International Differences in Male Wage Inequality: Institutions versus Market Forces

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The Journal of Political Economy, Volume 104, Issue 4 (Aug., 1996), 791-837.

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This paper studies the considerably higher level of wage inequality in the United States than in nine other OECD countries. We find that the greater overall U.S. wage dispersion primarily reflects substantially more compression at the bottom of the wage distribution in the other countries. While differences in the distribution of measured characteristics help to explain some aspects of the international differences, higher U.S. prices (i.e., rewards to skills and rents) are an important factor. Labor market institutions, chiefly the relatively decentralized wage-setting mechanisms in the United States, provide the most persuasive explanation for these patterns.

I. Introduction

The level of wage inequality generated by a country's labor market is fundamentally important for those interested in understanding poverty, social stratification, and economic incentives facing workers.

We are grateful to David Blanchflower, Per-Anders Edin, and Andrea Ichino for their help in acquiring data. Portions of this work were completed while we were visiting fellows at the Australian National University, Canberra. We have benefited from the helpful comments of participants at the University of Illinois, Cornell University, University of Oregon, and Columbia University Labor Economics Workshops, the 1994 NBER Summer Institute, and the 1995 meetings of the American Economic Association. We thank Robert Topel and an anonymous referee for helpful comments and suggestions.

[*Journal of Political Economy*, 1996, vol. 104, no. 4]
 0022-3808/96/0404-0002$01.50

Labor earnings are by far the most important component of income for individuals who are employed; hence, in the absence of any compensatory government policies, low living standards in market economies will be associated with low labor incomes.[1] More generally, labor market inequality is a major determinant of disparities in living standards. The level of labor market inequality may also influence the solidarity that individuals feel with one another. Workers with similar earnings most likely feel more in common with each other than those with vastly different economic rewards and status.

To the extent that labor market inequality reflects economic returns to skills, international differences in inequality imply differences in economic incentives. Countries with high rewards to skills have a wage structure that encourages skill acquisition by their workers. Moreover, centralized wage-setting mechanisms that reduce wage variation tend to limit firms' flexibility in responding to differences in market conditions across industries or geographical areas.[2] Also of concern is that relatively high wages for low-skill groups may reduce their relative employment.[3] On the other hand, a downside of high rewards to labor market skills is that they penalize demographic groups with below-average levels of skills, even in the absence of explicit discrimination against them. For example, the rising returns to skill in the United States in the 1980s have been found to reduce the relative wages of black workers (Juhn, Murphy, and Pierce 1991) and immigrants (LaLonde and Topel 1992) and to retard the economic progress of women (Blau and Kahn, in press *a*). Similarly, Blau and Kahn (1992, 1995, in press *b*) found that the higher rewards to skills in the United States compared to other industrialized countries were the most important reason for the relatively large gender pay gap in the United States.[4]

Considerable attention has been focused lately on the trend toward rising wage inequality that has been occurring in most of the industri-

[1] An example of the importance of labor market inequality is provided by the U.S. experience in the 1980s when rising wage inequality was sufficient to counteract the effects of economic expansion in reducing poverty (Cutler and Katz 1991; Blank 1993).

[2] Employers have voiced both these complaints about Sweden's "solidarity" wage policy, and that country's generous student stipends and subsidized loans for higher education may be viewed in part as a means of offsetting the distortions caused by wage compression (Edin and Holmlund 1995; see also Edin and Topel 1994).

[3] The impact of administered wages on employment is a controversial issue. For research on both sides, see Neumark and Wascher (1992), Card, Kramarz, and Lemieux (1994), Edin and Topel (1994), Abowd et al. (1995), Card and Krueger (1995), and Katz, Loveman, and Blanchflower (1995).

[4] This difference between the United States and other countries is due to the greater compression at the bottom of the wage distribution in these other countries, which disproportionately benefits employed women (Blau and Kahn, in press *b*).

alized countries.[5] Evidence that inequality increased in different countries with different institutional structures suggests that similar forces have been at work. For example, it has been suggested that technology and international trade have raised the relative demand for skilled workers among industrialized nations (Katz et al. 1995).

While changes in the demand for skilled labor appear to have led to a widening of the wage structures in many countries during the 1980s, considerable differences in the *level* of wage inequality remain. Of particular interest to us, the United States has a far greater dispersion of wages than other industrialized countries (Blanchflower and Freeman 1992; Blau and Kahn 1992, 1995, in press *b*; OECD 1993). Previous international comparative work on wage inequality has focused on recent changes in wage dispersion. In this paper, we are concerned with understanding the fundamental causes of the higher *level* of wage inequality in the United States compared to other industrialized countries in the 1980s. We concentrate on males in order to focus on a relatively homogeneous sample of workers for each country.[6]

The basic pattern of international differences in wage inequality that we seek to explain is illustrated in figure 1. (Details of the data sources and the method of calculating hours-corrected earnings are given below.) As expected on the basis of previous work, the United States has a considerably higher level of wage inequality than the other industrial countries in our sample. Panels *a* and *b* of figure 1 indicate that both the standard deviation of log wages and the 90-10 percentile log wage differential are considerably greater in the United States than in the other countries. It is interesting, however, that this higher level of inequality reflects considerably more compression at the bottom of the distribution in the other countries relative to the United States but a much smaller difference in the degree of wage inequality at the top of the distribution. Thus, while the 50-10 percentile wage differential is much larger in the United States than elsewhere (panel *c*), the U.S. 90-50 differential is quite similar to that in several other countries in our sample (panel *d*).

Published data show a pattern similar to that of our micro data. Specifically, the OECD (1993) surveyed wage inequality in its member countries and found that the 50-10 gap was far larger in the United

[5] For evidence of rising inequality in several countries, see Gottschalk and Joyce (1991), Bound and Johnson (1992), Davis (1992), Katz and Murphy (1992), Juhn, Murphy, and Pierce (1993), OECD (1993), Edin and Holmlund (1995), Erickson and Ichino (1995), and Katz et al. (1995).

[6] In Blau and Kahn (1992, 1995, in press *b*), we consider the consequences of differences in wage inequality across countries for international differences in the gender gap.

