus far.

A second important common pressure on the commercial and military sectors involves the influence of state and local laws, and, more specifically, the environmental and workers' compensation laws of California which are viewed as being particularly onerous by the many aerospace companies located in that state.¹⁷ A result has been the beginnings of an exodus of aerospace companies from California. In some instances, actual and proposed transfers are from unionized to non-unionized settings, and have resulted in any case in massive displacement of former aerospace workers in California.¹⁸

II. Workers, Unions, and Bargaining Structures

WORKERS AND LABOR MARKETS

Product and re-equipment cycles for commercial aircraft are very long, lasting decades (MIT Commission on Industrial Productivity[1989]); the product cycle for the military side is clearly more inherently politically determined. Production is also very cyclical, with engineers and various combinations of production workers needed at different

¹⁷ In 1988, 36% of all establishments in SIC 376 were located in California, employing 53% of all workers and accounting for 55% of total payroll in SIC 376. In total, 258,000 aerospace workers were employed in California, or 31% of the national total. (U.S. Department of Commerce, *County Business Patterns*).

¹⁸ Recent examples include Hughes' announced transfer of its missile-building operations to Arizona, Lockheed's transfer of its non-classified work to its facilities in Georgia, and McDonnell Douglas' decision to build its new commercial airliner MD-12 in one of 8 other states rather than at its existing commercial plant in Southern California (NY Times 12/18/91, LA Times 9/10/92). Ong, Lawrence and Smilanick[1993], who define the aerospace industry to include Aircraft and Parts, Guided Missiles and Space Vehicles, and Search and Navigation Systems and Equipment (SIC 381) find that California lost over 130,000 aerospace jobs between 1988 and 1993, and that "few laidoff aerospace workers have been able to gain meaningful work, with a majority remaining out of work and an increasing number running out of unemployment benefits" (p. 3).

stages of the long process between product conception and final production. There is much movement among companies by workers, particularly on the West Coast, and a general perception that "when one aerospace company is hiring, another is laying people off," although the employment figures presented in Table 2 and Figure 1 indicate cyclicity in the entire industry as well. While the unions are concerned about employment security, their demands (largely unsuccessful to date) tend to take the form of limits on subcontracting rather than explicit employment guarantees; given the inherent cyclicity of production and the increasing volatility of the commercial market, many in the industry view such guarantees as infeasible.¹⁹

This cyclicity also poses a dilemma for companies regarding their provision of on-the-job-training: the movement of workers among companies limits the returns to the company that actually provides the training. The industry has a higher proportion of skilled craft workers and professional and technical workers and a lower proportion of less-skilled operatives than manufacturing as a whole; in 1990, 45% of all aerospace workers were production workers, while 27% were engineers, scientists and technicians (Aerospace Industries Association, from company annual reports and *Employment and Earnings*). Much of the actual general training takes place in the military and at vocational-technical schools. According to the Current Population Survey Outgoing Rotation Group (CPS), in 1990 1% of aerospace production workers were in the military in World War II, 4% in the Korean War, 12% in the Vietnam War, and 12% during other periods; 71% had not been in the military.

Before the recent downturn, employers claimed that the industry was facing a severe shortage of experienced, blue collar skilled labor (Schwartz et. al. [1987]: 266), and

¹⁹ Schwartz et. al. [1987] discuss in more detail this cyclicity and its relationship to the issue of job security.

even now there is evidence of employer difficulty in finding qualified engineers (LA Times 8/22/92). Some in the industry claim that the introduction of numerically controlled machine tools and automation are diminishing the severity of the skills shortage, however. Finally, the fact that workers on certain classified government programs require security clearance restricts the labor pool available for those programs.²⁰

UNIONS

The aerospace industry remains highly unionized, though the share has dropped over the course of the decade: the CPS Outgoing Rotation Group indicates that union membership among production workers fell from 53.8% in 1985 to 44.5% in 1991, and among all workers from 28.9% in 1985 to 24.8% in 1991.²¹

The two unions representing the most production workers in the industry are the IAM and the UAW. As indicated in Table 1, the main plants at Boeing, Lockheed, General Dynamics, United Technologies (Pratt and Whitney Engines), Raytheon (Beech Aircraft), and Rohr are primarily organized by the IAM, while the main plants at Rockwell, Martin Marietta, and General Electric (Engines) are primarily organized by the UAW. Two of the companies in this table

²⁰ The security requirements also tend to wreak havoc on seniority progression systems when both classified and non-classified programs are part of the same ladder.

²¹ This particular measure, based on the CPS Outgoing Rotation Group, is not available prior to the mid-1980s. Freeman and Medoff[1979] estimated that over the period 1973-75, 60% of aerospace production workers belonged to a union. Kokkelenberg and Sockell[1985] estimated that the unionization rate among all workers in Aircraft and Parts was 41.6% over the period 1973-75, 41.0% over the period 1974-76, 38.7% over the period 1975-77, 37.0% over the period 1976-78, 39.8% over the period 1977-79, 42.6% over the period 1978-80, and 43.5% over the period 1979-81. Curme, Hirsch, and Macpherson[1990] estimated that the unionization rate among all workers in Aircraft and Parts was 38.1% over the period 1983-85, 37.3% in 1986, 34.3% in 1987 and 32.2% in 1988; among all workers in Guided Missiles and Space Vehicles, 16.8% over the period 1983-85, 16.9% in 1986, 17.4% in 1987, and 18.7% in 1988.

deviate from this rule of essentially exclusive representation by one or the other of these unions.²² McDonnell Douglas has major plants represented by both unions, with the workers in its main military plant organized by the IAM and those in its main commercial plant organized by the UAW. Hughes is primarily organized by the Carpenters' and Joiners' Association (CJA), an artifact of the company's production of the wooden Spruce Goose in the 1940s. This study concentrates on the relationships with the IAM and the UAW.

The two unions have different origins, craft for the IAM and industrial for the UAW, and they engaged in intense jurisdictional disputes in the industry during the 1930s and 1940s. They eventually signed a "no-raid" pact in 1949 prohibiting organizing activities by either union in plants where the other union had agreements or NLRB certification.²³ The two have coordinated bargaining to varying degrees through the years, as will be discussed below.

