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Corporate Governance Versus Economic Governance:
Banks and Industrial Restructuring in the U.S. and
Germany

Sigurt Vitols

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Sigurt Vitols

Corporate Governance Versus Economic Governance: Banks and Industrial Restructuring in the U.S. and Germany

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Abstract

This paper critically examines the debate on corporate governance and the claim (often made in Anglo-American companies) that the close links between German banks and industry are primarily responsible for the longer-term investment strategies and greater quality competitiveness of German manufacturing. Instead, it is argued here that manufacturing investment and bank behavior must be examined within a broader system of economic governance. In particular the regulation of labor markets is a key factor influencing company choices between price and quality-competitive strategies.

The corporatist regulation of German labor markets has encouraged quality-competitive strategies by keeping labor costs "out of competition" to a greater extent than in the US, where a collapse in pattern bargaining in core manufacturing industries and the strategic use of bankruptcy was motivated by companies' attempts to gain a comparative price advantage on the basis of lower labor costs. This argument is supported through a case study of the restructuring of the steel industry in Germany and the US in the 1980s.

Zusammenfassung

Gegenstand dieses Discussion Papers ist eine Untersuchung der These, daß die langfristig angelegten Investitionsstrategien und die hohe Wettbewerbsfähigkeit der deutschen Industrie primär den engen Beziehungen der deutschen Universalbanken zu Industrieunternehmen (Stichwort: Corporate Governance) zuzuschreiben sind. Im Gegensatz dazu wird hier die These vertreten, daß Investitionen und das Verhalten der Banken wesentlich von einem breiteren institutionellen Umfeld (Stichwort: "Economic Governance System") abhängen. Vor allem ist die Regulierung des Arbeitsmarkts ein entscheidender Einfluß auf die Entscheidung in Unternehmen, ob die Produktionsstrategie auf niedrigen Kosten oder auf hoher Produktqualität basieren soll.

Die korporatistische Regulierung des Arbeitsmarkts in Deutschland und die dadurch relativ geringe Möglichkeit, durch Lohnsenkungen Kostenvorteile gegenüber Konkurrenten zu erzielen, hat stark zu einer Qualitätsstrategie beigetragen. Im Gegensatz dazu haben in den USA große Industrieunternehmen Anfang der achtziger Jahre ihre auf freiwilliger Basis koordinierten Lohnverhandlungen aufgegeben und zum Teil Insolvenzverfahren eingeleitet, um Kostenvorteile zu erreichen. Dieses Argument wird durch eine vergleichende Fallstudie der Umstrukturierung in der us-amerikanischen und deutschen Stahlindustrie in den achtziger Jahren unterstützt.

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0. Introduction¹

In the US, increasing concern about chronic massive trade deficits and a shortage of high-wage secure employment has initiated an extensive policy debate on the causes of the decline in manufacturing competitiveness.² One problem universally identified in the plethora of studies produced in recent years is deficient investment in skills and new technology relative to successful exporters such as Germany and Japan. One overall measure of national investment, the rate of fixed capital formation as a proportion of gross domestic product, shows that the US is in the same league as the UK but lags considerably behind Japan and Germany (Table 1). While investment in skills is more difficult to quantify, informed estimates suggest that company expenditures on training in Germany and Japan exceed US company expenditures by a large multiple, particularly for manual workers (Dertouzos 1989; Competitiveness Policy Council 1993).

In these studies one of the areas most critically scrutinized is the financial system and its role in providing finance for manufacturing investment. Particular attention is given to the distinction between US commercial banks, which allegedly maintain an "arms' length" relationship with the companies they lend to, and banks in successful exporting countries such as Germany and Japan, which own shares in and play an active role in the corporate governance of their corporate customers. In contrast with "bank-based" financial systems in the latter two countries, the US financial system is becoming increasingly dominated by institutional investors such as mutual funds and pension funds (Frankel and Montgomery 1991); these investors have a speculative orientation towards investing and thus exert pressure on non-financial companies to forgo investments which may be profitable in the long run but do not generate an immediate return. Based on these studies, many are calling for financial system reform in the US to emulate the virtuous features of bank-based financial

¹ This is a revised version of a paper presented at the Annual Meeting of the American Political Science Association Convention in Chicago, 31 August-3 September 1995. Special thanks to the discussants, Christopher Allen and Richard Locke, for useful comments on the earlier version of the paper.

² The balance of trade deficit, which increased greatly in the early 1980s, has shown only moderate improvements despite a decrease in the value of the dollar since 1987 and some improvements in the international trade regime. Relative wages and job security for manual workers in the manufacturing sector, one of the major providers of "good jobs" for less skilled males, have deteriorated since the early 1970s (Burtless 1990, particularly the Blackburn et al article).

TABLE 1:
Economic and Financial Performance Indicators, 1980-92

		UK	US	Germany	Japan
Growth in GDP/Capita	Annual Av.	1.8%	1.4%	1.9%	3.3%
Rate of Fixed Capital Formation/GDP	Annual Av.	5.7%	5.5%	8.2%	16.2%
Exports/GDP	Annual Av.	25.6%	9.1%	30.8%	12.1%
Balance of Trade/GDP	Annual Av.	-0.6%	-1.7%	1.9%	4.2%

Source: Own calculations from OECD Historical Statistics and National Accounts, 1960-1992.

systems, particularly of the German universal bank system (Jacobs 1991; Porter 1992; Calomiris 1993; Benston 1994).³

The most extensive theoretical framework for analyzing the relationship between models of financial system organization and outcomes in the "real" economy is provided by the new institutional economics (NIE). Based on theoretical advances in the economics of information, recent work within NIE has argued that banks can play a special role in **corporate governance** in monitoring investments and leading corporate reorganizations. NIE distinguishes between two models of bank organization; while commercial banks lend money to but play no active role in the corporate governance of non-financial companies, universal banks supplement their lending activity with shareholdings and frequently also nominate representatives to the boards of directors of their corporate customers. NIE asserts that universal banks are better able to deal with the information and incentive problems involved in the provision of debt finance than commercial banks, particularly the risk of default due to moral hazard; the apparently larger debt-to-equity ratios of the non-financial corporate sector in Germany and Japan than in the US and UK are taken as evidence that banks in the first two countries are willing to provide more debt than in the latter two countries. Insofar as people within the NIE perspective have addressed the problem of financial reform, they have suggested that further deregulation of the US financial system is desirable, particularly the removal of the Glass-Steagall Act which constrains commercial banks from holding shares in and nominating representatives to the boards of non-financial corporations. This is consistent with the general thrust of NIE, which focuses on relationships between economic actors on the micro level and emphasizes the desirability of allowing these actors maximum freedom in economic contracting.

This paper suggests that an **economic governance** perspective provides a more fruitful framework than the NIE's corporate governance perspective for understanding the problem of default risk, investment levels, and the role of banks in industrial restructuring. In contrast with the corporate governance perspective, the economic governance perspective focuses on the macro and meso levels rather than on the micro level. In this paper, the economic governance perspective is used to show that default risk and the capacity to finance investments are more dependent upon the characteristics of the governance regimes that companies are in than upon the micro relationships between creditors and debtors; the degree of price competition and

³ The financial system has also come under criticism for fueling a speculative boom in the 1980s, the bursting of which precipitated a credit crunch in the early 1990s. While most advanced industrialized countries (with the notable exception of Germany) also had significant problems with the accumulation of non-performing investments and insolvent financial institutions in the 1980s, the US was distinguished by the breadth (almost every credit market segment was affected) as well as the depth of the problem (almost half the value of one sector, the savings & loans, was wiped out) (Federal Reserve Bank of New York 1993).

cooperation between firms in a sector influence profit margins (which in turn influence the level of default risk and capacity to finance investment) and the degree to which companies can specialize in different market niches based on high quality production. This paper focuses in particular on the role of the state's regulation of labor and the degree to which wages are "taken out of competition" in influencing product market strategy (price-competitive versus high quality specialized production) in mass production industries under conditions of a slowdown of growth and excess capacity.

The first section reviews the NIE perspective on corporate governance and points out a number of important deficiencies in this perspective. The second section outlines the economic governance perspective and the problem of transition from mass production to higher quality, small batch size/customized production (or DQP -- diversified quality production). The differential effect of two ideal types of labor regulation -- a "public" order in which parameters in the hiring, firing, use, and remuneration of labor are largely outside the discretion of the individual employer, and a "private" order under which they are under the individual employer's discretion -- are analyzed in terms of their ability to support this transition. The third section analyzes the regulation of labor in Germany and the US and shows that the two countries approach the "public order" versus "private order" ideal types, respectively.

The fourth section examines the role of banks in the restructuring of the steel industry in the two countries as a "test case" of the economic governance perspective; while banks have much closer ties with steel companies in Germany than in the US, the more successful restructuring of the German steel industry is attributable to the role of the state in labor market regulation than to the role of the banks. The US steel industry since the early 1980s has been dominated by price-competitive strategies based on bringing labor costs into competition through concession bargaining and, in some cases, through Chapter 11 proceedings; these strategies have been enabled through the "private" nature of labor regulation. The resulting low profit margins, low degree of specialization, and overcapacity have constrained cash flow and the investment needed for transition from mass to higher-quality production strategies. In Germany, in contrast, the public ordering of the capital-labor relation has constrained steel companies from pursuing price-competitive strategies on the basis of lower labor costs, encouraging cooperation in the reduction of capacity, investment, and specialization in high quality production niches.

The implication of this analysis is that the emphasis of the corporate governance debate on financial system reform (in particular on deregulation and the removal of the Glass-Steagall Act) in order to encourage manufacturing investment and modernization in the US is misguided. A more fruitful way to encourage this modernization would be to start with labor market reform in

order to limit the capacity of employers to pursue price-competitive strategies based on reducing labor costs.

1. The New Institutional Economics and Industrial Finance

One major body of literature which addresses the problem of financial organization behavior and industrial finance is the new institutional economics (NIE). While NIE has a number of important variants,⁴ the common core of NIE is a critique of the neoclassical theory of the firm as a profit-maximizing production function (Williamson 1988). In contrast with neoclassical financial economics which treats financial structure as independent of real investment, employment and production decisions, NIE seeks to integrate the analysis of financial structure with a more general theory of the firm. The main results of NIE are to highlight the importance of incentive and information problems in financial contracting and to stress the special role that banks play in the financial system.

The core behavioral assumptions of NIE are bounded rationality and opportunism. Bounded rationality is behavior which is "*intendedly* rational, but only *limitedly* so"; the consequence of bounded rationality is incomplete contracting, since it is impossible to specify each party's obligations and payoffs in every conceivable future state of nature. Opportunism is "self-interest seeking with guile"; the consequence of opportunism is greater contractual hazard, since one party to the contract may attempt to maximize his or her utility to the detriment of others. "These two behavioral assumptions support the following compact statement of the purposes of economic organization: craft governance structures that economize on bounded rationality while simultaneously safeguarding the transactions in question against the hazards of opportunism" (Williamson 1988: 569).

For the transaction cost economics (TCE) variant of NIE, the fundamental question is why some transactions are carried out through the market while others are performed within the firm. Transactions are costly due to the need to craft and operate governance structures, but the cost of different types of transitions vary with the nature of these transactions and with the type of governance structure they are embedded in. In some cases markets involve result in lower transaction costs; in other cases they are lower within a hierarchical governance structure (the firm). TCE stresses the problem of moral hazard in the case of asset-specific investments; the party making the

⁴ Williamson (1988) distinguishes between transaction cost economics and the property rights approach. Berglöf (1991) further breaks down the latter into traditional property rights theory, agency theory, and the new property rights approach.

investment suffers more from the premature termination of the relationship and is thus vulnerable to demands for ex-post re-negotiation of contracts (Coase 1988; Williamson 1975, 1985).