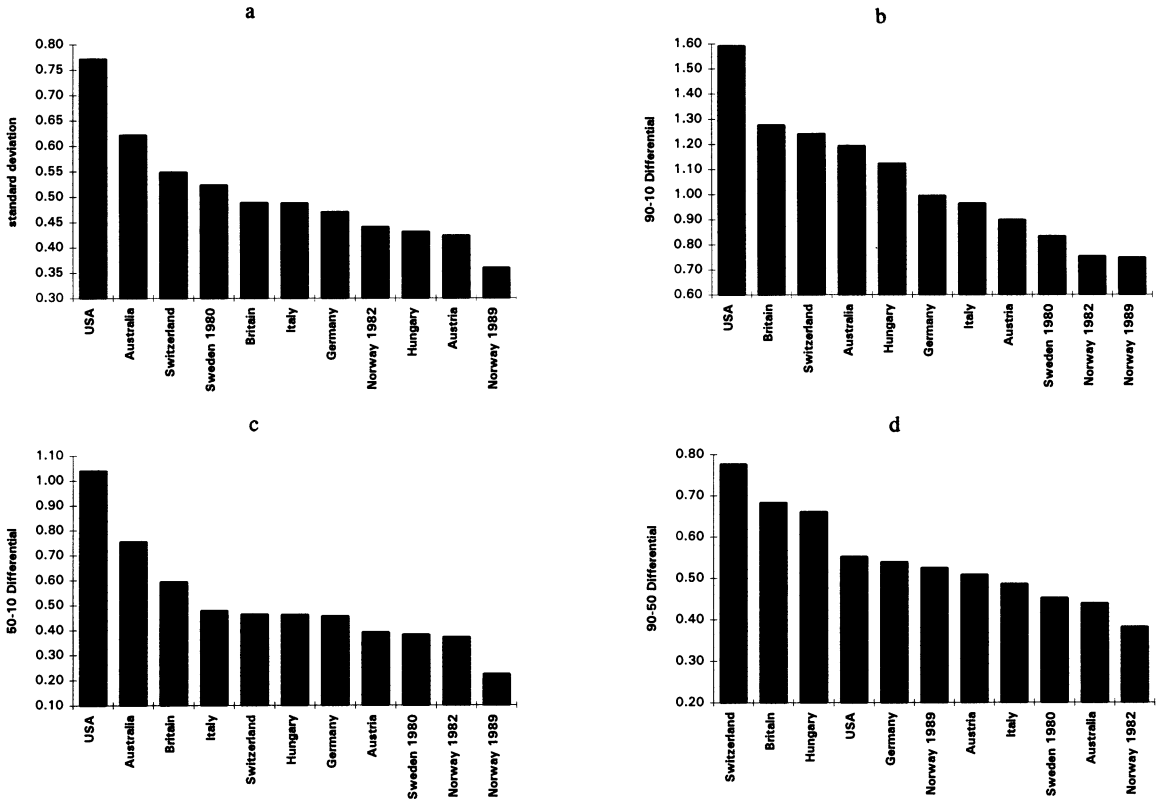

FIG. 1.—Summary measures of male log wage inequality

States than in other countries. While the 90-50 gap was also larger in the United States, the difference between the U.S. 90-50 gap and that of other countries was much smaller than the corresponding difference for the 50-10 gap.[7] This pattern of greater compression at the bottom is important from a policy perspective in that it implies that the labor market reward structure in other countries generates less poverty and relatively higher incomes for employed low-skill workers than in the United States.[8] Of course, as suggested above, there are potential costs of wage compression that would have to be compared to these benefits in deciding whether this is a desirable approach.

In the empirical work below, we focus on three possible explanations for these international differences in patterns of wage inequality. We first examine the role of differences across countries in the distribution of measured characteristics. We conclude that while measured characteristics help to explain some aspects of the international differences, U.S. labor market prices—that is, higher rewards to labor market skills and higher rents received for employment in favored sectors—are an important factor contributing to the observed differences in inequality between the United States and other countries.

Second, we assess the contribution of labor market institutions to explaining the differences in wage inequality. The United States has a largely nonunion labor market with very decentralized wage setting even in the union sector. The other countries have considerably higher rates of unionization, and most of them have much more centralized wage-setting processes than the U.S. union sector. Further, in several countries, the terms of collective bargaining agreements are routinely extended to cover nonunion workers, and their

[7] Among the countries in our sample for which the OECD also had data (i.e., Austria, Germany, Italy, Norway, Sweden, and the United Kingdom), the 50-10 gap averaged 0.59 log points higher in the United States, whereas the 90-50 gap averaged 0.25 log points higher. (Australia was also included in the OECD data, but only for nonsupervisory workers.) In our hours-corrected micro data for these countries, the 50-10 gap averaged 0.61 log points higher in the United States, whereas the 90-50 gap averaged 0.032 log points higher. The higher U.S. level of relative inequality at the top in the OECD data appears to reflect differences for the United States between the Current Population Survey data, which the OECD used, and the International Social Survey Programme (ISSP) data, which we employ in this paper. In this regard, it is interesting to note that our ISSP results closely correspond to those we obtain with Michigan Panel Study of Income Dynamics data (see below). In any case, the same qualitative pattern of considerably larger differences between the United States and other countries at the bottom of the distribution than at the top emerges regardless of the data source.

[8] The claim about poverty holds if we are comparing countries with similar average real wage levels, as is the case here. For example, in 1988, hourly compensation in manufacturing in the OECD countries other than the United States averaged 98 percent of the U.S. level, when one adjusts for exchange rates (U.S. Department of Commerce 1992, p. 841).

larger union sectors may also induce greater voluntary emulation of the union wage structure by the nonunion sector. Finally, in some of the countries, the government or the union movement has followed explicit policies to raise the relative pay of the lowest-paid workers.

Consideration of labor market institutions thus suggests less labor market inequality in these other countries than in the United States, and it may also imply greater compression at the bottom of the distribution than at the top. This is, of course, consistent with the pattern of inequality that we identify empirically. Moreover, we present information on the nature of union and nonunion patterns of inequality that reveals interesting features of the differences between the United States and other countries in the impact of labor market institutions. Specifically, our results imply that union pay policies that bring up the bottom of the union wage distribution are common to all countries, including the United States. However, unions in other countries appear to be more successful than U.S. unions both in reducing inequality in the union sector and in extending such policies to the nonunion sector.