Recently, however, there have been basic philosophical differences between the unions: the IAM is generally considered to be a traditional, arms-length union while the UAW is more interested in union-management cooperation, as will be discussed in more depth below. Furthermore, the UAW has always been part of a larger "orbit of coercive comparison,"²⁴ and UAW-represented bargaining units and the units they strongly influence tended to follow the actual terms of automobile industry settlements more closely than

²² The Boeing Vertol Helicopter Unit in Pennsylvania is represented by the UAW, but did not have more than 4,000 members during the 1980s, compared to the west coast IAM unit, which approached 60,000.

²³ For a comprehensive early history of industrial relations in this industry, see Levinson[1966].

²⁴ Ross[1956] first defined this concept of the psychological and organizational forces of equitable comparison driving wage equalization.

did IAM-represented and influenced units before the break of the inter-industry pattern in 1983.

In addition, the aerospace branch of the union is seemingly more influential within the IAM, where former local union officials in the aerospace industry have risen as high as the vice presidency of the international union. Within the UAW the aerospace department has been considered secondary to automobiles and agricultural implements.

Finally, while the UAW and the IAM are perhaps working less closely together now, the IAM has been consciously trying to increase coordination within its organization. While representatives of the internationals at both unions have traditionally actively engaged in the bargaining process, providing information to local negotiators and participating in the negotiations, the IAM locals now share even more information about their experiences and strategies with each other, and the presidents of the locals at the major companies represented by the IAM meet together at the beginning of bargaining at each company. This new higher level of coordination was initiated before the 1986 bargaining round.

Another distinctive feature of unionization in this industry is the existence of large engineering and technical unions, most notably at Boeing, where the Seattle Professional Engineering Employees Association (SPEEA) represents close to 30,000 workers; such unions also represent engineers and technicians at McDonnell Douglas and Lockheed (Southern California Professional Engineering Employees Association, Engineers and Scientists Guild). The negotiations carried out by these unions and the companies differ from those with the production worker unions in that they primarily negotiate wage floors and wage pools, which are then distributed on the basis of merit. In the 1992 bargaining round, SPEEA became involved in a dispute with Boeing over the union's desire to limit the discretion of supervisors in awarding the merit portion of the pay

increases. The following sections will primarily concentrate on the production worker unions, however.

BARGAINING STRUCTURES

The bargaining structures developed by the companies and the unions vary significantly across the companies that make up the industry. A brief description of some of the most prominent gives a sense of the wide range of different structures. Boeing and the IAM negotiate a corporate-wide master agreement which is then voted upon by each of its three main locals, in the Puget Sound region, Wichita, and Portland. Lockheed, which has its main facilities in Georgia and both northern and southern California, negotiates the "major economics" with the IAM across the three main plants, but bargains non-economic issues on a decentralized basis.²⁵ McDonnell Douglas, on the other hand, has a much more decentralized bargaining structure across its IAM-represented plants in St. Louis and southern California and its UAW-represented plant in southern California, with wages and benefits more likely to be negotiated locally than at the other two companies. The other companies tend to fall within this spectrum: Rockwell, for example, signs a master agreement with its Aerospace Group, while General Dynamics (before selling its aerospace divisions to Lockheed and Northrop in 1992) was more decentralized.

As for informal bargaining structure, the industry has traditionally followed a tight intra-industry pattern, as will be discussed below. It should be noted, however, that not all of the companies with major union representation listed in Table 1 have been strongly associated with this pattern. Negotiators at Hughes claim to be little influenced by the other aerospace settlements in their negotiations with the CJA; in general, the relationship

²⁵ Lockheed is distinctive because the IAM also represents its clerical workers (about one quarter of the membership).

between Hughes and the CJA local tends to be more "locally oriented" than the relationships between the other companies and the international-union influenced IAM and UAW locals. The Hughes-CJA contract cycle has been moved so far out of sync that they now settle two years after Boeing; moreover, unlike the rest of the west-coast aerospace companies, they eliminated COLAs in their 1982 contract.

The two major domestic engine manufacturers are also not very closely associated with this pattern. They are located in the mid-western and north-eastern parts of the country, and thus lack physical proximity (and commonality of labor markets) with the vast majority of the aircraft and missile/space producers located in the west and the south. The contracts at United Technologies' Pratt and Whitney division have tended to significantly deviate from the other aerospace companies, particularly in the phasing-down of cost of living clauses during the early 1980s and the return to general wage increases before the rest of the industry. General Electric negotiates a master agreement with most of its main unions across its different industry segments; the company's aerospace workers are covered by the same contract as the other (mainly IUE) unionized workers in that wide-ranging corporation. Having noted these deviations, the next section will examine the development of inter- and intra-industry wage patterns during the 1980s among companies that were strongly associated with the pattern.

III. Bargaining and Bargaining Outcomes

EARNINGS

Aerospace workers have traditionally been highly paid: Table 5 presents average hourly earnings (including overtime and lump sum payments) in the industry and in all manufacturing for production workers from 1970 to 1991, at 1982-84 prices. The table indicates that the hourly earnings premium for workers in Aircraft and Parts over all

manufacturing rose from 22-24% in the 1970s to 34% in 1983, then remained stable within the range of 34% - 39% until 1991, when it rose to 42%. Figure 3 presents production worker hourly earnings (including overtime) in Aircraft and Parts (both with and without lump sums), Automobiles (excluding lump sums and profit sharing payouts due to lack of availability of the data in hourly form), and all manufacturing over the period 1960-1991, at 1982-84 prices. This figure indicates that aerospace workers have recently done relatively better than their traditional comparison group, automobile workers, as will be discussed below.

HISTORY OF PATTERN BARGAINING PRIOR TO 1980s²⁶

The aerospace industry has traditionally followed a tight intra-industry pattern, with later contracts generally following the first contract to be negotiated in a given round. In addition, aerospace settlements have traditionally followed closely the terms negotiated in the automobile industry, jointly forming (with the agricultural implements industry) the "auto-aero-implement" pattern. One stylization of the wage portion of this pattern is that the bargaining units within it closely adhered to the wage rule of "3% AIF plus COLA" during much of the post-war period.

After resolving their jurisdictional disputes in the 1930s and 1940s, the two unions held joint aerospace industry bargaining conferences before the start of several of the bargaining rounds in the 1950s and 1960s. The two unions jointly targeted Boeing, Lockheed, McDonnell Douglas, Rockwell or United Aircraft, presumably the one that was most prosperous, to create the "key settlement" to form the pattern, with both unions waiting to negotiate with the other companies until this first settlement had been reached and the later settlements generally falling into line with the pattern setter.

²⁶ This section draws from Levinson[1966], McCann[1989], and U.S. Department of Labor[1974, 1976a, 1976b].