For the other major branch of NIE, the property rights approach, the major concern is the implication of the separation of ownership and control in the public firm (Berle and Means 1932; Fama and Jensen 1983). The growth of the modern firm involves the creation of two separate groups, owners and managers. The owners ("principals") hire managers ("agents") to manage a bundle of assets ("the firm") for them (Jensen and Meckling 1976). These two groups have interests which to some degree conflict; owners are interested in the maximization of the value of their shares, while managers tend to be more interested in the private consumption of firm resources and the growth of the firm ("empire building"). Corporate governance involves the writing of contracts and development of mechanisms to deal with this conflict.

For NIE, the seminal contribution in the area of financial contracting is the treatment of the problem of credit rationing by Stiglitz and Weiss, who provide the "first theoretical justification for true credit rationing" (1981: 394).⁵ Bank income on lending is dependent upon two factors, the interest rate charged and the probability of default. Under perfect information, banks would be able to assess the probability of default and would take this into account in their lending decisions; adjusting the interest rate would bring the supply of and demand for credit into equilibrium. However, banks can only imperfectly assess the riskiness of lending and use a number of screening devices for choosing lenders, including the interest rate. The interest rate, however, may itself affect the average riskiness of credit applications; prospective debtors with low-risk projects will drop out of the applicant pool as the interest rate goes up, while prospective debtors with high-risk (but potentially high-return) projects will stay in the pool, increasing the riskiness of the average investment. Secondly, high interest rates may themselves affect the behavior of debtors by increasing the probability of default due to higher interest payments; as debtors approach insolvency, they have an incentive to take gambles to stay in business. Therefore, in the Stiglitz and Weiss model, "there is no presumption that the market equilibrium allocates credit to those for whom the expected return on their investments is highest" (1981: 407); the interest rate generally will not bring the supply of and demand for credit into equilibrium.

⁵ For two decades financial economics had been based on the Modigliani-Miller theorem, which stated that, given certain conditions, the choice between different financial instruments (internal, debt, and equity finance) was inconsequential for real decisions within the firm (Modigliani and Miller 1958). Financial structure could thus be studied separately from other aspects of the firm. Explanations for variations in capital structure were sought primarily in the uneven impact of taxation or the costs of bankruptcy on different forms of financing. For a survey of the banking literature within this framework see Santomero (1984).

For NIE, incomplete contracting creates two additional problems leading to a potential suboptimal allocation of finance. One problem is the conflict of interest between shareholders and creditors. If the company experiences financial distress and the value of equity approaches zero, shareholders will have little to lose and will prefer risky investments in the hope that a gamble will pay off and the value of the firm will increase; they may also attempt to liquidate firm assets and receive the payoff in the form of dividends. Creditors in contrast will have an interest in conservative investment policies which preserve the value of the assets of the firm and the repayment of debt (Berglöf 1990). A final problem is caused when shareholders are widely dispersed. Greater dispersion increases the probability of divergent interests among shareholders and raises the costs of collective action (Alchian 1984; Alchian and Demsetz 1972). This problem is especially great when the firm experiences financial distress; the costs of collective action may be so high that shareholders have an incentive to "exit" by offloading their shares rather than exercising "voice" in restructuring the firm (Franks and Mayer 1985; Jacobs 1991).

While these three problems (the "credit rationing" problem, owner-creditor-manager conflicts, and the dispersed shareholder problem) may lead to a suboptimal allocation of finance, mechanisms which mitigate these conflicts may be constructed under certain circumstances. Information flows to investors may be improved by creating a board of directors and including investors on the board, enabling investors to judge more accurately the risks of investment projects; inclusion of shareholder representatives on company boards can also help owners more carefully monitor managers. Conflicts between investor groups may be mitigated by allowing investors to hold both debt and equity. Finally, the costs of collective action may be lowered by designating a "lead" shareholder to develop policy and guide restructuring (Cable 1985; Berglöf 1991; Kester 1993).

The US financial regulatory system has been criticized by NIE for restricting or prohibiting all of these types of contracting arrangements. Commercial banks are prohibited from nominating representatives to company boards, constraining the flow of information from management to banks. Banks are also prohibited from taking equity stakes in the companies that they lend to, thus ruling out one mechanism which could prevent a creditor-shareholder conflict. Finally, collective action among shareholders is made more difficult by securities and tax laws which remove tax preferences for active shareholders and impose high costs on communication and coordination. The NIE approach suggests that a deregulation of the US banking system is desirable in order to improve the efficiency of financial contracting (Benston 1994; Roe 1990, 1991, 1993; Porter 1992; Calomiris 1993).⁶

⁶ A typical statement of this position is as follows: "strict regulation has prevented banks from effectively exercising control in non-financial corporations, affecting their willingness to extend credit" (Berglöf 1991: 108). Geographical restrictions on bank branching have

Recent work within the NIE perspective view has drawn on evidence from other countries in support of its position. Cross-national comparisons of debt to equity ratios for the non-financial corporate sector show that these ratios are higher in Germany and Japan (where banks hold shares in non-financial companies and dominate their respective financial systems) than in the US and UK (where banks are relatively more important in terms of total assets and in ownership); NIE interprets this as evidence that banks are comfortable with higher levels of debt when they also hold shares (Berglöf 1991). Studies on Germany show that shareholding and board representation increases the profitability of and reduces the credit constraints faced by non-financial companies (Cable 1985; Elston 1984; Audretsch and Elston 1994; Chirinko and Elston 1995). Also backing up the thesis of short-termism are a number of studies which show that investment in the 1980s is becoming increasingly sensitive to short-term interest rates and less sensitive to long-term interest rates (Bennett 1990; Bosworth 1989; Friedman 1989; Mauskopf 1990; Mosser 1992).

Closer examination of the four most important financial system, however, the NIE view runs into a number of problems. A number of careful studies have shown that cross-national differences in debt to equity ratios are largely a result of accounting conventions. German accounting law uses a narrower definition of capital which excludes 50% of special reserves, subscribed capital unpaid, own shares held and goodwill. Companies are allowed great freedom to revalue their assets from historical to current value.⁷ In Japan, non-financial companies also have greater flexibility in recognizing the value of assets. When adjustment is made for these accounting differences, the apparently large cross-national differences become smaller or disappear (Deutsche Bundesbank 1994; Perlitz et al 1985; Macharzina and Langer 1991; Nobes and Parker 1991). Crossnational differences in finance also appear to narrow when examining the flow rather than the stock of funds. In all countries most finance is internally generated; in the UK, US and Germany, bank loans appear to account for about the same proportion of net finance (Mayer and Alexander 1990; Edwards and Fischer 1994; Corbett 1994).⁸

also come under fire for constraining the growth of banks (Roe 1991). Even the largest US banks lack the financial capacity needed to make substantial equity investments in large industrial companies; in the late 1980s, only one US bank, Citibank, was among the world's largest forty banks. Japan accounted for twenty-three of these banks, Germany for five, France for four, the UK for three, Switzerland for two, and Italy and Hong Kong each for one (American Banker 1989).

⁷ An excellent illustration of this is when Daimler-Benz was forced to adopt US accounting conventions in order to be listed on the New York Stock Exchange and declared billions of dollars in so-called "hidden reserves".

⁸ Bank loans in Japan throughout the 1970s and 1980s accounted for a greater proportion of net funds in the UK, US, and Germany. This, however, appears to be the result of more rapid growth in Japan; as growth is slowing in the 1990s, the dependence of Japanese companies on bank loans relative to internally-generated funds is decreasing.

A second anomaly for NIE can be seen when breaking down non-financial companies by size. German banks rarely hold shares in or nominate directors of the SMEs they lend to; NIE would thus predict that banks would be more reluctant to provide debt to SMEs. However, German SMEs in fact have both higher debt-to-equity ratios and higher proportions of long-term debt than large companies (Deutsche Bundesbank 1992).⁹

NIE also runs into difficulties when trying to explaining the British case. Britain lacks the formal relational contracting restrictions that the US has in acquiring equity stakes, nominating directors and playing an active role in corporate governance. However, the British clearing banks have exploited this opportunity only to a limited extent and generally limit their financial activity to the granting of shorter term credits (Scott and Griff 1985).

Finally, there is a considerable body of evidence that the problem in the US is not that companies have too little access to external finance but on the contrary too liberal access (particularly in the 1980s). Financial organizations in the US were too willing to invest in companies beyond "prudent" levels either through the voluntary extension of debt or through financing hostile takeovers; as a result the level of debt of non-financial corporations rose considerably in the 1980s, in the case of individual companies to as high as 90% of the capital structure. One of the consequences of high debt are periodic "credit crunches", which occur when banks reduce their lending sharply because of an accumulation of non-performing investments. Another consequence is that company investment and solvency is more vulnerable to business slowdowns, since high debt repayment obligations place high demands on internally generated funds (Bernanke and Campbell 1988; Bernanke et al 1990; Warshawski 1991).¹⁰

⁹ Large German companies are also becoming less dependent upon external finance because of the build-up of own pension reserves which can be considered the "worker's share" in companies; while US and UK legislation strictly separates pension from company assets, German companies are able to reinvest pension provisions within the firm.

¹⁰ On the basis of 1988 debt levels, Bernanke et al (1990) estimated that one quarter of all public firms would be insolvent if the 1974-75 recession would be repeated.

2. An Economic Governance Approach to Industrial Finance

2.1 Economic Governance Systems and Profitability

While the NIE approach stresses the features of the contracting relationship between actors ("corporate governance" in the financial context), the alternative approach advocated in this paper focuses on the institutional environment that constrains and coordinates economic action. In this alternative approach, economic action is a subset of social action and a governance system is the "...totality of institutional arrangements -- including rules and rule-making agents -- that regulate transactions inside and across the boundaries of an economic system" (Hollingsworth et al 1994b: 5). Using Durkheim's term, this economic governance structure constitutes the noncontractual elements of relationships between contracting parties. These institutional arrangements contribute to the solution of coordination problems such as the setting of prices and the compensation of labor.

The analysis of governance systems at the macroeconomic or at the sectoral levels involves the examination of the major structural features of these institutions and of the roles they play. In terms of structural forms of institutions, markets and hierarchies are the two forms most extensively analyzed by economists; in markets activity is coordinated by price, while in hierarchies activity is coordinated by command (Williamson 1975; 1985). However, these forms of coordination are most suited to sequential input-output relationships; Hollingsworth et al (1994b: 5-8) drawing on earlier work by Hollingsworth and Lindberg (1985) and Schmitter and Streeck (1985) analyze the state, informal networks, and associations as mechanisms which are more suitable for other types of coordination.

In terms of approaching the problem of industrial finance, the alternative approach developed here focuses on the macro and meso determinants of default risk. This alternative perspective claims that the NIE approach overemphasizes the problem of moral hazard in driving default risk as well as the capacity of bank shareholding and board representation to reduce this risk. In the alternative conception developed here, the key determinant of default risk is the profitability of the firm, i.e. of its capacity to pay back debt after normal operating expenses are paid out of current income. The profitability of the firm also determines its capacity to invest, i.e. to retain income within the firm (rather than paying it out as dividends) and use it for enhancing the future productive capacity of the firm. Thus the profitability of the firm is a prior variable influencing the capacity of the firm to both invest and repay debt (thus influencing default risk).