Third, we examine international differences in the supply of and demand for labor market skills as an alternative explanation for the observed differences in inequality between the United States and other countries. We find that market forces, as best as we can measure them, do not appear to be a viable explanation for the international differences, further increasing our confidence that institutions are important.

Finally, we present two additional pieces of empirical evidence suggesting that wage-setting institutions are an important determinant of international differences in wage distributions. First, examining the impact of centralization across the countries in our sample more generally, we find that the degree of wage centralization, as commonly measured by comparative industrial relations researchers, is negatively associated with wage dispersion, the 50-10 differential in the log of wages, and the pay gap between middle- and low-skill workers. Second, as would be expected on the basis of employer responses to de facto high wage floors, we generally find that the low-skilled have a higher employment/population ratio relative to the higher-skilled in the United States than elsewhere.

II. Determinants of Wage Inequality: Skills and Institutions

Wage inequality as measured by overall wage variation or by the wage gap between workers at different parts of the distribution (e.g., the tenth vs. the fiftieth percentile) is affected by the distribution of skills,

both measured and unmeasured, and the prices determined for those skills in the labor market. This price structure may include rents received by individuals employed in certain favored sectors. Prices, in turn, are influenced by both market and institutional forces.

Market forces determine skill prices through the interaction of the supply of and demand for skills. Suppose that workers of different skill levels (e.g., high school– or college-educated workers) are imperfect substitutes in production. Then differences in the relative supply of or demand for skills will produce differences in relative wages across countries.[9] The effects of demand can be felt both between and within industries. Final demand for output in one country may favor industries that (worldwide) disproportionately employ highly skilled workers. If such is the case, then the relative demand for skilled workers in this country will be higher than elsewhere; and, all else equal, we would expect skilled workers to do relatively well even in industries not directly affected by the high demand level. It is also possible that the relative demand for highly skilled labor is greater in each industry in one country than another, if different technologies are employed.

Institutional factors include the extent of collective bargaining coverage, the scope of collective bargaining where it occurs, union pay policies, and government policy toward the labor market. From each of these perspectives, we expect the United States to have a more unequal wage structure than other countries. The following decomposition of a country's overall level of wage inequality is useful in understanding the role of unions in producing differences in inequality across countries:

$$v_i = \alpha_{ai} v_{ai} + (1 - \alpha_{ai}) v_{ni} + \alpha_{ai}(w_{ai} - w_i^*)^2 + (1 - \alpha_{ai})(w_{ni} - w_i^*)^2, \quad (1)$$

where, for country i, v is the overall variance of log wages; α_a is the fraction of workers unionized; v_a and v_n are the variances of log union and nonunion wages; w_a and w_n are average log union and nonunion wages; and w^* is the country's average log wage level.[10]

By the accounting scheme in equation (1), there are several routes through which the industrial relations system can affect overall wage inequality. First, unions typically raise their members' relative wages. This effect alone could increase or decrease overall wage dispersion, depending on where union workers would have been in the wage

[9] This assumes barriers to the mobility of capital, labor, or goods across national boundaries so that skill prices are not equalized.

[10] Freeman (1980) uses such a decomposition to assess the role of unionism on U.S. wage inequality. See also Juhn et al. (1993), who employ a similar approach to measuring the impact of industry on wage inequality.

distribution in the absence of unionism. However, as suggested by the final two terms in equation (1), in an accounting sense, it is the union-nonunion wage gap (with other wage-influencing factors not controlled for) itself that is important in "explaining" the overall variance. All else equal, the larger this gap, however it is achieved, the larger the country's overall wage variance will be. And our data show that this gap is much higher for the United States than for other countries.[11]

Second, unions typically negotiate contracts that allow for less variation in pay than occurs in the nonunion sector (Freeman 1982; Blanchflower and Freeman 1992). Unions are much less prevalent in the United States than elsewhere; thus the lower union variance in pay would get a smaller weight in equation (1) in the United States. Hence, we would expect a higher overall variance in wages in the United States even if the variance of wages within the union and nonunion sectors were identical across countries. However, there are strong reasons for expecting both of these within-sector variances to be higher in the United States than elsewhere. These higher within-sector variances constitute a third route by which the U.S. industrial relations system raises wage inequality relative to other countries.

With respect to the union sector, collective bargaining in the United States is relatively decentralized, with an emphasis on single-firm agreements that, in most cases, are not firmwide (Hendricks and Kahn 1982). In contrast, as discussed below, in most of the other countries in our sample, bargaining is conducted on an industrywide or even an economywide level. Thus there appears to be more scope for interfirm and interindustry wage differentials in the United States than elsewhere, and a substantial portion of the wage inequality we observe in the United States is associated with such firm or industry wage effects (Blau 1977; Krueger and Summers 1988; Davis and Haltiwanger 1991; Groshen 1991).

While a lower variance in the union sector of other countries could be achieved either by raising the bottom, restraining the top, or both, centralized bargains often emphasize the setting of wage minima across diverse units. For example, in Austria, Germany, Italy, Sweden, and Switzerland (as well as in several European countries outside our sample), collective bargaining agreements, generally at the industry level, set minimum rates for the lowest pay group in a collective agreement ("Minimum Pay in 18 Countries," 1992). Such minima, to

[11] Much of this higher U.S. union-nonunion wage differential is due to a higher ceteris paribus U.S. union-nonunion wage gap rather than to differences in the personal characteristics of union and nonunion workers (Blanchflower and Freeman 1992). Thus a strong causal role for the industrial relations system is suggested.

the extent that they are binding, will tend to bring up the floor among workers covered by the contract. In the limiting case, a contract that covered all workers in the economy might be expected to compress the bottom of the distribution, just as a high national minimum wage would. Thus we expect to find greater narrowing at the bottom than at the top in the union sector in most countries compared to the United States but regard this as to some extent an empirical question.

Several factors also lead us to expect more dispersion of nonunion wages in the United States than elsewhere. These factors include the practice in many other countries of extending the terms of collective bargaining agreements to nonunion workers. Such contract extensions blur the distinction between union and nonunion wage setting. To the extent that unions in all countries tend to compress wages at the bottom in the union sector, contract extension will not only reduce wage variation in the nonunion sector but compress wages at the bottom as well. In addition, the higher degree of union organization outside the United States should produce more "voluntary" imitation of union pay structures by nonunion firms than in the United States.[12] Finally, the impact of these factors has been further strengthened by explicit union and government policies in some countries to bring up the bottom of the wage distribution.