Particularly notable were the bargaining rounds in the early 1950s, when the UAW consciously attempted to match the GM settlement provisions at the aerospace companies it represented; according to Levinson[1966:53], in 1953 an arbitration panel found that "automobile wage rates and wage movements [were] relevant to a determination of wages in the airframe industry" and viewed its award "as a a step toward narrowing the differential." The UAW, in particular, pushed for parity with the automobile industry down through the years. While the differential was never fully eliminated until the 1980s (as indicated in Figure 3), the prominence of the UAW in the aerospace industry, particularly in those years when one of its bargaining units formed the "key settlement," insured that the aerospace industry closely followed the "3% plus COLA" wage rule established in the automobile industry through the end of the 1970s.

Katz[1985:27-28] notes the functions served by wage rules in the automobile industry: orderly adjustment of wages during multiyear agreements, reduction of the potential scope of disagreement over compensation, provision of structure for negotiations, provision of political stability for labor and management leaders, and reduction of the likelihood that overt conflict might break out in the face of a negotiations impasse. The same functions likely applied to the aerospace industry as well, along with the extra political stability provided by overtly following the settlements in the automobile industry. In the 1980s, however, both the wage rule and the inter-industry pattern came to an end, while the intra-industry pattern weakened considerably.

MAJOR DEVELOPMENTS IN BARGAINING IN 1980s²⁷

Table 6 presents the general wage increases (GWI), lump sum bonuses (LSB) and profit sharing provisions negotiated

²⁷ This section draws from Bureau of National Affairs[1992], Erickson[1992], and various issue of *Current Wage Developments*.

by four of the prime contractors and the unions representing their production workers (Boeing-IAM, Lockheed-IAM, McDonnell Douglas-IAM, and Rockwell-UAW) and one highly unionized subcontractor (Rohr-IAM), as well as the most recent previous General Motors-UAW agreement during the 1980s. It is important to note that this table does not include benefits, which tend to show more variance across these companies; the role of benefits, particularly health care coverage, in contract negotiations in the 1980s will be discussed below. In addition, cost-of-living provisions are not included in this table. COLAs tend to be provided on a cents-per-hour per point change in the CPI basis in this industry, though Boeing moved to a proportional system in 1989; otherwise, there were not major changes in COLA provisions in the 1980s (except for the diminution of coverage at Pratt and Whitney and Hughes, discussed above). Finally, wage changes due to classification and auto-progression systems are not included in the table. What the table does tell us is how the wage growth pattern changed over the course of the decade.

The 1980 bargaining round was the last that followed the "3% AIF plus COLA" wage rule. Even under this regime, the first year was seemingly more negotiable, with the second and third years more likely to stand at exactly 3%.²⁸ Note the similarity of the settlements across the five aerospace companies presented here, as well as the similarity with the General Motors settlement- clear evidence of a tight pattern.

In 1983, however, Boeing broke with past practice and did not offer any across-the-board GWI, instead offering LSB of 3% of the employee's previous year's earnings in each of the three years of the contract and selective wage increases to the top labor grades. In the crisis atmosphere of the

²⁸ See Erickson[1992] for further evidence that "3% plus COLA" actually showed considerable variability, particular in the first year of the contracts, during the 1970s.

early 1980s, the union accepted the offer without much objection, though they later became more critical of lump sum payment systems. This settlement was also significant because it deviated from the form of concessions negotiated in the most recent automobile contracts, opting for LSB rather than profit sharing. Thus, in this year, when the industry was in a deep trough (see the employment figures in Table 2), both the inter-industry pattern based on the settlement negotiated in the auto industry and the stable post-war wage rule of "3% plus COLA" apparently came to an end.

As regards the form of the concessions, the auto industry (along with much of the rest of unionized manufacturing) started using lump sum bonuses later in the 1980s, following Boeing's innovation.²⁹ On the other hand, explicit profit sharing has not been attempted to any significant extent in the aerospace industry.³⁰ There are several possible explanations for this lack of profit sharing in aerospace, which is particularly striking given the previous importance of the automobile industry in setting the inter-industry pattern. The actors tend to emphasize the technical infeasibility of profit sharing in this industry due to the cyclicity of employment and the long lag between product conception and break-even (rendering employment guarantees problematic and project-based profits long in coming), as well as the low level of trust between the unions, particularly the IAM, and the

²⁹ From the end of 1987 through the third quarter of 1991, the percentage of all private sector workers under major collective bargaining settlements covered by lump sum provisions was between 40% and 43%; recent evidence suggests that these provisions are becoming less common, however: by the third quarter of 1992, the share had fallen to 33% (U.S.D.O.L.[1992]).

³⁰ Gainsharing was attempted with reportedly limited success at the UAW-represented McDonnell Douglas plant; Lockheed imposed an ESOP program that was viewed with hostility by the IAM because the company was perceived to be designing the program so as to thwart a hostile takeover rather than addressing the workers' and the company's legitimate joint interests.

companies. In addition, government contracting poses particular problems for bonus schemes: considering that there is already much disagreement over who will ultimately pay for bonuses that are based on annual earnings ("how much of the year did a particular worker work on a particular project?"),³¹ one can see how much more complicated it would be to define "profits" on this side of the industry.³²

Another possibility is that the bonus schemes allowed the companies to provide the workers with more money than their counterparts in the auto industry, which was in comparatively much worse financial shape during much of the 1980s, without making this difference explicit (and thus directly upsetting orbits of coercive comparison) and without putting the money permanently into the base wage. According to Katz and Meltz[1991], profit sharing payouts at GM, Ford, and Chrysler between 1982 and 1989 totaled \$1,754, \$13,365, and \$4,306, respectively: except for the Ford payouts, this is clearly less than the bonus payouts in the major aerospace companies.³³ Note, however, that the union movement generally views lump sum payments much less favorably than profit sharing.³⁴ In any case, Figure 3 does indicate that, even disregarding lump sums, aerospace workers' average earnings caught and passed auto workers' average earnings during the 1980s.

³¹ In fact, there has been much disagreement over whether the U.S. Department of Labor should include lump sums in its calculations of industry earnings, which are used in the negotiations between the government and the companies over reimbursements.

³² There have been nascent attempts to define gains on the basis of reducing hours to finish a particular project, but people in the companies tend to complain that the government thinks in terms of reimbursing costs while refusing to share gains.

³³ Consider from Table 6 that the total bonus payouts at Boeing during the 1980s for a worker earning \$40,000 per year (including overtime) would have amounted to \$14,000.