The profitability of the firm is the operating revenues of the firm (prices times output) minus the operating costs of the firm (labor costs, materials & components costs, depreciation, and rent). The profitability of the firm is to a large extent determined by the characteristics of the sector a company is in and the relative position of the company within this sector. Prices and costs are to a large extent determined by the economic governance structure of the sector (e.g. the degree of competition versus cooperation, division of market share, etc.). This economic governance perspective thus shifts the emphasis of the analysis of risk away from information problems and fraud emphasized by NIE to industrial organization and industrial policy concerns. Especially in the case of large companies, it is generally relatively easy for banks -- whether or not they hold shares or have board representation -- to determine the position and condition of individual companies, the competency of management, and the technological feasibility of most investment projects.¹¹

In terms of the roles that institutions play, a minimum list includes the structuring of relationships: (1) between firms in the sector, (2) between the firm and labor, (3) between the firm and suppliers, (3) between the firm and financial organizations, and (4) between the firm and the real estate markets (see Table 2). These in turn are key determinants of the operating revenues of the firm (prices and output) and of the costs of factors of production: labor, materials & components, capital, and land and in turn of the profitability of the firm.

¹¹ Interviews with bank lending officers in the US and Germany indicate that, given a minimum level of confidence in the competency and trustworthiness of management, the most important factor in the banks' lending decision is the sector a company is in. Confidence in management is usually established by checking the background and qualifications of management and credit repayment history of the company and, in the case of small companies, secured by taking the owners' house as collateral. The future growth potential of the sector is taken to be the main determinant of the firms' profitability, growth and survival chances. Finally, key financial ratios of the company are compared with the sector average to see if there are any substantial deviations from sectoral norms.

Table 2:
Economic Governance Determinants of Profitability

Determinants of Profitability	Factor	Institutional Mediation between:
Operating Revenue	Prices & Output	Firms in sector
Costs of Factors of Production	Labor	Firm and labor
	Raw Materials & Components	Firm and suppliers
	Capital	Firm and financial institutions
	Land	Firm and Real Estate Market

Table 3:
Nature of Costs of Factors of Production

Factor of Production	Costs With Respect to Output
Labor	Variable
Materials & Supplies	Variable
Capital	Fixed
Land	Fixed

2.2 Excess Competition in Mass-Production Industries

The model presented here focuses on the problem of excess competition in industries dominated by the mass production of standardized goods, the development of oligopolistic practices in an effort to control these problems, and the problem of transition to diversified quality production in the context of a shift from a high growth to a stagnant or declining growth regime.

The introduction of Taylorist principles allowed for the achievement of economies of scale in the mass production of standardized goods. This involved a shift in investment from human capital to physical capital. Large investments in plant and equipment were necessary to increase productivity to capture economies of scale.

Large capital expenditures however involve an increase in the proportion of fixed costs in total costs, i.e. costs which are inelastic with the level of output. This results in profit levels which are highly sensitive to the level of output; relatively little fluctuation in capacity utilization can result in great fluctuations in the level of profitability. As a result, during recessions there is a great temptation on the part of individual producers to cut prices in order to try to increase market share and spread fixed costs over a greater output. This strategy is especially tempting in mass production industries, since consumers are relatively indifferent with regard to which producer they purchase from.

The problem of excess competition arises if this strategy is carried out by a sufficient proportion of producers. The general price and profit levels in the industry will fall without any major expansion in the output of the sector, and the division of market share between companies will change relatively little. Capacity to invest and to repay debt will generally decrease (and thus default risk will increase) under this situation of excess competition.

The presence of great economies of scale, however, leads to the dominance of many of these mass production industries by a small number of relatively large firms. The small number of these firms decreases the difficulties in coordination between these firms in agreeing to avoid practices which lead to excess competition. Thus the history of the rise of mass production industry is replete with attempts to create oligopolistic governance structures which reduce overall output rather than price during recessions and thus reduce the sensitivity of profit levels to output levels. These involve implicit or explicit agreements on pricing and may extend to investment and remuneration of factors of production (particularly of labor). Pricing and output may take the form of explicit cartel agreements; alternately, a "price leader" may set prices which are adopted by other producers, and given a common price level, market share will generally remain stable with changes in output levels.

In the absence of legally-backed pricing and quota agreements, an important factor in the sustainability of oligopolies is the maintenance of relatively similar cost structures of the producers; producers who have significantly different cost structures and who feel they may benefit more from increasing market share through a price war (and possibly eliminating or forcing less efficient producers to sell out) will have a temptation to defect from oligopolistic arrangements. The greater the ability to reduce costs, the greater will be the temptation to defect.

The position of labor is special since wages are generally the component of variable costs over which employers have the greatest influence (see Table 3). Land and (to a great extent) capital costs are fixed with respect to output. The extent to which producers can reduce components and especially raw materials costs (the other main variable cost components) are also limited.

Producers who are able to substantially reduce wages relative to their competitors will have a substantial advantage in achieving price competitiveness. Producers with higher wage costs (e.g. because of incomplete unionization of a sector) or in favor of oligopolistic practices in general will have an interest in "taking wages out of competition" through wage uniformity throughout the sector, and may thus conditionally support strong unions who are able to impose uniform labor agreements throughout the sector.

2.3 The Low Profitability Trap and the Transition to DQP

During the 1970s many mass production sectors in the industrialized countries experienced a slowdown or even decline in the growth of demand for their products. The causes of this varied from sector to sector but generally include the following: (1) saturation in demand for standardized products, (2) reduction in "specific demand" (i.e. unit demand per unit of GDP) particularly for processed materials sectors like steel and chemicals, and (3) greater competition from countries with lower labor costs. Particularly during the severe recessions of the mid-1970s and early 1980s these industries experienced a sharp drop in demand, low capacity utilization rates (in some cases exacerbated by the expansion of capacity through capital expenditure programs with long lead times still based on assumptions of high growth), and decreasing or negative profit margins due to high fixed costs.

Two general responses at the sectoral level to this situation were possible. One was a breakdown of oligopolistic cooperation between companies, the outbreak of price wars, and a plunge into a low-profitability low-investment vicious circle. Firms trapped in a low profitability-low investment vicious circle are less able to generate internally the funds to pay off existing debt and make new investments needed; furthermore, the greater danger of default makes it

more difficult to raise externally new funds needed for investment to modernize production. The probability of this scenario occurring will be increased by the extent to an "uneven playing field" between companies in the same sector exists or may be created; this uneven playing field (caused by uneven labor, capital, or transportation costs) encourages price competitive strategies and discourages the cooperation needed to support quality-competitive strategies.

An alternative strategy involves a greater degree of cooperation between the companies and a shift to a high-investment, higher customization/quality strategy. Companies give up the strategy of being "universal" providers of a whole spectrum of standardized products in the industry; instead, there is a "division of labor" between companies, with each specializing in one or more product niches. A prerequisite of this, however, is the overcoming of the overcapacity/low profit/low investment vicious cycle, which is often set off by a deep recession. This typically requires a degree of cooperation between the companies in maintaining prices to support profitability and investment capacity, in sharing of capacity reductions and in moving to mutually exclusive areas of specialization in higher quality goods. The intervention of the state may be necessary to help overcome this trap.

The economic governance perspective focuses on the central role of the regulation of labor in influencing the choice between price competitive versus specialization strategies. The contrast is made between two different regimes: one in which the capital-labor relation is largely a "private" matter and one in which this is a "public" matter subject to the binding regulation of the state and, in crisis situations, the intervention of the state in order to protect the interests of labor. In the first, the hiring, firing, use, and remuneration of labor is largely a private matter, negotiable between management and the worker (as an individual or as part of the collective workforce of a company). In the second case, important aspects of the hiring, firing, use, and remuneration of labor are a matter of public regulation and are binding on capital and labor.

The existence of one labor regime or the other has important implications for the type of strategy likely to be chosen by capitalists. In the regime where the capital-labor relation is a "private" matter, the temptation for individual capitalists to "go it alone" and try to follow price competitive strategies is greater because of the greater possibility to force wage costs down relative to competitors, e.g. by forcing wage concessions in bankruptcy court. In a regime where these are a matter of public regulation, i.e. are not discretionary areas for capitalists, the possibility and thus temptation to "go it alone" is correspondingly greater.

3. Regulation of Labor in the US and Germany

Labor in Germany is subject to "public" regulation to a much larger extent than the largely "private" regime in the US. The result of this is a much greater degree of state support for keeping labor costs "out of competition" in Germany than in the US. While labor was taken "out of competition" in most core mass production industries in the US in the 1950s and 1960s through the establishment of pattern bargaining, the slowdown in economic growth after 1974 and especially in the twin recessions in the early 1980s led to a greater temptation to break from these pattern bargains to try to reduce labor costs, and pattern bargaining collapsed in almost all industries.

In Germany, one of the main mechanisms for keeping labor out of competition is industry-wide wage and working standards agreements. When employers accounting for at least 50% of the employees in an industry belong to an employers' association, collective bargaining agreements between the industrial union and employers' association may be declared legally binding by the Labor Ministry on all companies in the industry. An estimated 90% of all employees in industry are covered by such collective bargaining agreements (Müller-Jentsch 1986).

A second mechanism for keeping labor costs "out of competition" is the great degree to which "fringe benefits" are legally mandated and/or publicly financed. Health insurance co-financed by employer and employee is mandated, and contribution levels vary little between insurance companies due to legally mandated minimum benefits. Social security contributions are uniform across states, thus there is a constraint on regional competition on the basis of labor costs. State pensions are much more generous in the US; while there is variation in the level benefits provided by supplemental company pensions, these supplemental pensions are less important than in the US, thus their impact on variation in labor costs is less pronounced than in the US.

Finally, the state has intervened more frequently on an *ad hoc* basis in rescuing troubled firms in Germany than in the US. This is important because it limits the extent to which voluntary benefits above industry-wide and state-mandated minimum benefits are curtailed and the extent to which "industrial order" in an industry will be disrupted through bankruptcy. This intervention is typically pressured by labor and is justified in terms of reducing the impact of company/sector crises on labor.

In the US, in contrast, these dimensions are much more subject to the discretion of employers and employees (with or without union representation). Thus there is more scope for discretion with regard to labor costs. Collective bargaining agreements may not be declared legally binding on the whole industry, thus even in industries which are relatively highly organized (and with pattern bargains), there is the possibility for non-union employers to undercut

union employers by paying non-union wages or for union employers to negotiate on an individual basis with the union.

Similarly, the level of state-mandated benefits is low in the US. Health care is not mandated. State pensions are low in comparison to other advanced capitalist countries, thus reliance on supplemental company pensions is greater. Finally, there is great variation between states in contribution levels e.g. for unemployment compensation, encouraging regional competition on the basis of labor costs.

Finally, the state has been less willing to intervene in trying to help distressed companies than in Germany. This despite the efforts of unions (and many companies) to get state intervention to help solve sectoral crises in steel, autos and a number of other industries. The consequence is that these companies have often continued operation afterwards, and under Chapter 11 they have been able to reduce their labor costs considerably through reducing their pension obligations and/or getting judges to agree to reduce collectively-bargained wages. Another variant is that companies shut down plants, but then the plants are bought up and reopened by another company with an (at least partially) different workforce and thus not subject to the old collective bargaining agreement.

Thus there are much greater constraints on employers in Germany than in the US to pursue low-cost strategies through putting labor costs "in competition."