III. Overview of International Differences in Labor Market Institutions

In this section, we provide a brief review of the institutional arrangements governing wage determination in the countries in our sample that suggests that wage setting is indeed more decentralized in both the union and nonunion sectors in the United States. In the union sector, Sweden and Norway exemplify a very high degree of centralization of wage setting in our sample of countries. There, the major union federation (LO) signs an agreement with the employer association (SAF in Sweden and NHO in Norway) covering a major portion of the labor force (Leion 1985; Thorsrud 1985; OECD 1989). Austrian collective bargaining is also very centralized, with agreements in most cases covering an entire industry or group of industries throughout the country (Tomandl and Fuerboeck 1986). In Germany, contracts usually cover all employers in an industry in a state, providing a higher degree of centralization than in the United States

[12] This will be the case if union "threat" effects dominate any negative "crowding" effects in the nonunion sector caused by the adverse employment effects of unionism. Kahn and Curme (1987) found for the United States that, other things equal, nonunion wage dispersion was lower in highly unionized than in less unionized industries.

but probably less than in Scandinavia or Austria (Kennedy 1980). And in Italy, master industrywide agreements negotiated at the national level between unions and employer associations have traditionally been the norm (Katz 1993). Collective bargaining in Australia has also been characterized by considerable centralization, since the system relies heavily on government tribunals and compulsory arbitration in setting wages (Katz 1993). It has been estimated that about 90 percent of the Australian labor force has its pay set by these tribunals (Killingsworth 1990). Hungary was surveyed during the period of Communist party rule. While most workers were in unions, wages were controlled by the state, providing another example of centralized wage determination (Rezler 1973; U.S. Department of Labor 1992). For each of these countries, we would expect less dispersion of union wages than in the United States.

Collective bargaining in Switzerland and Britain is less centralized than in the countries discussed above, but likely more centralized than in the United States. While Britain, like the United States, had a mixture of single-firm and multiemployer agreements, in the 1970s, the latest period for which quantitative data are available, bargaining appeared to be more centralized in Britain. In the United Kingdom for 1977–78, 25 percent of manufacturing contracts covered more than one firm (Deaton and Beaumont 1980), whereas for the United States the figure in 1975 was only 13 percent (Hendricks and Kahn 1982). Switzerland appears to have a mix of centralization and decentralization. On the one hand, many agreements exclude the subject of pay, leaving it to individual determination. On the other hand, there are no antitrust laws, and parties are encouraged to form associations, leaving open the possibility of de facto centralization (Wrong 1987). Further, it has been estimated that about half of the Swiss private-sector workforce is covered by industry collective bargaining agreements ("Minimum Pay in 18 Countries," 1992).

Events in the 1980s and 1990s have led to the decentralization of bargaining in virtually every industrialized country.[13] In Sweden and Norway, the influence of the central employer federation–LO agreement was reduced starting in the 1980s, though by the end of the decade, some recentralization had occurred in Norway. In Australia, tribunal decisions have allowed more interfirm variation in wage settlements. In Germany and Italy, bargaining has shifted in some cases from the industry to the plant level in the late 1980s. In Britain and the United States, multiemployer units continued to crumble in the 1980s and 1990s.

[13] This discussion of recent trends is based on OECD (1989), Katz (1993), Edin and Topel (1994), and Edin and Holmlund (1995).

We have no way of knowing whether decentralization has proceeded faster outside the United States than inside. Nonetheless, one's impression is that, with the possible exception of Britain, systems of collective bargaining remain more centralized in the other countries than in the United States. The United States does not have the centralizing institutions that are still in place in these other countries. And deunionization proceeded much more rapidly in the United States than in other countries (including Britain), providing an extreme form of decentralization (Blanchflower and Freeman 1992; Katz 1993).

The structure of collective bargaining thus leads us to expect more dispersion of union wages in the United States than elsewhere. A review of labor market institutions in other countries leads us to expect more dispersion of nonunion wages in the United States as well. In Australia, wage tribunals set minimum pay rates across both the union and nonunion sectors, whereas in then-Communist Hungary, wages in both sectors were controlled by the state. In Germany, Austria, Italy, and Switzerland, the government routinely extends the terms of collective bargaining agreements to nonunion workers.[14] It has been estimated that as of 1992, legally binding industry or sectoral level agreements covered 90 percent of workers in Germany, 98 percent in Austria, "the vast majority" in Italy, and "nearly all" workplaces in Sweden ("Minimum Pay in 18 Countries," 1992). In Switzerland, in 1992, roughly 10 percent of all workers (or about 20 percent of nonunion workers) were nonunion employees whose wages had been set through contract extensions ("Minimum Pay in 18 Countries," 1992). These figures for 1992 suggest that whatever trends there have been toward decentralization in the 1980s and 1990s, wage setting remains considerably more centralized in Western Europe than in the United States.

Finally, in Sweden, Italy, Norway, and West Germany, explicit union and government policies have been followed that would be expected to lead to strong compression at the bottom of the distribution. From 1968 to 1974, the LO in Sweden made a conscious effort to raise the relative wages of lower-paid workers, leading to a sharp fall in inequality (Edin and Topel 1994). In Italy, the wage indexation

[14] See Kennedy (1980), Tomandl and Fuerboeck (1986), Treu (1990), and "Minimum Pay in 18 Countries" (1992). A sizable proportion of Italian workers are self-employed or work in an underground or informal sector in which government-mandated benefits are not paid. The self-employed are not included in our analysis because of our interest in the wage determination process for wage and salary workers. Further, it is likely that since informal-sector employment is illegal, it is underreported by the respondents in our survey-based data. Thus we may understate wage inequality in Italy.

system, the *scala mobile,* in place from 1975 to 1992, gave across-the-board lira increases in wages in response to inflation. The system was designed to reduce skilled-nonskilled pay differentials (Treu 1990; "Italy," 1992). By 1990, Italian employers claimed that accumulated indexation payments accounted for 40 percent of labor costs ("New Industrial Relations Talks Continue," 1990). While other aspects of the pay package to some degree counteracted the leveling effects of indexation, Erickson and Ichino (1995) found that the system still had some independent effect in reducing inequality. In Norway in 1980, a special fund for wage increases for the low-paid was established (U.S. Department of Labor 1984). Finally, in recent years in Germany, some unions have succeeded in getting above sectoral levels of wage increases for low-paid workers, in an attempt to raise the floor ("Minimum Pay Setting: Germany," 1992).