³⁴ For example, the UAW[1989] cites "lump sum wage settlements instead of percentage improvement factors" as a major cause of the situation that "the aerospace industry continues to enjoy a period of rising profits while the workers' spendable income has remained relatively stable," while also arguing that "workers should be able to share in the fruits of their labor by the establishment of a true profit sharing program."

Although the table suggests that the intra-industry pattern still held in 1983, the nature of the bargaining after the key settlement had been reached also constituted a break from the past. The unions consciously tried to break the pattern established at Boeing, in contrast to past practice when the unions generally tried to enforce (or build upon) the pattern. The Lockheed and Rockwell contracts did deviate somewhat, providing for 3% GWI rather than LSB in the third year. Although the UAW held a long and bitter strike at McDonnell Douglas to fight the imposition of the terms of the Boeing settlement and to attempt to follow the terms of the Lockheed settlement, the rank-and-file ended up accepting essentially the same contract as at Boeing, as had the IAM-represented workers at McDonnell Douglas over the objections of the union leadership. It is notable that the UAW tried to follow the pattern established at Lockheed rather than the one established in the automobile industry or the "key settlement" within the industry, in contrast to past practice; this suggests both that profit sharing may not have been viewed as feasible and that the Boeing settlement was viewed as concessionary.

Finally, the 1983 round was important because it saw the introduction of a weak form of two-tier wage systems (in the form of expanded rate ranges) at several of the companies (most notably Boeing and Lockheed), though most were later phased out. The Boeing contract alone also contained the industry's first significant language on technological change, which will be described in greater detail below.

The 1986 round saw Boeing and the IAM again negotiate no GWI, with LSB of 12%-5%-5%. Lockheed and the IAM soon signed a similar agreement. McDonnell Douglas and the two unions became engaged in a bitter dispute over the company's attempt to initiate a medical insurance co-payment provision. After months of "working to rule," the unions

signed settlements that did contain the co-payment provisions; whether health care should be substantially contributory (on the part of workers) remains a contentious issue in the industry. The agreement also contained a combination of GWI and LSB, in contrast to those at Boeing and Lockheed. In addition, the "intra-company" pattern at McDonnell Douglas was broken as the UAW signed a five-year agreement with the company while the IAM signed an agreement with the traditional three-year duration. This break appears to have been driven by the company's desire to separate the two contracts and thus diminish their influence on each other as well as the influence of the Boeing settlement on the UAW negotiations; in general, the breakup of the intra-industry patterns have been company-driven. Rockwell and the UAW negotiated a combination of GWI and LSB as at McDonnell Douglas and General Motors, while Rohr and the IAM signed an agreement with only LSB, as at Boeing and Lockheed.

At first glance, the table would seem to indicate that the intra-industry pattern broke down in 1986-87, with the variety of combinations of GWI and LSB in the different contracts. Consider, however, the following rule of thumb, related by negotiators. If you consider the cost of the two types of provisions within the life of a single contract, and disregard compounding and the time-value of payments as well as issues such as anchoring points for future contracts (the hourly base wage often serves as an anchor), a GWI of 1% in the first year of a three year contract is approximately equivalent to an LSB of 3% in the first year, considering that the GWI will also be received in the second and third years. Similarly, a second year GWI of 1% is equivalent to a second year LSB of 2% and third year GWI and LSB are directly comparable.³⁵ If you convert all of the

³⁵ One management negotiator referred to this metric as "percentile units," saying that it is often used in discussions among company negotiators and with the unions.

GWI to LSB in this manner for the aerospace companies in Table 6 in the 1986-87 bargaining round, and then add up the total value of the settlements, they all add to 22%. While seemingly non-rational on its surface, a reasonable stylization of the wage rule in 1986-87 in the aerospace industry was thus "22%".

The 1989 round, however, saw further significant weakening of the intra-industry pattern. The negotiation of the "key settlement" was exceptional because Boeing was in extraordinarily good shape, with backlogs and orders unprecedented for the 1980s (the commercial aircraft order boom of the late 1980s peaked in that year), and resultant high expectations among the union and the rank-and-file. After a 48 day strike, the first at Boeing in 12 years, the settlement finally reached provided GWI of 4%-3%-3% and LSB of 10%-5%-4%.³⁶

The settlements at the other companies, which were not in as good financial shape as Boeing (nor had that company's long-term prospects) due to the decline in defense expenditures, deviated from both the exact terms and the overall value of the Boeing settlement (no equivalent of the "22%" rule holds). The Lockheed settlement was notable because it paid workers in the lowest labor grades lump sums alone with no increase in the hourly wage, and also moved to a preferred provider medical arrangement with large deductibles (by industry standards). At the end of the Lockheed negotiations, the chief negotiator for the IAM local stated, and the chief negotiator for the company agreed, that this was the first time in 50 years that the first contract settled in the aerospace industry had not set a pattern.

The only major contract settled in the 1992 round as of this writing was at Boeing. This contract contains an LSB

³⁶ In addition to wages and bonuses, other main points of contention were the pension formula and the extent of mandatory overtime.

of 12% only in the first year of the contract, along with GWIs of 3.5% in the second and third years. It is notable that neither the main stated concern of the union (limiting subcontracting), nor the main stated concern of the company (inducing the workers to bear more of the burden of health care costs) were addressed in the final contract. As in 1989, it appears as though the diverging fortunes of the companies due to their concentrations in one or the other segments of the industry will lead to further collapse of the intra-industry pattern.

Yet, it is worth emphasizing that the bargainers in the rest of the industry still look to the Boeing settlement as the trend-setter. It is also worth noting that in 1983 at Boeing and 1990 at Lockheed, the contracts provided for selective increases in the base wage for workers in the higher labor grades, allowing the companies to widen the skills differential that tends to be narrowed by cents-per-hour COLA clauses; this suggests that, at least in these two instances, the companies obtained latitude to differentially reward higher skill levels, and that lump sum payments helped to ease this differential treatment.

Overall, then, regarding wage rules and patterns, "3% AIF plus COLA" and the strong inter-industry pattern (whereby aerospace contracts followed closely the terms of automobile industry contracts) came to an end in the 1983 round, while the strong intra-industry pattern started to weaken in the 1986-87 round and significantly weakened further in the 1989-90 round.

In fact, in general, except for the introduction of LSB and the breakdown of the old rules and patterns of wage bargaining, the contracts in this industry have been remarkable for their lack of innovation, especially when compared to the employment or income security, profit sharing, and other cooperative arrangements that have been developed elsewhere (such as the auto industry).