4. Steel Industry Restructuring in the US and Germany

This section presents a case study of the problem of industrial finance and the restructuring of a mass production industry. A close examination of the resolution of the steel crisis in the two countries since 1980 provides a good test of the utility of the economic governance perspective relative to the corporate governance perspective. Steel is one of the archetypal mass production industries with large economies of scale, huge investments and plant size, high fixed costs, and the extensive use of unskilled and semiskilled labor in mass production. Since the early 1980s recession, which dramatically signaled both a drop in demand for mass steels in the advanced industrialized countries and an increase in competition from developing countries, the mass production strategy in high wage countries has become increasingly unviable.

Both the corporate governance and economic governance perspectives would predict that the German steel industry would be more successful in restructuring. The corporate governance perspective would stress the contrast

between the close steel company-bank links in Germany and the "arms-length" relationship between steel companies, banks, and other investors in the US. The economic governance perspective, on the other hand, stresses the extent to which the regulation of labor is "publicly ordered", thus the extent to which labor costs are not at the discretion of individual steel producers and the temptation to defect from oligopolistic practices are minimized; in addition, the economic governance perspective emphasizes the role of the state in intervening to protect labor in the case of a deep sectoral crisis.

In fact the German steel industry has been more successful in maintaining profitability, investment levels, and creditworthiness and in making the transition to the production of high quality high value added steels; the US steel industry, in contrast, has been plagued by a drop in profitability, investment levels and creditworthiness, has suffered a loss in export competitiveness, and has been largely dependent upon Japanese investments for modernizing the industry, particularly in the further processing of sheet steels. It is argued here, however, that the crucial difference between the countries was not in the ability of German banks to restructure the companies individually but rather in the role of the state in supporting the sectoral governance structure which kept "wages out of competition" and stabilized product markets; this involved underwriting the costs of restructuring including workforce reduction, closure of excess capacity, and subsidies for the modernization of remaining capacity. In the US case in contrast the weakness of the state's support for the sectoral governance structure and its unwillingness to intervene during the crisis led to a collapse in this governance structure and into a situation of low profitability, low investment, high default risk.

4.1 Steel Industry Characteristics

The steel industry is the archetypal "heavy industry" characterized by great economies of scale, large investments in fixed capital involving large plants with large workforces, and a cyclical product market. There are major economies of scale involved in the production of steel (see Appendix 1). Integrated steel plants, which perform all steps in steelmaking from the processing of raw materials (iron ore, coke, limestone) to the production of finished steel goods (sheet, tube, profile forms, etc.), have reached a minimum efficient scale of over 1 million tons of steel production per year. The largest integrated plans have capacities of over 4 million tons per year.

The capital investments involved in steelmaking are huge; the minimum costs of setting up an efficient integrated plant (i.e. a plant capable of producing at least 1 million tons of steel a year) exceed \$1 billion.¹² The large

¹² An integrated plant with a capacity of 3 million tons/year planned but eventually abandoned by US Steel was projected to cost \$3.6 million in the late 1970s.

size of fixed capital involved creates a dependence upon external financing for growing companies, since the investment costs of setting up a new plant exceed the internal financing capacity of even the largest steel companies. Even the modernization of individual stages of the steelmaking process are large, in each case involving hundreds of millions of dollars, thus exceeding the internal financing capacity of all but the largest steel companies.

The large size of fixed capital in the steel industry results in high fixed costs due to high maintenance, depreciation, and financing costs. Due to the extreme conditions involved in steelmaking (high temperature, great weight and pressure), steel mills require major maintenance in order to maintain their productive capacity and efficiency. Depreciation generally follows accounting rules with limited flexibility regarding the number of years and rate at which capital expenditures may be recognized as operating costs on company balance sheets. External financing is often provided in the form of long-term fixed interest rate debt capital and thus also involves fixed annual or semiannual repayment obligations.

High fixed costs mean that profit levels are highly sensitive to the level of production. In the steel industry, fixed costs of production represent a large proportion of unit costs of production (which includes both fixed and variable costs). A decrease in production (and thus a decrease in the utilization rate of the full production capacity of steel plants), which means that total fixed costs must be spread over a smaller base of production, results in a significant increases in fixed costs per unit of production and thus in total unit costs. Relatively small fluctuations in the level of production around the "break even" can thus lead to dramatic fluctuations in the level of profitability of steel companies.

These characteristics of the steel industry (great economies of scale, large investments, fixed costs constituting a high proportion of unit production costs, and cyclical product markets) make the profitability and investment capacity of steel companies highly dependent upon the nature of industrial organization and sectoral governance. During downturns, individual companies have a strong temptation to cut prices in order to maintain sales volume (thus spreading fixed costs across a greater volume of production). If all companies pursue this strategy, however, the collective consequence is a glut of production and greater downward pressure on prices. The reduction in profitability affects investment by reducing the capacity to generate internally and attract externally the financing needed for these investments. This dynamic also puts great pressure on companies to reduce costs during downturns, particularly labor costs which are the most "variable" component of variable costs.

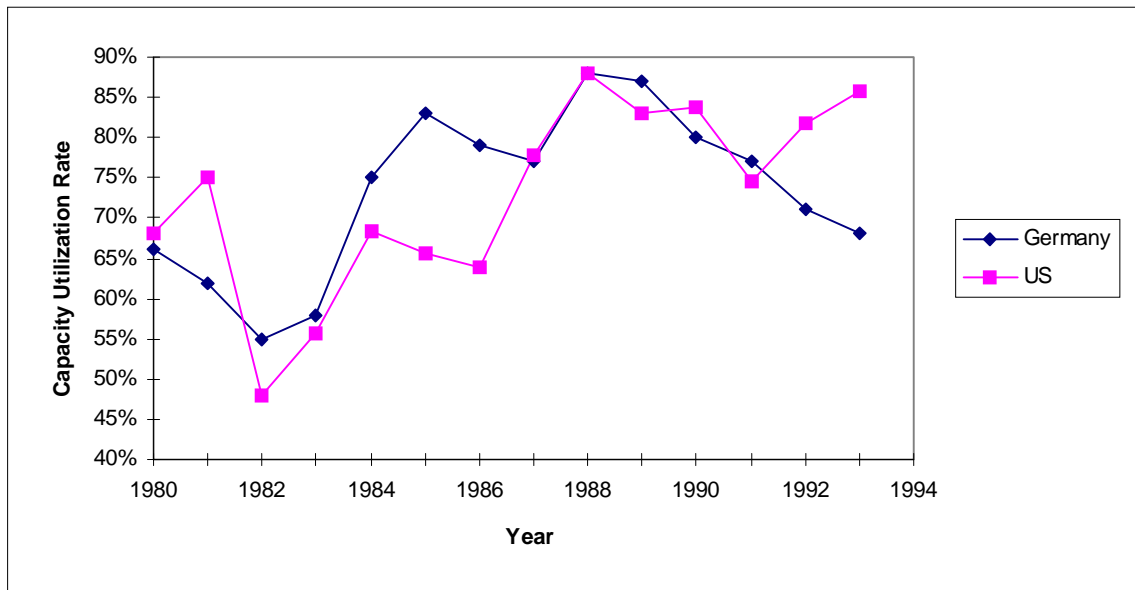
The steel sector has had a long history of cooperative arrangements and attempts at arrangements in order to hinder this downward spiral of prices,

profitability, and investment. These cooperative arrangements have taken a number of forms and tried to coordinate different aspects of the steel industry. The simplest form of cooperation has been cooperation in setting prices (price cartels), which has often been supplemented by the setting of production quotas; this allows production to be cut while maintaining prices, which reduces the fall in profits. A more complex form of cooperation is the coordination of investment (rationalization cartels) in order to better match available capacity with the level of demand and to allow for specialization in particular segments of the steel market. Another form of cooperation is to set up jointly-owned ventures for purchase of raw materials, sale of steel products, or production of specific types of steel. Finally, outright merger is another form of cooperation between owners of steel firms.

While these forms of cooperation have been utilized almost since the beginning of steelmaking a little more than a century ago, a new element of governance which has appeared since World War II has been the industry-wide organization of labor. These industrial unions have attempted to take labor costs "out of competition" by imposing similar wages and working standards all steel companies and has hindered the cutting of wages during downturns. The organization of labor has been an important element of sectoral governance arrangements hindering "excess" domestic competition in the industrialized countries in the postwar period.

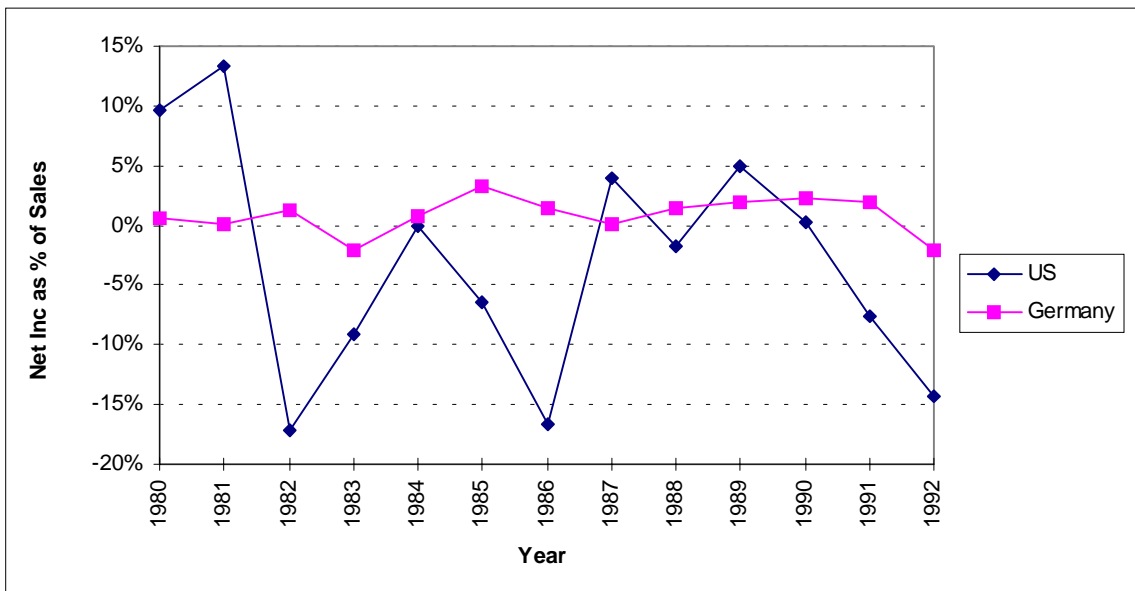
Pressure on these sectoral governance arrangements has increased since the stagnation of world demand for steel since the 1970s. Pressure has been especially great in the advanced industrialized countries, since a number of developing countries have continued to make major investments in new capacity on greenfield sites with the newest technologies and significantly lower labor costs. While significant market opportunities exist for steel companies in industrialized countries in the area of higher quality specialized steels, the shift to this strategy requires major capital expenditures, particularly in equipment for controlling quality for processing of steel future down the production chain (finishing and coating); it also requires investment in training and in organizational changes needed to shift to a "customer orientation." This strategy thus has a prerequisite the profitability of steel companies, which involves the reduction of excess capacity and the maintenance of prices (see Appendix 1 for a detailed discussion of these trends).

Chart 1:
Capacity Utilization Rate in US and German Steel Production



Source: Statistisches Jahrbuch der Stahlindustrie

Chart 2:
US and German Steel Company Profitability



Source: American Iron and Steel Institute and Statistisches Bundesamt

4.2 Comparative Performance

In both countries the steel industry experienced a sharp and permanent drop in demand after 1980. In the US there was a 20% drop in apparent domestic consumption of steel mill products between 1980 and 1982; in Germany there was a 16% drop in the same period.