IV. Results

A. *Data Sources and the Definition of Hours-Corrected Earnings*

We compiled micro data from several sources to examine international differences in male wage inequality. First, we used the International Social Survey Programme (ISSP) for the following countries and time periods: Austria (1985–87 and 1989), West Germany (1985–88), Hungary (1986–88), Switzerland (1987), Britain (1985–89), the United States (1985–89), and Norway (1989). Second, we supplemented the ISSP with several other micro data bases in order to expand our coverage of countries. Specifically, we used the Class Structure and Class Consciousness (CSCC) data base compiled by Erik Wright for Sweden (1980) and, since it is also available, Norway (1982)—providing us with a second Norwegian data set; the Income Distribution Survey (IDS) for Australia (1986); and a Bank of Italy survey for Italy (1987).[15] In all cases, the sample is restricted to wage and salary workers, aged 18–65. Third, we performed a special comparison for 1984 between the United States and Sweden using two additional databases with more detailed information on personal characteristics and earnings: the Michigan Panel Study of Income Dynamics (PSID) and the Swedish Household Market and Nonmar-

[15] Blanchflower and Freeman (1992) describe the ISSP data, Rosenfeld and Kalleberg (1990) the CSCC data, Blackburn and Bloom (1991) the IDS data, and Erickson and Ichino (1995) the Bank of Italy data. The ISSP had information on Italy, but it did not collect data on the respondents' industrial sector. We therefore used the Bank of Italy data instead. Further, preliminary results indicated that the Australian data in the ISSP were inconsistent with other sources, leading us to use the more consistent IDS data.

ket Activities Survey (HUS).[16] In this portion of the analysis, the sample is further restricted to full-time workers and, in the case of the U.S. data, to whites. White males are used instead of all males in order to produce a relatively homogeneous U.S. sample to compare with the Swedish data. (The ISSP did not collect information on race.)

The specific earnings measures available in the data for each country are described in detail in Appendix table A1. For all cases except the 1984 Sweden–United States comparison, the earnings variable supplied by the data source is expressed on an annual or monthly basis. For example, the Appendix shows that in Britain, the United States, Australia, Italy, and Norway, the variable is annual earnings from all jobs; whereas in Austria, Germany, Switzerland, and Hungary, it is monthly earnings. For the 1980 data on Sweden, income is counted for the year and includes labor and nonlabor income, which is dominated by labor income (Rosenfeld and Kalleberg 1990). The computation of wage rates from such data is complicated by the omission of information on annual weeks worked. Data on weekly hours worked are available, however, allowing for some adjustment of earnings for time input (described below). But because of the lack of data on weeks worked for most of the countries, we cannot directly compute a wage rate, which would be the preferable measure of earnings. For the 1984 Sweden–United States comparison, however, we are able to compute hourly earnings.[17]

With the exception of the 1984 HUS (Sweden) and PSID (United States) data, the earnings variable in the raw data files generally arrived to us coded into categories. We used the midpoint of each interval as the actual earnings measure, except for the top interval, since it was open-ended. In the analyses presented below, we arbitrarily coded the top category as 1.2 times its minimum value. Our results were not sensitive to assumptions about top-coding.[18] Finally,

[16] For a description of the PSID, see Blau and Kahn (in press *a*), and for information on the HUS, see Edin and Holmlund (1995).

[17] For Australia and Norway in 1982, weeks worked information is available. We thus are able to compute hourly earnings for these two countries in addition to the 1984 Sweden–United States comparison. However, we treat these countries like the others in order to maintain comparability. As we note below, the difference between the United States and these countries in the distribution of hourly wages is quite similar to that for our hours-corrected earnings variable (described below), increasing our confidence in the data correction method.

[18] The Australian earnings data were originally reported as a continuous variable, and the 1989 Norwegian data were also available in continuous form. However, to maintain comparability with the other countries, we recoded the Australian earnings into the ISSP's intervals for Australia and used the interval 1989 Norwegian data. Wage distributions for Australia and Norway in 1989 using the original continuous variables were virtually identical to those reported here. These findings for the cases in which we are able to construct a continuous earnings variable give us some confi-

concern about adequate sample size led us to pool years of data for those ISSP countries surveyed more than once (see above). However, since the multiple years of data on Sweden and Norway come from different sources, we do not pool them.

Because our basic data sources apart from the U.S. PSID and the Swedish HUS generally do not provide enough information to allow us to compute hourly earnings, we adjusted the raw earnings variable for time input, using the information available. Adjusting for time input is essential in studying the inequality of the price of labor across countries, since the distribution of working hours varies across countries. For example, Björklund and Freeman (1994) report that the variance of annual work hours is greater in the United States than in Sweden, and our micro data show that the U.S. variance in weekly work hours is greater than that in other countries, both among all workers and among full-time workers. To create the hours-corrected earnings measure, which was used to construct figure 1 and in the analyses below, we implemented the following procedure.

For each worker i in country j, the following regression was estimated:

$$\ln \mathrm{EARN}_{ij} = b_{j0} + b_{j1}\mathrm{PART}_{ij} + b_{j2}\mathrm{HPART}_{ij} + b_{j3}\mathrm{HFULL}_{ij} + \mathbf{B}_j'\mathbf{X}_{ij} + \sum_t \tau_{jt}\mathbf{YR}_{ijt} + e_{ij}, \tag{2}$$

where ln EARN is the log of earnings; PART is a dummy variable for part-time work (less than 35 hours per week); HPART and HFULL are interactions of weekly work hours with part- and full-time status; $\mathbf{X}$ is a vector of explanatory variables including years of schooling, potential experience and its square, a dummy variable for those married, spouse present, a union membership dummy variable, and one-digit industry and occupation dummies; $\mathbf{YR}_t$ is a vector of dummies for the countries for which we pooled different years of data; and e is an error term. (For ease of notation, we have suppressed t subscripts for the dependent and explanatory variables besides $\mathbf{YR}_t$ and for the error term. See App. table A2 for variable definitions.)[19]

The PART, HPART, HFULL, and year dummy variable coeffi-

dence in the cases in which we are forced to use interval data. The Bank of Italy data were also continuous but did not match up with the ISSP categories for Italy. We therefore used the continuous earnings variable for Italy.