IV. THE DOMESTIC NONUNION SECTOR

There are at least three primary reciprocal influences between aerospace industry collective bargaining and labor relations in the nonunion U.S. companies. First, even two of the main nonunion companies, Northrop and TRW, do have smaller IAM-represented bargaining units.

Second, and more importantly, the union and non-union aerospace companies draw from the same labor markets. This induces the non-union companies to engage in "union substitution" strategies: Northrop even distributes to its employees a document, "Working with Northrop," which resembles a union contract in some respects: it includes rules on seniority, layoffs, and recalls; promotions and transfers; grievance procedures; and pay determination. People in the industry claim that wages are generally comparable or even higher at the non-union companies.

Most of the companies, union and nonunion, also participate in the same specialized compensation surveys which, obviously, exert influence on as well as being influenced by collective bargaining outcomes. This influence also works through the DCAA, which uses 14% above the average pay for a classification in its definition of the "labor market"³⁷ as the criterion for an audit for overpayment at nonunion companies. One major difference is that the non-unionized companies have much more latitude to pay workers on government contract projects differently from those working on commercial projects.

Finally, the widespread joint venturing between the unionized and non-unionized companies also suggests a strong mutual influence of the two sectors. As discussed above, a major concern of unions in the 1980s has been the unionized companies' ability to de-facto operate on a non-union basis

³⁷ This is a slippery and contentious definitional issue; both union and nonunion companies inside and outside of the industry have been included in the various surveys that have been used.

through these joint ventures and subcontracting arrangements.

The non-union sector has been growing, as evidenced by the decline in the unionization rate cited above. Two plausible explanations for this growth in the nonunion sector are the movement of unionized companies to right-to-work states and the recent increase in subcontracting by the (relatively highly unionized) prime contractors.

V. Workplace Level Developments

PRODUCTION SYSTEM, TECHNOLOGY, AND EMPLOYEE INVOLVEMENT

The aerospace industry has been moving toward a leaner production system in fits and starts, with mixed union acceptance and involvement. One key element of the industry's bargaining history, perhaps related to the technology, is that the parties claim that they do not negotiate production standards, such as productivity, speed of the line, or other aspects of the "effort bargain." Some of the companies do, however, discuss technological change with their unions (and, in general, the parties claim that the companies have been more forthcoming with information recently), and some have attempted to implement Total Quality Management Systems (TQMS), with mixed success.

In a recent study of the impact of technological change on labor relations in the commercial aircraft industry, Schwartz et al.[1987:266] identify five major technological changes in commercial aircraft production, which also apply to military aircraft production and, to some extent, guided missiles and space vehicle production: (1) the increasing use of light-weight materials of comparable strength, (2) changes in the assembly process which have eliminated welding after forming and have improved the efficiency of die-making, (3) the production of large jets from refractory alloys (with electrochemical machining), (4) the increasing use of computer-aided design, and (5) the introduction of

numerically-controlled machine tools. Nevertheless, these authors still classify aircraft production technology as primarily batch production.

The IAM was a pioneer in demanding union voice on technological change, and negotiated with Boeing language on technological change in the 1983 agreement. The contract outlined the company's obligation to brief the union on new technology, created a joint training advisory committee with equal participation by union and management to make advisory decisions on training for those affected by technological changes, and set up pilot projects aimed at improving the quality of work life and productivity (Verma and McKersie[1985], Schwartz et. al.[1987]). These programs were continued in the 1986, 1989 and 1992 agreements and the Quality Through Training Program was eventually funded at 10 cents per bargaining unit hour for training, tuition, facilities, staff, administration, publicity, equipment, and materials. These particular forms of explicitly bargained technological consultation and adjustment arrangements did not spread to the other bargaining relationships in the industry, however.

Boeing also formed quality circles on an experimental basis without the involvement of the union, starting in 1980 (Verma and McKersie[1985]). Yet, the IAM remains suspicious of the team concept. In fact, the national union has issued a white paper on team concept programs that says, in part, that:

By their very nature, these [team concept/TQM/QWL/EI] programs interfere with the union's obligations (1) to represent each and every member of the bargaining unit, (2) to enter into collective bargaining over wages, hours and working conditions, (3) to abide by and enforce the terms and conditions of any collective bargaining agreement already in effect, and (4) to preserve the integrity of the union as an autonomous,

democratic organization according to the laws of the land and the IAM's constitution and By-Laws.... Therefore, it is the policy of the IAM to resist any team concept program. (IAM[1990]).

On the other hand, TQMS has been attempted more extensively at the UAW-represented plants at McDonnell Douglas and Rockwell, as the dominant faction of that union is generally more receptive to participating in EI (for internal union debate about UAW involvement in EI at NUMMI, which was used as a model for the system at McDonnell Douglas, see New York Times articles by Parker and Slaughter[12/4/88] and Lee[12/25/88]). The McDonnell Douglas plan is generally viewed as a failure, perceived as chaotic by the production workers and falling victim to the existing highly adversarial environment at that plant; the gallows humor among the highly mobile skilled production workers was that TQMS meant "Time to Quite and Move to Seattle." The Rockwell program, though more limited in scope, has been viewed as more successful, and reference to the parties' joint commitment to EI was included in the 1990 contract. The U.S. government has been encouraging TQMS as a condition for receiving military/space contracts; the experience in this industry suggests that such mandates can lead to wildly different outcomes when implemented, depending on the existing culture and the commitment of the parties to genuine change.

Thomas[1991] studied union-management cooperation during the course of three technological changes at a major aerospace manufacturing firm that had forged with its union a set of agreements in the early eighties committing both sides to pilot projects in work redesign, retraining for employees displaced by new technology, and advance consultation on the company's plan for technological change. Among his findings were that the union was ambivalent about the true costs and benefits of cooperation, had concerns

about perceived co-optation by management, and had little advance involvement in the introduction of the new technology; the industrial relations staff played only a marginal role.

In their study of a quality circle program at a Fortune 100 aerospace company that introduced quality circles without the involvement of the union, Verma and McKersie[1987] found that participation in the program increased workers' identification with the company and its goals.

STRIKES AND GRIEVANCES

Table 7 reports the strikes in the industry involving major bargaining units from 1982 to 1990. The table indicates no more than four strikes took place at major bargaining units in the industry during any given year during this period. Perhaps the two most notable strikes in the decade were the UAW strike at McDonnell Douglas in 1983-84 over the company's attempt to follow the concessionary Boeing contract and the IAM strike Boeing in 1989 discussed above; in neither case did the strikes spread to the rest of the industry.