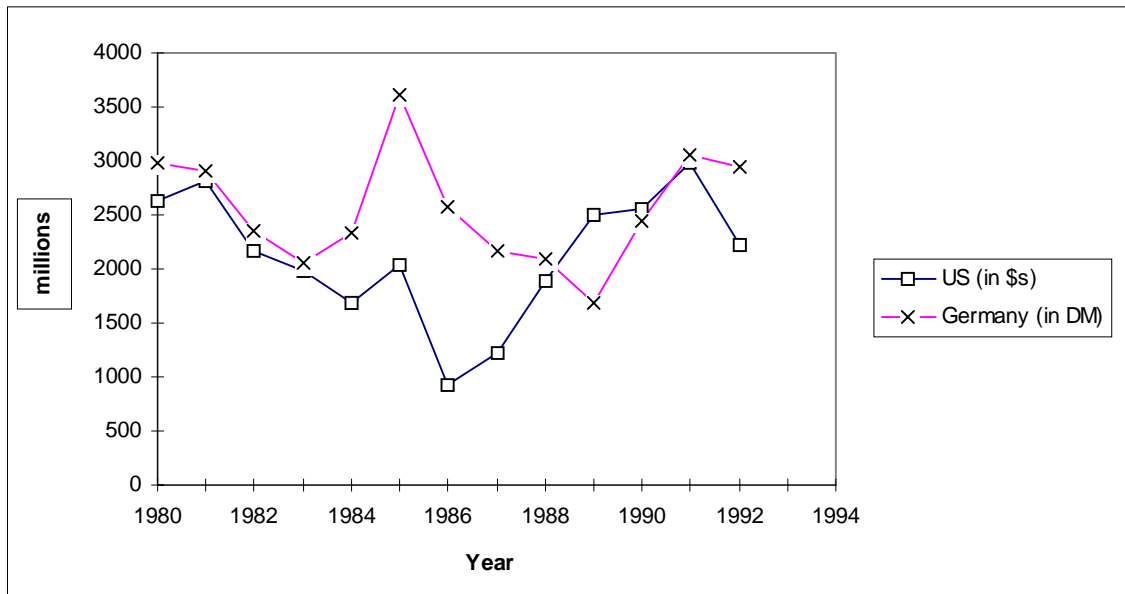
In response to the drop in demand, steel production in both countries dropped sharply. US steel production dropped more sharply than domestic demand during the same time period (by 26%), due to an increase in steel imports by 10%; imports increased from 16% to 21% of domestic steel consumption from 1980 to 1983. German production dropped 19% from during this period, more than the drop in domestic consumption, because of the decline in exports.

A significant difference between the two countries was that the German steel industry was able to reduce excess capacity much more rapidly than in the US. Reduction of excess capacity is important in order to reduce the high fixed costs for steel mills through a higher capacity utilization rate on remaining capacity; reducing capacity by shutting down older mills also allows for an increase in the average efficiency of production. In Germany raw steel capacity was reduced 29% between 1980 and 1985 versus 20% in the US.

As a result of more rapid reduction of excess capacity, the capacity utilization rate was higher throughout most of the 1980s in Germany than in the US. The break-even point (i.e. the point where production becomes profitable) was at a capacity utilization rate of around 70% in both countries (see Chart 1). Germany was able to increase capacity utilization above this level by 1984, whereas the slowness in reducing capacity in the US delayed this point until 1987. Thus while the German steel industry as a whole was profitable by 1984 (and thus able to generate internally funds needed for investment), the US steel industry in contrast continued to suffer significant losses until 1987 (see Chart 2).

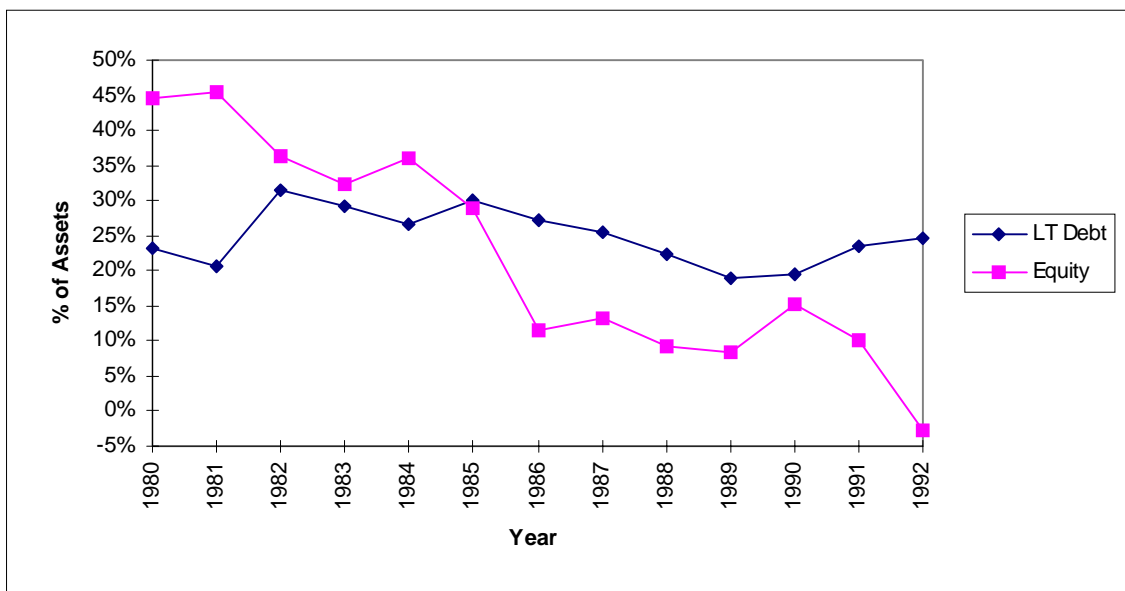
One consequence of lower (and in most years negative) profitability in the US was a serious erosion in equity capital, the "margin of safety" that absorbs losses in the short and medium run. The level of equity decreased from 45% of assets in 1980 to a low of 8% of total assets in 1989 (see Chart 4). Only after two years of consecutive profits (in 1989 and 1990) was the steel industry able to rebuild its capital somewhat; the equity ratio increased to 15% in 1990. In 1991 and 1992, however, the steel companies made large losses and average level of equity actually became negative.

Chart 3:
US and German Steel Industry Capital Investment



Source: US Census of Manufactures and Statistisches Bundesamt

Chart 4:
US Steel Company Financial Condition



Source: American Iron and Steel Institute

As a result of large losses and deteriorating equity capital, the US steel companies have experienced declining credit ratings, making access to external capital more difficult and, in the case of some companies, impossible (ITC 1988). Only with the improvement of profitability in 1991 and 1992 was the steel industry able to improve its access to external long-term debt finance again, and it increased its debt ratio from a low of 19% in 1989 to 24% in 1991.

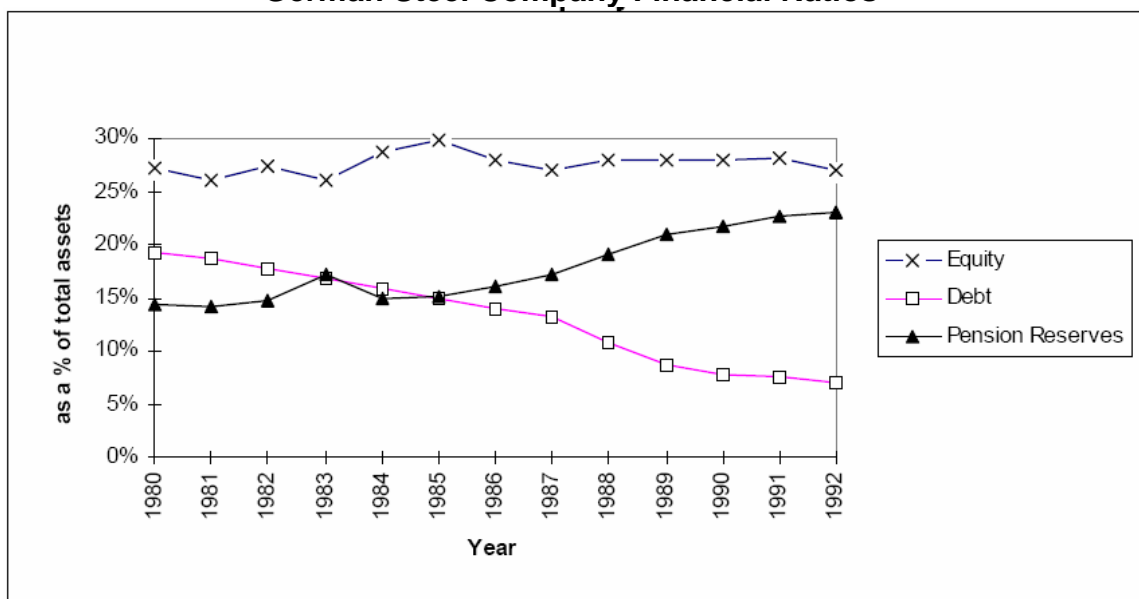
In Germany, in contrast, most steel companies regained profitability by 1984, allowing both high internal generation of funds and continued access to external debt capital. As a result, the financial condition of the industry has been robust compared to the US steel industry. The equity ratio has remained remarkably stable since 1980, fluctuating between 27% and 30% of assets. The level of debt has declined steadily since 1980, and been replaced almost mark for mark by pension reserves; together their worth is about 30% of assets. With the resolution of the crisis, the steel companies have thus enjoyed continued reliable access to external funding throughout the 1980s (see chart 5).

The more rapid return to profitability allowed the Germany steel industry to increase its capital expenditures more rapidly; by 1984 the slide in investment was reversed and in 1985 it even reached levels substantially higher than in 1980 (see chart 3). In the US in contrast investment levels continued to slide until 1986, less than half of its level in 1980.

Differences between the two countries in investment in further processing of steel have been even more dramatic; new capital expenditures as a percentage of sales were a third higher in Germany than in the US in the 1980s (own calculations from Statistisches Bundesamt and US Census of Manufacturing Data). Much of this investment in the US was provided by Japanese companies and came in the latter part of the decade (see Table 5). These differences are important because further processing is the key for higher value added production and for the customization of steels to customer standards for size, thickness, finish, and other characteristics.

As a result of the higher levels of investment the German steel industry was able to modernize its remaining facilities more rapidly than the US. One significant indicator of modernization is the percentage of production that is cast continuously. Between 1980 and 1983 Germany increased the proportion of raw steel production that was continuously cast by 26 percentage points (to 72% of total production). The US proportion increased only 10 percentage points (to 30% of total production) in the same time period. Whereas four fifths of German steel production was continuously cast by 1985, the same level was reached by the US steel industry only in 1993. In the finishing area, the German steel industry more rapidly increased its proportion of high quality customized steels. By the mid-1980s over 40% of the sheet steel produced for the automotive industry was coated; US

**Chart 5:
German Steel Company Financial Ratios**



Source: Own calculations from Statistisches Bundesamt data

**Table 4:
Major Japanese Investments in the US Steel Industry, 1984-93**

Japanese Co.	US Partner	Type of Operation	Investment (\$)	Japanese Share (%)
Nippon Steel	Inland Steel	Cold Rolling Mill	520 mil.	40
Nippon Steel	Inland Steel	Galvanizing Line	550 mil.	50
Nippon Steel	Inland Steel	Integrated Steel Mill	186 mil.	14
NKK	National Intergroup	Integrated Steel Mill	2.2 bil.	70
Kawasaki Steel	Armco	Integrated Steel Mill	1.6 bil.	45
Kawasaki Steel	Armco	Galvanizing Line	150 mil.	50
Kawasaki Steel	CVRD (Brazil)	Rolling Mill	275 mil.	50
Kobe Steel	USX Corp	Integrated Bar and Pipe Mill	300 mil.	50
Kobe Steel	USX Corp	Galvanizing Line	200 mil.	50
Sumitomo Metal	LTV Corp	Galvanizing Line	100 mil.	40
Sumitomo Metal	LTV Corp	Galvanizing Line	180 mil.	50
Nisshin Steel	Wheeling-Pittsburgh	Integrated Steel Mill	15 mil.	10
Nisshin Steel	Wheeling-Pittsburgh	Galvanizing and Coating Line	96 mil.	67
Nisshin Steel	Wheeling-Pittsburgh	Galvanizing Line	120 mil.	100
Yamato Kogyo	Nucor	Mini-mill	210 mil.	50

Source: Kennedy and Florida (1993: Table 6.1).

producers only began making the investments needed to produce coated steels only in the second half of the 1980s (ITC 1988).