[19] Marital status was not available for Italy; union status was not available for Australia or Italy; and, as indicated in table A2, available occupation and industry classifications differ for some countries. For the purpose of comparing the United States to these countries, we estimated U.S. equations that conformed to the same specification as each country. In analyses of the U.S. PSID and the Swedish HUS data shown below, actual labor market experience is used; union status is not available in the HUS.

cients from (2) were used to adjust each person's earnings for work hours and year by assuming a 40-hour work week and the end year of the pooled years. That is, for each worker i and country j, we have

$$\begin{aligned} \mathrm{YFULL}_{ij} = \ln \mathrm{EARN}_{ij} - b_{j1}\mathrm{PART}_{ij} - b_{j2}\mathrm{HPART}_{ij} \\ - b_{j3}(\mathrm{HFULL}_{ij} - 40) - \sum_t \tau_{jt}\mathbf{YR}_{ijt}, \end{aligned} \tag{3}$$

where YFULL is the log of hours-corrected earnings, the b's and τ_t are coefficients estimated from equation (2), and the rest of the variables are defined above. We include part-time workers for sample size reasons and to have a representative sample. The share of part-time workers among male workers is small, ranging from 1 to 9 percent in the countries in our sample, and the distribution of hours-corrected earnings for full-time workers is similar to that for all workers in our sample.

In estimating the coefficients for the hours variables (the b's above) for the adjustment of earnings, we include all the explanatory variables in the basic wage determination model. We follow this procedure so that, as much as possible, the hours coefficients perform the function of adjusting for time input rather than picking up the effects of omitted variables. Of course, to some degree, even when one controls for human capital, marital status, industry, union status, and occupation, differences in hours may be associated with unmeasured productivity.[20] Nonetheless, for the purposes of computing an earnings measure with which to compare countries, we believe that it is important to adjust for hours input as fully as possible.[21] For the 1984 United States–Sweden comparison, we use the log of hourly earnings, based on the previous year's earnings divided by the previous year's work hours.[22]

Measures of inequality calculated on the basis of hours-corrected earnings were presented in figure 1 and are also shown in panel A of table 1. We again see that the United States has a considerably

[20] The impact of unmeasured productivity is discussed below.

[21] An alternative procedure is to first adjust earnings for hours by regressing ln EARN on the hours variables and year dummies only and use the resulting coefficients to create hours-adjusted earnings, which are then regressed on **X**. When we implemented this alternative, we obtained very similar wage distributions, **X** coefficients, and wage residuals as those obtained using eq. (2).

[22] For the U.S. PSID sample, we excluded anyone earning less than $1.00 per hour or more than $250 per hour in 1983 dollars. The U.S. minimum wage was $3.35 per hour at the time. For Sweden, we excluded anyone earning less than 7 kroner per hour, or about one-seventh the average measured wage. This exclusion restriction was made since $1.00 was about one-seventh the U.S. average. Since the U.S. wage distribution is more dispersed than the Swedish, any error caused by these exclusion restrictions will lead us to understate the Swedish-U.S. difference in wage dispersion.

TABLE 1

SUMMARY MEASURES OF WAGE INEQUALITY

	Standard Deviation	50-10 Percentile Differential	90-50 Percentile Differential	90-10 Percentile Differential
	A. Log Hours-Corrected Earnings			
Germany	.470	.456	.539	.995
Britain	.489	.594	.683	1.277
United States	.772	1.040	.552	1.592
Austria	.424	.391	.508	.899
Switzerland	.549	.464	.777	1.241
Sweden (1980)	.523	.382	.452	.834
Norway (1982)	.441	.372	.382	.754
Australia	.622	.755	.439	1.194
Hungary	.431	.462	.661	1.123
Italy	.488	.478	.486	.964
Norway (1989)	.360	.224	.525	.749
Non-U.S. average (unweighted)	.480	.458	.545	1.003
	B. Log Hourly Earnings			
Sweden (1984)	.343	.254	.388	.642
United States (1984)	.543	.772	.546	1.318

larger standard deviation of earnings and 90-10 gap than the other countries. However, whereas the U.S. 50-10 earnings differential is much larger than it is in the other countries (0.582 log points above the non-U.S. average), the 90-50 differential in the United States is smaller than in Britain, Switzerland, and Hungary and only slightly larger than in Germany, Austria, and Norway (1989). Overall, the U.S. 90-50 gap is only slightly larger (0.007 log points) than the unweighted average for the other countries. Similar results are obtained for a comparison of log hourly earnings between the United States and Sweden in 1984 (panel B). The U.S. 50-10 differential is much larger (0.518 log points) than it is in Sweden, whereas the 90-50 gap is only 0.158 log points higher. Further, these estimates of the U.S.-Swedish differences at the bottom and the top of the wage distribution are quite similar to those obtained for hours-corrected earnings using the ISSP data for the United States and the CSCC data for Sweden (panel A).[23]

[23] As noted above, it is possible for us to compute distributions of hourly wages among full-time workers for Australia and Norway (1982). When we compare them to the distribution of hourly wages among full-time workers for the United States using the PSID, the differences in wage distributions between the United States and these countries are quite similar to those obtained using the hours-corrected data.

B. The Role of Prices and Measured Characteristics

A crucial question raised by the results shown in table 1 is the degree to which the observed differences in wage dispersion between the United States and other countries are due to differences in measured characteristics versus differences in the prices of labor market skills (i.e., wage structure). To shed light on this issue, we employ a full distributional accounting scheme developed by Juhn et al. (1993) to study intertemporal changes in U.S. wage inequality.