Nevertheless, workers in this industry can have enormous strike leverage, depending on the state of the product-market cycle. Interruptions of production have always been costly for the commercial manufacturers (given the importance of on-time delivery), and are particularly costly during boom times in the newly competitive environment, such as 1989 at Boeing. In addition, the government has a policy to refuse delivery from plants on strike.

Kleiner, Nickelsburg and Pilarski [1988] found a surprising positive relationship between grievance activity and productivity in a large unionized commercial aircraft manufacturing firm that had attempted to follow "Japanese style" management techniques, with a significant employee

involvement program, during the latter two years of their period of study, 1978-87. This finding led them to question whether "zero is optimal" when it comes to grievances.

CONCLUSION

The aerospace industry remains among the few highly unionized and export competitive parts of the U.S. economy, largely because of the market position of one company, Boeing - the country's largest single exporter and home of one of the country's largest union locals, an unusual combination indeed for the early 1990s. Distinctive features of the industry's collective bargaining system are that it is organized by two major unions and has seen relatively little innovation as regards employment guarantees, employee involvement and other cooperative arrangements such as profit sharing. It was previously part of the strong auto-aero-implement inter-industry pattern, but moved away from this pattern in the early 1980s, and with it the stable post-war wage rule of "3% AIF plus COLA." Intra-industry pattern bargaining also weakened later in the decade. During recent years, market and budgetary constraints have tightened considerably in both the commercial and military/space sectors of the industry; the question that remains is whether more profound changes in the collective bargaining system will be necessary to adequately adapt to the rapidly changing competitive environment.

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TABLE 1: LARGEST UNION REPRESENTATION OF PRODUCTION WORKERS
IN AEROSPACE DIVISIONS OF COMPANIES IN THE 1980s

<u>Company</u>	<u>Locations</u>	<u>Primary Union</u>	<u>Range of workers covered by major settlements during 1980s⁺</u>
Boeing	Washington Oregon Kansas	IAM	26,000 - 58,000
	Pennsylvania	UAW	1,200 - 3,300
McDonnell Douglas	Missouri Southern California	IAM	13,000 - 18,300
	Southern California Oklahoma	UAW	6,600 - 15,000
Lockheed	Southern California Northern California Georgia	IAM	18,000 - 30,000*
United Technologies (Pratt & Whitney)	Connecticut	IAM	13,800 - 22,000
	Connecticut	IBT	6,200 - 6,600
General Dynamics (Cessna)	Southern California Texas	IAM	10,000 - 16,600**
	Kansas	IAM	2,000 - 6,000
Rockwell	Southern California Ohio Oklahoma	UAW	7,500 - 17,000
Hughes	Southern California	CJA	11,500 - 13,500
	Arizona	IAM	1,500 - 2,200
General Electric	Ohio	UAW	5,000***
	Massachusetts	IUE	5,000***
Raytheon (Beech)	Kansas Colorado	IAM	3,900 - 7,800
Rohr	Southern California	IAM	4,200 - 5,050
Martin Marietta	Maryland Florida Colorado	UAW	2,300 - 6,000

Source: U.S.B.L.S., *Current Wage Developments*

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- + Employment ranges based on contract reports in *Current Wage Developments* in the 1980s.
 - * Includes clerical workers
 - ** Aerospace divisions sold to Hughes and Lockheed in 1992.
 - *** Part of master agreement covering most unionized GE employees.

TABLE 2: AEROSPACE INDUSTRY EMPLOYMENT, 1968-1991

<u>Year</u>	<u>Airframes</u> (sic 3721)		<u>Aircraft Parts and Engines</u> (sic 3724, 3728)		<u>Missiles & Space</u> (sic 376)	
	<u>Number</u> (thous)	<u>% of mfg</u>	<u>Number</u> (thous)	<u>% of mfg</u>	<u>Number</u> (thous)	<u>% of mfg</u>
1968	468	2.4%	364	1.8%	150	0.8%
1969	457	2.3%	348	1.7%	124	0.6%
1970	370	1.9%	299	1.5%	98	0.5%
1971	288	1.5%	243	1.3%	88	0.5%
1972	287	1.5%	208	1.1%	93	0.5%
1973	301	1.5%	224	1.1%	93	0.5%
1974	308	1.5%	232	1.2%	94	0.5%
1975	293	1.6%	221	1.2%	93	0.5%
1976	281	1.5%	206	1.1%	86	0.5%
1977	270	1.4%	211	1.1%	83	0.4%
1978	288	1.4%	239	1.2%	93	0.5%
1979	333	1.6%	259	1.2%	102	0.5%
1980	349	1.7%	284	1.4%	111	0.5%
1981	344	1.7%	282	1.4%	123	0.6%
1982	320	1.7%	264	1.4%	131	0.7%
1983	305	1.7%	257	1.4%	141	0.8%
1984	306	1.6%	269	1.4%	154	0.8%
1985	326	1.7%	291	1.5%	177	0.9%
1986	339	1.8%	317	1.7%	200	1.1%
1987	356	1.9%	322	1.7%	206	1.1%
1988	369	1.9%	315	1.6%	208	1.1%
1989	382	2.0%	329	1.7%	194	1.0%
1990	381	2.0%	331	1.7%	185	1.0%
1991	357	1.9%	314	1.7%	167	0.9%

Source: U.S.B.L.S., "Employment and Earnings" and Aerospace Industries Association estimates.

TABLE 3: AEROSPACE INDUSTRY SALES, 1974-1991
(\$ millions 1982-84)

<u>Year</u>	<u>Civil Aircraft</u>	<u>Military Aircraft</u>	<u>Missiles</u>	<u>Space</u>	<u>Related Products and Services*</u>
1974	12,819	17,337	8,333	8,949	8,249
1975	12,013	18,532	7,017	8,710	8,907
1976	10,557	17,661	6,452	8,413	9,334
1977	10,203	17,830	6,776	8,252	10,073
1978	12,610	19,712	6,285	8,768	10,449
1979	18,219	18,120	6,581	9,015	10,627
1980	19,763	18,421	7,851	9,642	10,703
1981	18,072	21,601	8,405	10,328	11,974
1982	11,380	25,391	10,744	10,895	11,803
1983	12,423	30,179	10,310	14,002	13,383
1984	10,289	30,043	10,910	15,719	13,392
1985	12,760	34,156	10,630	17,245	14,958
1986	14,341	37,123	10,916	18,355	16,147
1987	13,614	38,489	8,996	19,600	16,140
1988	16,077	35,391	8,681	20,551	16,140
1989	17,664	31,973	10,985	20,382	16,201
1990	23,995	30,674	10,849	20,234	17,135
1991	27,645	28,248	8,025	21,058	16,995

* Related Products and Services = Sales of electronics, software, and ground equipment in support of aerospace products, plus sales by aerospace manufacturing establishments of systems and equipment which are generally derived from the industry's aerospace technological expertise in design, materials, and processes, but which are intended for applications other than flight.