In addition to maintaining capital expenditures, German steel companies increased their expenditures on training. The proportion of apprentices in the workforce increased from 4.7% in 1980 to 6.4% in 1985 and the content of apprenticeships was upgraded (own calculations from Statistisches Bundesamt data). A three- to three-and-a-half year apprenticeship is now the normal "port of entry" to production as well as maintenance occupations in the German steel industry. While US steel companies are currently trying to upgrade their training, this is mainly in the form of tuition reimbursement for skills upgrading for engineers, technicians, and skilled workers; to a lesser extent, steel companies are also introducing more formalized "on the job training", particularly in the further processing areas. Apprenticeship training, which was historically confined to the skilled maintenance trades, fell into almost total disuse during the 1980s.¹³

Investments in research and development have also fallen more significantly in the US, from above \$400 million annually in 1981 and 1982 to a level of about \$250 million annually throughout the second half of the 1980s. R&D investments have also fallen in Germany, but from a level of about DM 400 million annually in the early 1980s to about DM 350 in the second half of the 1980s (NSF 1994; Vitols 1992).

As a result of modernization, the German steel industry has maintained its position as a net exporter of high quality steel products. In 1993, 52% of rolled steel products were exported, the bulk of this concentrated in the higher quality segments such as coated steels. While Germany also had significant steel imports, accounting for 44% of domestic consumption, these were concentrated in the lower quality steel products. As a result Germany was able to achieve a DM 4 billion surplus in rolled steel products in that year. The US in contrast has remained a large net importer of steel products. While its position has improved since 1984, when it exported only 1% of its production and imported 26% of its domestic consumption, in 1992 it still exported only 5% of its production (mainly to Canada and Mexico) and imported 18% of its domestic consumption, contributing almost \$10 billion to the trade deficit. A significant proportion of investment in the US steel industry since the late 1980s has been financed by Japanese steel producers.

¹³ This information is based on presentations by the officials of the United States Steelworkers union and management of US and Canadian steel companies at the International Conference on Workplace Change: Human Resources and Rationalization in the Global Steel Industry, June 5-7, University of Toronto, Canada.

4.3 US Steel in the Low Profitability-Low Investment Trap

The steel industry arose in the second half of the nineteenth century and rapidly replaced iron as the main ferrous manufacturing material. Initial production was small scale, but new production technologies involving large plants with major economies of scale were developed, particularly by Andrew Carnegie. Carnegie Steel grew based on its ability to take advantage of technology-based economies of scale, to realize efficiencies by combining different steps of the process together into integrated plants, and to use its financial strength to buy up weaker competitors during recessions. While Carnegie was concerned primarily with growing, however, investors were concerned with the financial stability of the steel industry through merger and cartelization. The culmination of this trend was the formation of US Steel by JP Morgan through a merger of Carnegie Steel and a number of other large steel producers. US Steel accounted for about two thirds of the steel market in the early 1900s. This merger was complemented by the establishment of price collusion; other steel producers adopted the same prices set by US Steel. This oligopoly helped stabilize the industry and attract the large amounts of debt financing needed to build large plants and expand capacity further.

In the postwar period price collusion was complimented by the spread of pattern bargaining which took wages out of competition. While industrial unionism had considerable organizing success during World War I, the union was effectively forced out of most mills in 1919/20. During the New Deal and World War II, however, the United Steel Workers (USW), a new union initially financed by the United Mine Workers (UMW), rapidly increased the level of organization. After World War II, the United Steel Workers (USW) sought to "take wages out of competition" through reaching uniform wage and benefit agreements with steel producers. This was initially done by reaching agreement with US Steel and then putting pressure on other steel producers to accept identical terms ("pattern bargaining"). In 1956 industry bargaining was taken one step further when the twelve largest producers (including US Steel) formed the Coordinating Committee Steel Companies (CCSC); the CCSC, invariably chaired by US Steel, negotiated with the USW for all members of the committee. The agreement reached by the CCSC was also accepted by the smaller steel producers as well as many fabrication and industrial machinery plants organized by the USW. Thus in 1956 the formal and informal members of the regulatory cartel covering wages and prices (essentially all of the integrated producers) accounted for an estimated 95% of the domestic steel market (Hoerr 1988: 476).

The oligopoly created a high degree of stability in prices and the financial condition of the companies, and the integrated producers were able to attract large amounts of external debt financing to expand production capacity. Due to the high level of organization of the industry and the use of steel in a wide variety of key sectors (construction, autos, consumer goods), government also

often used the oligopoly to try to influence macroeconomic developments, particularly to hold down inflation by "jawboning" steel producers or by imposing formal price controls.

The effectiveness and solidarity of this oligopoly, however, began to weaken in the 1970s as it controlled a shrinking proportion of the steel market. A new group of independent producers, the minimills, significantly expanded their market share for cruder steel products such as heavy structural shapes for construction. Imports were also growing significantly both in the high and low ends of the market. By 1985 the share of the domestic market for steel accounted for by the integrated producers was down to 60% (Hoerr 1988: 476).

In the absence of mechanisms to control prices and wages outside of its membership, the decreasing proportion of the market controlled by the oligopoly resulted in greater pressures for price competition. Despite high transportation costs, imported steel often had a substantial price advantage due to lower production costs (lower labor costs and more efficient production) and due to "dumping" of excess production at lower costs than those charged in (often protected) domestic markets; the temptation to dump was especially great for foreign producers during recessions when their own domestic demand decreased and the dynamic of higher unit costs due to high fixed costs took effect. The US was never able to develop an effective trade policy to control the problem of foreign dumping.

The minimills also created greater pressure for price competition, particularly during recessions when the price of scrap metal (their major raw material) was generally low. More important however is the substantial cost advantage that minimills have over the integrated producers since they fall outside the "labor" side of the regulatory cartel. The minimills pay lower wages, offer less generous benefits, have a younger workforce and have fewer "legacy costs" for retiree pensions; since most minimills are nonunion, they also have fewer rules regarding job tasks, promotion and layoffs and other aspects of employment and work.

The oligopoly was thus not able to prevent steel prices from falling about 20% in the first half of the 1980s, i.e. exactly the time when production was drastically reduced and unit production costs went up. As a result of these developments the solidarity of the oligopoly came under intense pressure in 1981/82 and began to break up. In December 1981, the wage concessions movement came to the steel industry when McLouth Steel, at that time the nation's eleventh largest steel producer, filed for protection under Chapter 11 and demanded wage concessions from the USW.¹⁴

¹⁴ The "wage concessions" movement had started in late 1979 with small wage cuts agreed to by the United Auto Workers (UAW) to help save Chrysler, the third largest US auto manufacturer. The concessions movement spread quickly in 1980 to smaller companies which were having financing problems due to high interest rates: "High interest rates made

The granting of wage concessions by the union to McLouth Steel led to requests for concessions from other integrated producers, including Wheeling-Pittsburgh. The union granted a wage cut to Wheeling-Pittsburgh in 1982, but the company demanded concessions again; the union was willing to reduce labor costs from \$21.40 an hour to \$19.50, but only under the condition that the company reschedule its debt with the banks. The company refused and filed for bankruptcy, petitioning the bankruptcy judge to void the labor agreement. The judge agreed and authorized a reduction in labor costs to \$15.20 an hour. The union struck Wheeling-Pittsburgh to force the resignation of the chairman and get a better deal and after three weeks won, gaining \$18 an hour. However, this was still significantly below the \$25 per hour that other steel producers were paying.

The problem of wage concessions put the USW in an uncomfortable dilemma. On the one hand the refusal to grant concessions would increase the probability that a company would become insolvent, putting jobs at the company at risk. On the other hand, granting wage concessions to a company would undermine union solidarity and exacerbate the excess capacity problem; in addition, if the company was less productive than the industry average, this would hinder the modernization of the industry.

While the union's chief economist recommended a global wage cut to improve industry competitiveness, to keep the union from getting whipsawed by employers, and to put the burden of shutdowns on marginal producers, the USW leadership claimed that this was not a viable option since marginal plants forced into bankruptcy had a good chance of reemerging under new ownership with much lower wage costs.¹⁵ The alternative, granting of wage concessions to the most troubled steel producers to keep them alive, meant however that the overcapacity problem would be exacerbated and that less efficient producers (with significantly lower labor costs) were competitive with more efficient producers that stuck to the multi-employer bargaining agreement.¹⁶

it impossible for [these companies] to borrow money to buy needed equipment and perform maintenance work, or to pay the interest on previous loans" (Hoerr 1988: 59). These companies included firms in fabrication and industrial machinery organized by the USW. By the end of 1982, about 400 demands for concessions were being analyzed by the USW's research department.

¹⁵ "Whether a company closed shop or went into bankruptcy, chances were good that the plant would be reopened by a new owner -- but without the union. In the early 1980s, bargain seekers always seemed to be waiting in the wings to pick up an ailing plant at a cut-rate price and operate it with low-wage labor (which would not be difficult to find, since jobs were scarce). If the plant were shut down, the new owner could avoid the union by starting with a partially new work force" (Hoerr 1988: 69).

¹⁶ "In an excess capacity situation...the market eventually would force some company or plant out of business. In 1982, McBride [the president of the USW] could not bring himself to force the members of currently troubled companies to lose their jobs in order to save the jobs of unknown members of threatened companies in the future. He must have known that the concessions at the peripheral companies would eventually cause competitive problems for the major firms in the bargaining group. Yet he postponed the

Between the 1982 round and the planned 1985 round, National Steel and Allegheny-Ludlum had left the bargaining group.¹⁷ National decided to close its main plant, at Weirton. Because of the high costs of closure it offered to sell the plant to employees; in September 1983 the employees voted to do so, taking a 20% wage cut in the process. Weirton operated with a significant labor cost advantage over other large producers.

In 1985, the remaining five producers (US Steel, LTV, Bethlehem, Armco, and Inland) announced that they were abandoning joint bargaining. They noted that Weirton and Wheeling-Pittsburgh had significantly lower labor costs and that the commonality of interests had declined.¹⁸ The remaining constraints on divergence of labor costs and conditions were gone. Labor costs went down significantly at LTV as a result of its filing bankruptcy.

The consequence of the survival of marginal producers (partially enabled by the Uses wage concessions policy) led to a prolongation of the excess capacity-low prices-low investment problem. The differences in the cost situation of different steel producers widened due to different labor costs. Among the integrated producers, Wheeling-Pittsburgh and Weirton Steel were paying wages about 25% lower than US Steel. The minimills, most of which were nonunion, had labor costs between one-third and one-half below the level that the integrated producers had to pay throughout the 1980s; the integrated producers have almost completely ceded the low-end part of the market (low-quality profile steels) to the minimills.