We begin with a wage equation for worker i in country j:

$$\text{YFULL}_{ij} = \mathbf{B}_j'\mathbf{X}_{ij} + c_j + e_{ij} \equiv \mathbf{B}_j'\mathbf{X}_{ij} + c_j + \sigma_j\theta_{ij}, \tag{4}$$

where YFULL is hours- (and year-) corrected log earnings as defined in equation (3), $\mathbf{X}$ is a vector of variables defined above, $\mathbf{B}$ is the vector of estimated coefficients from equation (2), and e is necessarily the same error term as in equation (2). Note that c_j ($= 40b_{j3}$) derives from the computation of hours-corrected earnings in equation (3). Since it is constant across individuals in each country, it has no impact on our analysis of intercountry differences in wage distributions, and thus, for simplicity, we suppress it from the equations below. (For the 1984 Sweden–United States comparison, the dependent variable is simply hourly earnings, and $c_j = 0$.)

In general, the analysis proceeds in one step in which we estimate the determinants of the raw earnings variable in equation (2) to obtain all the coefficients necessary for the hours adjustment of earnings and for the analysis of international differences in the distribution of hours-adjusted earnings (described below) at the same time. Thus, for the purposes of the decomposition, we treat the hours (and year dummy) variables as pure adjustment factors rather than as productivity characteristics or labor market structure indicators. While, as noted above, hours may be correlated with productivity, it is also a direct measure of labor supply. Our goal is to explain international differences in the distribution of the price of labor rather than of labor incomes. Since YFULL is adjusted for hours input, it does a better job of this than the unadjusted earnings variable (ln EARN). However, as equations (2) and (4) show, the wage coefficients for the variables of substantive interest ($\mathbf{B}$) and the residuals (e) are unchanged when we shift our focus from ln EARN to YFULL.

To analyze the prices of skills as they influence international differences in the wage distribution, we begin by noting that, in the last term in equation (4), e is replaced by θ, a standardized residual with mean zero and variance one, multiplied by σ, the residual standard deviation of log hours-corrected earnings. Following Juhn et al. (1993), we may then create two hypothetical wage distributions for

each country. First, for country j we construct the set of wages that would emerge if we applied the estimated U.S. wage function ($\mathbf{B}_u$) and residual standard deviation (σ_u) to each worker i in country j:

$$Y(1)_{ij} = \mathbf{B}_u' \mathbf{X}_{ij} + \sigma_u \theta_{ij}, \tag{5}$$

where $Y(1)_{ij}$ is computed for each worker in country j by valuing his measured characteristics at the U.S. coefficient vector $\mathbf{B}_u$ and his position in his own country's distribution of wage residuals (e.g., the thirty-fifth percentile) at the corresponding position in the U.S. residual distribution. The primary difference between the distribution of YFULL for the United States and of $Y(1)$ for country j is the substitution of country j's distribution of measured characteristics for those of the United States in the U.S. wage equation.[24] Construction of $Y(1)$ is important because it allows us to determine the extent to which international differences in the distribution of wages are due to differences in the distribution of measured characteristics.

The second hypothetical distribution for country j results from giving each person in country j his own country's estimated wage coefficients but the U.S. wage residual corresponding to his position in his own country's residual distribution:

$$Y(2)_{ij} = \mathbf{B}_j' \mathbf{X}_{ij} + \sigma_u \theta_{ij}. \tag{6}$$

The difference between the distributions of $Y(2)_{ij}$ and $Y(1)_{ij}$ is entirely due to the difference between country j's wage function and that of the United States.

Finally, the impact of wage residuals on country j's wage distribution relative to that of the United States is the difference between the distribution of YFULL_{ij} and $Y(2)_{ij}$. While we would like to interpret this as the effect of unmeasured prices (i.e., the difference between σ_u and σ_j), it also includes the effect of differences in the distribution of unmeasured productivity characteristics and measurement error. First, while the U.S. residual distribution may be more dispersed than that of other countries because of higher prices of unmeasured skills, it may also be the case that the U.S. labor force is more diverse in its unmeasured characteristics. Second, the need to deal with interval data and the different definitions of earnings may have introduced differential measurement errors across countries. Such differences in the distribution of unmeasured productivity and in measurement errors would be included in our estimate of the effect of wage residu-

[24] Country j's estimated values of θ are also used in computing $Y(1)_{ij}$, but they are standardized across countries and therefore do not directly contribute to international differences in the distribution of wages. However, to the extent that θ is more strongly correlated with $\mathbf{X}$ for one country than another, the difference between the distribution of YFULL_u and $Y(1)_j$ will also reflect the effects of this difference in correlation.

als but do not reflect unmeasured prices. Our review of the literature on wage-setting institutions suggests that the United States does in fact have higher skill prices than other countries; but we cannot rule out the possibility that some portion of the cross-country differences in wage variation associated with the wage residuals reflects international differences in unmeasured quantities or measurement error as well as unmeasured prices.

To further support the notion that unmeasured prices are important, we supplement our other analyses with a comparison of 1984 data from the U.S. PSID and the Swedish HUS that are likely to be less contaminated by unmeasured heterogeneity than our other data sources. Specifically, as noted above, for the 1984 United States–Sweden comparison, we use a sample of white, full-time employed men from the United States and full-time employed men from Sweden. Thus racial heterogeneity in the United States will not directly affect this comparison. In addition, we are able to construct actual average hourly earnings in these samples, again reducing the scope for errors. Finally, we are able to control for actual, rather than potential, labor market experience. While potential labor market experience is a good proxy for actual experience for men, fewer errors will result if one has data on the real thing and if these data are themselves accurate.[25]

We perform the decomposition of differences in the wage distribution implied by equations (4)–(6) in two stages. Initially, we include only a vector of human capital characteristics (education, potential experience and its square, and marital status). Next, we augment the human capital variables with a vector of industry and occupation dummy variables and union status; that is, we estimate equation (2) above. A comparison of the results from the two specifications sheds light on the role of occupation, industry, and unionism in explaining the international differences.[26]

[25] In the Swedish data, information on actual experience since age 16 is collected, whereas in the PSID, the variable refers to years of experience since age 18. To make the two variables comparable, we added two times the U.S. white male employment/population ratio for ages 16–17 to the PSID experience figure. These data were collected from the U.S. Bureau of Labor Statistics (1985).