Source: Aerospace Industries Association.

TABLE 4: AEROSPACE INDUSTRY INTERNATIONAL TRADE, 1970-1991
(\$ millions 1982-84)

Year	<u>Civil Transports</u>		<u>Other Civil*</u>		<u>Military</u>		<u>Total</u>		<u>Aerospace Share of all Exports of U.S. Merchandise</u>
	<u>Imports</u>	<u>Exports</u>	<u>Imports</u>	<u>Exports</u>	<u>Imports</u>	<u>Exports</u>	<u>Imports</u>	<u>Exports</u>	
1970		3,307		3,178		2,291	794	8,776	7.9%
1971		3,869		3,736		2,773	921	10,378	9.5%
1972		2,677		4,390		2,012	1,352	9,079	7.6%
1973		3,748		4,784		3,050	1,761	11,581	7.2%
1974		5,385		5,310		3,696	1,511	14,391	7.1%
1975		4,455		5,441		4,587	1,388	14,483	7.2%
1976		4,337		5,640		3,807	1,012	13,784	6.7%
1977		3,195		5,137		4,178	1,206	12,510	6.2%
1978		3,923		5,307		6,109	1,446	15,339	6.9%
1979		6,884		6,576		2,720	2,237	16,180	6.3%
1980		8,164		7,914		2,740	4,313	18,818	6.9%
1981	216	7,899	4,085	6,746	651	4,755	4,950	19,409	7.4%
1982	239	3,973	3,776	5,983	717	6,212	4,734	16,169	7.2%
1983	189	4,702	2,750	5,936	521	5,492	3,460	16,130	7.8%
1984	260	3,075	3,385	6,221	1,096	5,149	4,741	14,445	6.7%
1985	557	5,128	4,075	6,900	1,067	5,375	5,699	17,402	8.6%
1986	677	5,726	5,161	7,824	1,372	4,448	7,210	18,000	8.7%
1987	485	5,614	5,157	8,267	1,317	5,910	6,959	19,789	8.8%
1988	951	7,410	5,477	9,748	1,254	5,622	7,681	22,779	8.4%
1989	1,034	9,930	4,773	10,731	2,281	5,235	8,087	25,896	8.8%
1990	564	12,770	5,749	11,344	2,716	5,789	9,029	29,903	9.9%
1991	943	15,331	5,861	10,769	2,742	6,049	9,547	32,150	10.4%

Note: Detailed imports only available for these categories after 1980.

* Other Civil = General aviation, helicopters, engines, spacecraft, used aircraft, gliders, airships, and parts.

Sources: Aerospace Industries Association; U.S. Bureau of the Census, "U.S. Imports for Consumption and General Imports, TSUSA Commodity and Country of Origin;" International Trade Administration.

**TABLE 5: AVERAGE HOURLY EARNINGS,
AEROSPACE PRODUCTION WORKERS, 1970-1991
(\$ 1982-84)**

<u>Year</u>	<u>Aircraft</u> (sic 372)	<u>Missiles and Space</u> (sic 376)	<u>Manufacturing</u>
1970	10.59		8.63
1971	10.74		8.81
1972	11.24	11.36	9.14
1973	11.28	11.31	9.21
1974	10.99	11.12	8.97
1975	11.15	11.19	8.98
1976	11.32	11.39	9.17
1977	11.42	11.62	9.37
1978	11.56	11.60	9.46
1979	11.38	11.36	9.23
1980	11.26	11.19	8.82
1981	11.34	11.07	8.79
1982	11.64	11.35	8.80
1983	11.87	11.64	8.87
1984	11.99	11.47	8.85
1985	11.87	11.42	8.87
1986	11.92	11.25	8.88
1987	11.87	11.27	8.72
1988	11.66	11.29	8.61
1989	11.65	11.27	8.45
1990	11.55	11.23	8.29
1991	11.62	11.08	8.21

Note: Includes overtime premiums; SIC 372 and SIC376 earnings also include lump sum payments.

Sources: U.S.B.L.S., "Employment and Earnings" and Aerospace Industries Association Estimates.

Table 6: Wage and Bonus Settlements at Selected Aerospace Companies and General Motors in the 1980s*

Bargaining Round	BOEING IAM	LOCKHEED IAM	MCDONNELL DOUGLAS IAM	ROCKWELL UAW	ROHR IAM	GENERAL MOTORS UAW (most recent)
1980-1981	first year increase 7% gwi second year increase 3% gwi third year increase 3% gwi	7% gwi 3% gwi 3% gwi	7% gwi 3% gwi 3% gwi	7% gwi 3% gwi 3% gwi	7% gwi 4% gwi 3% gwi	3% + 24¢ gwi 3% gwi 3% gwi
1983-1984	first year increase 3% lsb ¹ second year increase 3% lsb third year increase 3% lsb	3% lsb 3% lsb 3% gwi	3% lsb 3% lsb 3% lsb	3% lsb 3% lsb 3% gwi	3% lsb 3% lsb 3% lsb	profit sharing: 10% of pre-tax profits in excess of sum of 10% of net worth & 5% of other assets
1986-1987	first year increase 12% lsb second year increase 5% lsb third year increase 5% lsb	12% lsb 5% lsb 5% lsb	3% gwi + 3% lsb 2% gwi + 2% lsb 4% lsb	3% gwi + 2% lsb 6% lsb 5% lsb	10% lsb 6% lsb 6% lsb	9¢- 50¢ gwi + \$180 2.25% lsb 2.25% lsb profit sharing cont.
1989-1990	first year increase 4% gwi + 10% lsb second year increase 3% gwi + 5% lsb third year increase 3% gwi + 4% lsb	4% gwi ² 3% gwi + 4% lsb 3% gwi + 4% lsb	5.5% gwi + 4% lsb 3% gwi + 4% lsb 3% gwi + 4% lsb	4% gwi 3% gwi + 2% lsb 6% lsb	3% gwi 4% gwi + \$1200 4% gwi + \$1700	3% gwi 3% lsb 3% lsb profit sharing cont.