This difference in cost situation has hindered coordinated action between the integrated mills and encouraged them to find ways to reduce their costs in order to achieve price-competitive advantages over the other steel producers. The major steel producers have for the most part remained "universal producers" supplying a broad range of steel products; the degree of specialization has increased very little since 1980.

hard decision of which members to sacrifice, perhaps hoping -- as the steel companies themselves always did -- that the demand for steel would come back" (Hoerr 1988: 69-70).

¹⁷ By 1982 the original twelve members of the CCSC had been reduced to eight by mergers and included US Steel, Bethlehem, Jones & Laughlin, National, Republic, Armco, Inland, and Allegheny-Ludlum.

¹⁸ "The commonality of interests among the members of the group had diminished considerably. U.S. Steel, LTV, and Armco were conglomerates. Inland produced only steel and Bethlehem very little else. The earlier departures of National Steel and Allegheny-Ludlum from the group also had a bearing on the decision...U.S. Steel, the bargaining leader, presented problems for all four of its partners because it had split further from the pack than any firm. With its large revenues from Marathon Oil, USS could withstand a long strike that would sink the other four, especially LTV and Bethlehem. The corporation's growing reputation as the 'bad boy' of steel labor relations bothered some companies" (Hoerr 1988: 474).

One of the financial consequences of the above was an inability to generate funds internally and attract the external financing needed for modernization investments except for peak demand years when capacity utilization was very high. The US International Trade Commission summarized the problem as follows:

"Many of the structural problems encountered by the domestic integrated sheet and strip industry are related to the need to modernize facilities. Modernization has been hampered by the low profitability of the industry throughout the 1980s and the cost of financing investment. Relatively high interest rates are an ongoing problem for the industry. As a result of poor financial results, conventional loans are extended to domestic producers at several points above the prime rate if they are extended at all. Several producers indicated that they have difficulties acquiring conventional financing regardless of the interest rate or other terms. Bond ratings of the sheet and strip producers are marginal and have been declining steadily since the early 1980s" (ITC 1988: xxxiv).

US steel companies initially responded to the crisis after 1980 by increasing their level of debt, particularly long-term loans from banks; long-term debt increased from 23% to 31% of assets between 1980 and 1982. Both the steel companies and financial analysts believed that the crisis was short-term and that the industry should quickly recover, thus increasing debt could be paid off in the subsequent recovery. Losses made by the steel companies were absorbed by shareholders; the level of equity decreased from 45% to 36% of assets in the same time period (see chart 4).

The steel industry, however, continued to make losses every year throughout the mid-1980s and it became clear that there was a long-term structural crisis in the steel industry. Bond ratings of many steel producers dropped below investment grade, cutting off their access to high-grade (lower cost) debt; banks also became more reluctant to lend. Debt ratios remained around the 30% level until 1985; the equity ratio continued to deteriorate and reached 29% in 1985. After almost breaking even in 1984, the steel companies made large losses in 1985 and 1986 and the supply of external credit dried up; in every year between 1986 and 1990 the steel companies had large net reductions in debt due to outstanding debt obligations. Losses deteriorated capital levels further, and the equity ratio reached a low of 8% of total assets in 1989.

Only after two years of consecutive profits (in 1989 and 1990) was the steel industry able to rebuild its capital somewhat; the equity ratio reached a high of 15% in 1990; the improved financial standing of the steel industry improved its access to external debt finance again and it took on large levels of long term debt in 1990 and 1991, increasing its debt ratio from 19% in 1989 to 24% in 1991. In 1991 and 1992, however, the steel companies made large losses and average level of equity actually became negative.

Due to the low profitability trap, a significant proportion of investment has been financed by Japanese steel companies, who have bought significant equity stakes in US steel producers or entered into joint ventures with them. Japanese investment has been motivated by an effort to reduce trade tensions over high steel imports and to ensure a supply of high quality steel to their transplant automobile operations. This investment has focused on further processing, particularly in the rolling and coating of sheet steels for automobiles and appliances (see Table 5) (Kennedy and Florida 1994).

4.4 The Steel Crisis in Germany: The Transition to DQP

The steel industry is one of the sectors in Germany where the links between banks and companies has historically been strongest (Feldman 1977; Pfeiffer 1993). These links continue up to the current period; the major banks have significant shareholdings and have representatives on the supervisory boards of all of the major steel producers; in many cases, these representatives are chairs of the supervisory boards. Thus the NIE view would suggest that the comparative advantage of the German financial system -- the capacity of its banks to reorganize distressed companies -- should be greatest in sectors like steel. In response to the 1980s crisis, however, banks were only to a very limited extent able to supervise the restructuring of individual companies, and their "grand plan" at sectoral reorganization -- the plan developed by the *Stahlmoderatoren* -- was dead on arrival because of the lack of other important members of the governance structure, i.e. the unions and works councils and the state. Rather, successful modernization and a considerable degree of specialization between the major steel producers is due to the maintenance of the "uniform costs" element of the oligopoly (particularly labor costs), the ability to cut capacity and moderate price reductions, and the support by the state of measures for restructuring and modernization.

The German steel industry has a long history of forming cartels during crisis periods in order to deal with the problems of low prices; some of these cartels went beyond the setting of prices and were involved in the coordination of production and investment, particularly in the interwar period (Feldman 1977). The cartels however have had mixed success; while they have helped solve the worst overcapacity and price problems, the limits of coordination have often been quickly reached over issues such as pricing for specialized steel products and production quotas.

After World War II, while the allies tried to break up the steel oligopoly by creating more than thirty individual steel companies (most limited to one major production site), the concentration of the German steel industry was quickly

increased by major fusion waves in the 1950s and early 1970s.¹⁹ After the mergers of the early 1970s and the rationalization of the Saarland in the late 1970s, seven large companies (Thyssen, Krupp, Hoesch, Klöckner, Peine-Salzgitter, Mannesmann, and Saarstahl) accounted for almost all of raw steel production in Germany (94% of raw steel production in 1979). Four of these, the core of the industry, had operations concentrated in or adjacent to the Ruhr: Thyssen, Hoesch, Krupp, and Mannesmann. The other three major producers were Arbed (in the Saarland), Klöckner (with steel mills in Bremen and Bavaria), and Peine-Salzgitter (with operations in Lower Saxony near Volkswagen's main production facility) (Esser et al 1983: 38). With the exception of Mannesmann, which after 1974 focused exclusively on the production of seamless tube, these steel companies were "universal producers" offering a full spectrum of standardized steel products.

An important part of the oligopoly was the rise of industry-wide collective bargaining which took wages out of competition; in 1954 the tradition of annual collective bargaining rounds was established and the results of the main bargaining region (North Rhine-Westphalia) were increasingly spread to other regions and individual companies.²⁰ A significant degree of coordination was also provided by the German Iron and Steel Federation (Bührer 1986).

The beginning of the serious crisis in the German steel industry dates from 1980.²¹ While the weakest firms were affected first, e.g. Hoesch in Dortmund,

¹⁹ The first wave of concentration, aided by a special law (Investitionshilfegesetz of 1952) which created special investment incentives for the coal and steel industries to speed reconstruction and the founding of the 1952 ECSC, led to a re-establishment of many companies initially broken up by the Allies; this wave ended in 1958, with the eight leading Ruhr-based companies (Thyssen, Krupp, Hütten-Union, Klöckner, Mannesmann, Hoesch, Gute-Hoffnung-Hütte and Rheinstahl) controlling two thirds of West German steel production. A smaller concentration wave occurred in the 1960s. Finally, in early 1970s the third round of concentration took place, including the absorption of the Rheinstahl group by Thyssen.

²⁰ The German steel producers are represented in negotiations by the Arbeitgeberverband Eisen und Stahl (AES). The AES started out after World War II as a regional employers' association centered in North Rhine-Westphalia (NRW), the federal state in which the Ruhrgebiet is located in; the Saarland at the time was under French administration and the "peripheral" steel producers as a rule were closer to the regional employers' associations (Markmann and Höhnen 1968: 32). However, the AES has expanded its influence throughout the postwar period to first coordinate negotiations with and then to extend its jurisdiction to other geographical areas in the NRW bargaining area. In sharp contrast with the trend towards decentralized and company bargaining in most other countries, collective bargaining has become even more unified in Germany in the last years; in the 1990 AESIG Metall wage negotiations, Klöckner's Osnabrück facilities as well as the whole of Peine-Salzgitter were brought into the NRW negotiating area. There also is an employers association in the Saarland, the Verband der Saarhütten Fach- und Arbeitgeberverband, which however as a rule follows the wage and salary increases negotiated between AES and IG Metall.

²¹ When the demand for steel production fell in 1975, however, the steel producers in the Saarland were threatened with insolvency. When the Saarland was integrated into

as the crisis deepened even the biggest steel companies, Krupp and Thyssen, were affected.

Unlike in the US, significant labor cost concessions on an individual company basis were not a viable option for the steel companies. While minor concessions on benefits were made for individual companies and some industry-wide relief was provided by slowing down the rate of wage increases to below the inflation rate in the first half of the 1980s, no major cuts in wages were made and the principle of industry bargaining was never an issue in the negotiations. The union (IG Metall) accepted the principle that marginal operations should be shut down in order to maximize the efficiency of remaining operations except for cases in which a region would be especially effected by shutdown; necessary workforce reductions should be dealt with by offering substitute jobs in other subsidiaries or through early retirement. The dismantling of industry-wide bargaining itself however was never a serious option in the German steel industry.

The crisis had three distinct phases: the beginning of the financial crisis, the banks' attempt at a global solution under the sponsorship of the federal government (which failed due to the resistance of the union and the *Länder*), and the coordinated negotiation of restructuring plans for individual companies.

The first phase of the crisis began when traditional measures for dealing with cyclical downturns (temporary shutdowns of mills, workforce attrition through natural turnover, and short-time work) was insufficient to adapt production to demand. As losses mounted, the banks refused to make more credits available to the companies and were becoming increasingly concerned about defaults on the DM 7 billion of outstanding loans to the steel industry.

The second phase of the crisis was marked by the attempt of the banks to impose an "optimal" reorganization plan for the sector. Under the pressure of IG Metall, the *Länder* with significant steel production (North Rhine-Westphalia and the Saar), the banks and some of the companies, the federal government called a conference to try to develop an industry-wide solution to the crisis.

Germany in the late 1950s these steel producers had a lower level of technology than the main Ruhr region and were not able to catch up during the 1960s. The Saarland also had locational disadvantages relative to the Ruhr, which was located closer to major consumers of steel (industrial machinery and autos) and had better access to water transportation. As a result of the reduction in demand the smaller Saarland producers were threatened with bankruptcy and turned to the state for aid. Both the Saar state government and the federal government were willing to provide subsidies for modernization; these were however conditional upon the integration of the Saar companies into one major steel company in order to take maximum advantage of efficiencies within the Saar region through the closure of older and isolated facilities, most efficient use of new capital expenditures, etc. (Esser et al 1983).

The result of the conference was the appointment of a three-member committee including two representatives of the Deutsche Bank and one representative of Allianz Versicherung, the largest insurance company in Germany. This committee (the *Stahlmoderatoren*) was commissioned to develop a plan to rationalize the German steel industry. The plan they came up with recommended merging the companies into two main groups, Gruppe Rhein and Gruppe Ruhr; the first, involving a fusion of the strongest companies (Thyssen and Krupp); the rest of the industry was to be brought together in the Gruppe Ruhr.