Source: U.S. Department of Labor, *Current Wage Developments*, various issues.

lsb = lump sum bonus payment as percentage of previous year's earnings

gwi = increase in hourly base wage (general wage increase)

* Boeing negotiates a corporate-wide agreement with the IAM. Lockheed signs separate agreements with the IAM at its three main plants, but negotiates with them on wages and benefits as a group. McDonnell Douglas negotiates with its plants separately; the settlement with the IAM-represented Torrance-Huntington Beach plant is reported, although until 1986 the settlements at the other McDonnell Douglas plants were usually similar. The Rockwell Aerospace Group agreement with the UAW is reported, as is the agreement between Rohr and the IAM for the company's two plants in Southern California.

¹ Workers in the top labor grades did receive some wage increases.

² Workers in the bottom third labor grades received no wage increases and lump sums of 4%, 7% and 7% in the first, second, and third years, respectively.

**TABLE 7: AEROSPACE INDUSTRY STRIKES
INVOLVING 1,000 OR MORE WORKERS, 1982-1991**

<u>Year</u>	<u># of Strikes</u>	<u># of Workers Involved</u>	<u>Work-Days Idle</u>	<u>Bargaining Units</u>
1982	4	11,900	45,200	Avco - UAW General Electric - UAW Goodyear Aerospace - UAW Textron - UAW
1983	2	8,700	369,200	McDonnell-Douglas - UAW
1984	4	14,600	188,200	Beech Aircraft - IAM General Dynamics - IAM McDonnell-Douglas - UAW
1985	4	19,700	289,800	General Dynamics - IAM General Electric - UAW, IAM Textron - UAW, IAM United Technologies - IAM
1986	--	--	--	
1987	--	--	--	
1988	3	10,600	415,800	General Electric - UAW, IAM Loral - UAW Textron - UAW
1989	2	58,500	1,848,000	Boeing - IAM Textron - IAM
1990	1	2,300	56,700	Lockheed Service - IAM
1991	1	1,500	--	Textron - UAW

Source: U.S.B.L.S., "Current Wage Developments" (Workers involved and work-days idle tabulated by Aerospace Industries Association).

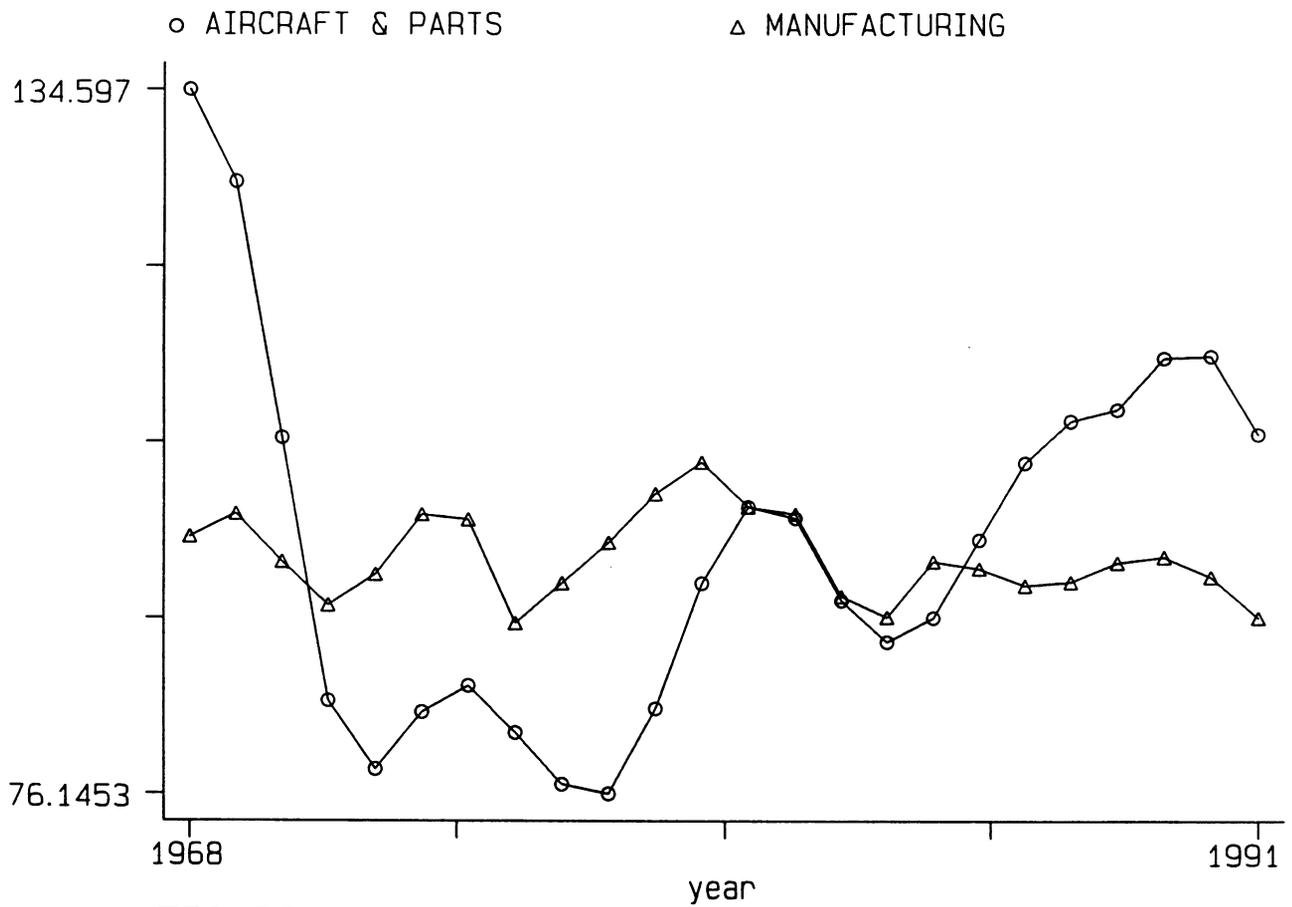


FIGURE 1: EMPLOYMENT INDEXES, 1980 = 100

FIGURE 2: WORLD MARKET SHARE OF LARGE COMMERCIAL TRANSPORT AIRPLANES, 1970-91