This plan ran into significant opposition from the union, some companies, and some of the *Länder* and municipalities, since it was clear that the first group had the best survival chances; the second group, made up of the weaker companies, would be most vulnerable to further declines in demand for steel. It quickly became clear that the plan could not be implemented due to this opposition.

As a result of the failure of the banks' strategy, the federal government shifted to encouraging the development of modernization plans at the company level which involved a reduction of capacity and a focus of production on a smaller set of higher quality, higher value-added steels; higher value added products would have a better chance of competing with imports from low-wage countries, and reducing the product line would enable companies to benefit from specialization. Between 1983 and 1985 the federal government established a number of special programs to assist rationalization and provided substantial financing for these programs. Special provisions for early retirement and "zero short-time work" enabled the maintenance of a balance workforce age structure despite a great reduction in overall workforce. Most employees over 55 went into retirement. At the same time apprenticeship was upgraded and the proportion of workforce in apprenticeships increased. This enabled an overall increase in the skill level of the workforce.

In addition, investment subsidies and a loan program were set up to encourage rationalization and modernization. The loan program, administered by the Bank for Reconstruction (*KfW*), gave the federal government particular leverage over restructuring; loans were made for capital improvements conditional upon the development of restructuring plans involving capacity reduction. Since the large banks had cut back on their lending to cut their exposure to possible defaults, Bank for Reconstruction loans were particularly important in generating the funds needed for investment.

These efforts were supported by the European Coal and Steel Community's emergency intervention in the early 1980s. The ECSC set quotas and minimum price levels for standardized steel products and provided early retirement and retraining subsidies for workers affected by mill shutdowns. Steps were also taken to limit import competition. While the ECSC measures

were not completely effective, they no doubt contributed to supporting prices and profitability in the European Community to a greater degree than would have been the case in their absence (Meny and Wright 1987). As a result less pressure was put on steel prices within Germany.

These programs supported the reduction of steel production capacity by 16 million tons (i.e. 25% of total production capacity) between 1982 and 1985, including shutting down the remaining Siemens-Martin steel converters and 14 of 69 blast furnaces; between 1983 and 1984 alone capacity was reduced by 10 million tons. At the same time capital expenditures increased greatly, exceeding \$3.5 billion in 1985. These capital expenditures focused on further modernizing the remaining production facilities, including increasing the share of continuous casting (up 19 percentage points, to 80% of total production) and computerization of production.

The product market strategy of most of the producers was to move from being universal suppliers to a higher degree of specialization. For example, Hoesch focused on the production of coated sheet for the automobile and appliance industry. Krupp focused on specialty steels. Arbed Saarstahl focused on the production of profile steels for construction.

The role of industrial relations was to give some labor cost relief to the industry but to maintain the principle of industry-wide bargaining. Relief was granted by moving bargaining back to the end of the bargaining calendar (postponing wage increases for about half a year months) and making concessions on holiday pay. Supplemental wage agreements at some companies negotiated by works councils were also reduced somewhat. However, labor costs per hour across companies are almost identical since wages have remained "out of competition" within the German steel industry.

As a result of the maintenance of the oligopoly and the implementation of restructuring plans, none of the seven major steel producers went bankrupt in the 1980s. The financial condition of the industry has been robust compared to the US steel industry. The equity ratio has remained remarkably stable since 1980, fluctuating between 27% and 30% of assets. With the resolution of the crisis, the steel companies have thus enjoyed continued reliable access to external funding throughout the 1980s.

5. Conclusion

This paper has contrasted two approaches to the problem of default risk and industrial finance, corporate governance and economic governance, and examined their utility in explaining the resolution of the steel crisis in the 1980s

in the two countries. The corporate governance approach focuses on the micro relationship between a company and its investors and default risk and under-investment which stem from the problem of moral hazard in this relationship. Further deregulation of the US financial system is advocated by this perspective in order to allow investors (particularly banks) to develop more efficient financial contracting mechanisms (equity stakes and board representation) which are widely used by German (and to a lesser extent by Japanese) banks.

A detailed comparison of the US and Germany in the 1980s, however, indicates that the German banks played a limited role in the resolution of the crisis. The first phase of the crisis in Germany, the refusal of banks to renew credits, indicated the limits of a strategy based on restructuring companies on a bilateral basis. The second phase also showed the limits of the banks' ability to restructure the industry on a coordinated basis; the "optimal" plan of the financial community's experts (*Stahlmoderatoren*) for industry restructuring failed to receive the support of the union, the Länder and many municipalities, and a number of the smaller companies that would have been sacrificed. This indicates the extent to which the banks' powers to restructure were limited by the collective nature of the problem and the extent to which other important actors had power in influencing restructuring (and whose acquiescence was needed for successful restructuring).

The paper has argued that an alternative perspective, the economic governance perspective, provides a more useful perspective for understanding the problem of industrial finance in the restructuring of mass production industry in the 1980s. This perspective focuses on the broader sectoral and macro-level determinants of the financial situation of the firm; default risk and investment capacity are both dependent on the profitability of the firm, which is in turn dependent upon the nature of the competition in the existing economic governance regime. The major problem of the US integrated steel producers -- being caught in the low price, low profitability, low investment, high default trap -- stemmed from the inability of the oligopoly to control its environment (imports and labor costs of minimills) and eventually the price setting of its own membership, not from the weakness of ties of steel producers with banks.

The crucial difference between the two countries is in the regulation of labor and the willingness of the state to intervene to protect the interests of labor in a sectoral crisis. In the US, the "private" ordering of industrial relations allowed the new (nonunion) minimills to operate with significantly lower labor costs than integrated producers and capture the market for low-quality steels. It also allowed members of the oligopoly to "defect" and try to compete on the basis of lower wage costs rather than modernization through pushing the union for wage concessions on a company basis. The most radical version of this plan was going into Chapter 11, which allowed a few companies to realize major labor cost reductions due to judge's approval of lower wages and

reduced pension obligations. This dragged down prices in general and the profitability of companies that failed to push for such concessions. The survival of marginal producers has made the process of rational capacity reduction and modernization of remaining capacity more difficult. The low profitability and high financial risk of the US steel industry has resulted in a dependence upon Japanese investment in major capital improvements.

In Germany in contrast the "public" ordering of the industrial relations system has more effectively kept wages out of competition throughout the 1980s. In contrast with the US, minimills in Germany have captured only a small fraction of the steel market because of limited wage cost advantages. The legal industry-wide extension of collective bargaining agreements also places limits on the ability of individual producers to "defect" from the oligopoly and gain cost advantages by pushing labor costs down. Finally, a crucial role was played by the intervention of the state in order to protect labor and reduce the social costs of restructuring. The forms of state intervention included special early retirement provisions and investment incentives to support capacity reduction and modernization of remaining capacity. In contrast with the banks' plans, capacity reductions were spread across firms and no firms were "sacrificed." The industry quickly regained profitability and its ability to finance investment and repay debt. On this secure basis, banks retained their close links to the steel companies.

Appendix 1: Technical Aspects of the Steel Industry

The steel industry arose in the second half of the nineteenth century and steel quickly replaced iron as the major ferrous manufacturing material. Steel has greater tensile strength than iron and thus is more suitable for large-scale bridges and buildings as well as for thinner and lighter applications in the consumer good industry.²²

The production of steel involves three different types of operations. The first is the production of iron in blast furnaces through the melting down of iron ore. The second involves the conversion of iron into steel in steel converters through the addition of carbon. The third step involves the processing of steel into various steel products, such as structural products (rails, beams, etc.) or flat products (plate, thin sheet). While the three steps are technologically separate, the most efficient setup involves combining all three operations at the same site (so-called integrated plants).

Blast furnaces have reached a minimum efficient scale of over 1 million tons of iron production per year; the largest blast furnaces have capacities of up to 4 million tons per year. Steel converters have somewhat lower minimum efficient levels in the area of a few hundred thousand tons per year, as do rolling mills for finished steel products. Each step involves major capital investments; hot strip mills cost around \$250-300 million and cold rolling mills around \$150 million. The minimum costs of setting up an integrated plant capable of producing 1 million tons of steel a year exceed \$1 billion.²³

Within the industrialized countries, there is declining demand for steel since manufacturers are trying to work with thinner shapes to reduce the weight of products like cars. Demand is also declining because of increasing substitution of other materials for steel such as plastics and aluminum. Thus the growth in steel demand has not kept pace with general economic growth. Significant increases in productivity combined with the stagnation in world demand (and even absolute decline in industrialized countries) have resulted in led to decreasing employment levels, contributing to the image of steel as a "declining industry."

Despite the stagnation of world demand for steel since 1980 and the presence of significant overcapacity (around 200 million tons or 20% of the total annual capacity of 1 billion tons of production throughout the 1980s), developing countries have continued to add new productive capacity based on the most modern technologies. Reductions in overcapacity are particularly

²² The greater machinability of iron has however left a niche market for this material for complex components such as internal combustion engines and crankshafts.

²³ An integrated plant with a capacity of 3 million tons/year planned but eventually abandoned by US Steel was projected to cost \$3.6 billion in the late 1970s.

difficult to achieve because of the great sunk costs involved, high break even points, and the large scale of individual production units; only the largest of steel companies have more than a few blast furnaces, thus the decision to close a blast furnace involves cutting a major proportion of production for individual steel companies. Since the steel market is relatively undifferentiated in the mass steel segments, customers can readily obtain most common steel products from a large number of producers. Individual companies during recessions are tempted to cut prices in an effort to take market share away from their competitors in order to maintain high levels of production (and thus come under pressure to reduce variable costs, particularly labor costs). The consequences of this are typically ruinous price competition.

However, the impact of this decline on individual companies is differentiated, and an improvement in competitive position is possible without pressing down wage levels. One strategy is to reduce unit costs through investment in new technology. A number of new technologies have appeared over the postwar period. In the production of iron, technologies have been developed allowing larger and larger blast furnaces and the realization of greater economies of scales. In steel processing, the Basic Oxygen Furnace (BOF) has been developed, which allows for greater energy savings and quicker production of steel than the older open hearth technology. In the processing area, one of the biggest developments has been facilities which combine or eliminate some of the steps between the production of crude steel and the final product, involving savings in energy, labor, and transportation costs. The first of these was continuous casting, where steel produced by the converter is directly cast into thick sheets; this saves one step in the process since before steel was poured into ingots and then had to be heated up and rolled into sheets. This is being taken one step further with thin slab casting, which allows even thinner shapes to be cast and eliminates one step in the rolling process. All of these however involve significant investments in new equipment.²⁴

A second general product market strategy is to differentiate one's production from the mass steel market. Product quality can be significantly improved with investment allowing for better control over metallurgical properties and thickness. Special types of steels can be produced addressing the special needs of customers. These are often developed jointly with larger customers; the automobile industry in particular has demanded new types of alloy and coated steels that are thinner, stronger, and more corrosion resistant.

²⁴ An alternative strategy however is pursued by the so-called minimills. The development of efficient electric furnaces allow the minimills to eliminate some of the most capital intensive steps of production (blast furnaces and coke ovens) and instead directly melt scrap to produce cruder steel products for the local market. Most minimills are nonunion and have significantly lower labor costs and greater labor flexibility than the integrated producers. The minimills are highly vulnerable to fluctuations in the price of scrap metal and local demand conditions, but have grown in importance because of their greater flexibility than the large integrated producers.

Steel can also be "produced to order" instead of for inventory; the shorter production and delivery times involved require however a significant restructuring of production organization. Most of these steps involve significant expenditures and thus one can get stuck in the low profitability trap having difficulties in generating the investments needed to modernize.

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