[26] For the full specification, the analysis proceeds in one step, as described above, in which we estimate eq. (2) to obtain all the coefficients necessary for the adjustment of earnings and for the decomposition at the same time. For the human capital specification, estimation proceeds in two steps. We first obtain YFULL using eqq. (2) and (3). That is, we adjust earnings for hours input using an equation with all the explanatory variables included. This procedure was followed in order to obtain an hours-correction factor with the least possible contamination by omitted variable bias. We then estimate the coefficients in the modified **X** vector (i.e., including human capital variables only) using YFULL as the dependent variable. Thus the basic dependent variable in comparisons of the human capital and full specifications is the same.

The results of performing this decomposition for the standard deviation of log wages are shown in table 2. Panel A of the table shows the human capital specification results, and panel B shows the findings for the full specification. The actual U.S.–country j differences are shown in column 1. As may be seen in column 2 of the table, the distribution of measured characteristics explains relatively little (about 6 percent, on average) of the higher variation in wages in the United States than elsewhere under either specification. In contrast, prices appear to be important in explaining the differences in inequality between the United States and the other countries. In every instance, measured prices and residual effects serve to raise the U.S.

TABLE 2

DECOMPOSITION OF THE U.S.–COUNTRY j DIFFERENCES IN THE STANDARD DEVIATION OF LOG WAGES

	U.S. Standard Deviation − Country j Standard Deviation (1)	Measured Characteristics Effect (2)	Wage Coefficients Effect (3)	Wage Equation Residual Effect (4)
	A. Human Capital Specification			
Germany	.301	.008	.020	.274
Britain	.283	.044	.021	.218
Austria	.348	.006	.062	.279
Switzerland	.223	.001	.035	.187
Sweden (1980)	.248	.034	.017	.197
Norway (1982)	.331	.018	.047	.266
Australia	.150	.014	.036	.100
Hungary	.340	.038	.078	.224
Italy	.284	−.0004	.048	.236
Norway (1989)	.411	.023	.042	.347
Sweden (1984)	.200	−.001	.069	.132
Non-U.S. average (unweighted)	.284	.017	.043	.224
	B. Full Specification			
Germany	.301	.021	.032	.248
Britain	.283	.037	.037	.209
Austria	.348	.008	.075	.265
Switzerland	.223	−.004	.032	.195
Sweden (1980)	.248	.032	.018	.198
Norway (1982)	.331	.014	.071	.246
Australia	.150	.007	.051	.092
Hungary	.340	.025	.111	.205
Italy	.284	.020	.037	.227
Norway (1989)	.411	.008	.076	.327
Sweden (1984)	.200	.011	.080	.109
Non-U.S. average (unweighted)	.284	.016	.056	.211

standard deviation of wages compared to each country. Table 2 indicates that prices of measured characteristics explain a larger share than the distribution of measured characteristics: 15–20 percent on average, with the bulk of the difference between the United States and the other countries (74–79 percent) attributable to the larger residual variation of wages in the United States. Thus prices of labor market skills (both measured and unmeasured) appear to be the primary cause of the higher variation in wages in the United States, although we cannot rule out the possibility that the distribution of unmeasured characteristics and measurement error also play a role. The 1984 United States–Sweden comparison is instructive in this regard. Despite the more homogeneous U.S. sample and the better measure of wages and experience, the results are quite similar to those of the 1980 United States–Sweden comparison. Most notably, measured characteristics actually play a smaller part in explaining the U.S.-Swedish difference in the 1984 comparison.

We explicitly compare the magnitude and sources of the 50-10 and the 90-50 differentials in table 3. The results for the human capital specification are again shown in panel A and the results for the full specification in panel B. Column 1 of both panels shows the actual U.S.–country j difference in the 50-10 and 90-50 log wage differentials. As we saw above, these differences are considerably greater for the 50-10 gap (0.576 log points, on average) than for the 90-50 gap (0.021 log points, on average).[27] Column 2 of table 3 shows that these 50-10 versus 90-50 comparisons are substantially affected by the distribution of measured characteristics.

For each country j, the measured characteristics effect is the difference between YFULL_u and $Y(1)_j$ at the indicated percentiles of the distribution. The positive effects for the 50-10 differentials for both specifications indicate that the U.S. distribution of measured characteristics widens the 50-10 gap compared to that in each country. These effects—0.245 log points for the human capital specification and 0.207 log points for the full specification, on average—are large indeed. A comparison of the results for the two specifications indicates that it is the U.S. distribution of human capital characteristics that is relevant in explaining the international differences, with the U.S. distribution of industry, occupation, and union status slightly lowering the 50-10 gap compared to other countries.[28] On average, measured characteristics are estimated to account for 35.9–43.4 per-

[27] These figures differ slightly from those presented above because Sweden (1984) is now included in the non-U.S. average.

[28] To some degree union status, while treated here as a measured characteristic in panel B of tables 2 and 3, could be considered part of the wage-setting institutions. The effects of collective bargaining are discussed below.

TABLE 3

DECOMPOSITION OF THE U.S.–COUNTRY *j* DIFFERENCES IN THE 50-10 AND 90-50 DIFFERENTIALS IN LOG WAGES

	U.S. Differential − Country *j* Differential (1)	Measured Characteristics Effect (2)	Wage Coefficients Effect (3)	Wage Equation Residual Effect (4)
	A. HUMAN CAPITAL SPECIFICATION			
	50-10 Log Wage Differential			
Germany	.584	.312	−.019	.291
Britain	.446	.083	.089	.274
Austria	.649	.299	−.005	.355
Switzerland	.576	.254	.053	.269
Sweden (1980)	.658	.385	.034	.239
Norway (1982)	.668	.331	−.013	.350
Australia	.285	.069	.068	.148
Hungary	.578	.158	.038	.382
Italy	.562	.246	.041	.275
Norway (1989)	.816	.338	−.037	.515
Sweden (1984)	.518	.225	.018	.275
Non-U.S. average (unweighted)	.576	.245	.024	.307
	90-50 Log Wage Differential			
Germany	.013	−.183	.095	.101
Britain	−.131	−.134	−.043	.046
Austria	.044	−.199	.121	.122
Switzerland	−.225	−.300	.046	.029
Sweden (1980)	.100	−.075	.078	.097
Norway (1982)	.170	−.132	.086	.216
Australia	.113	−.067	.054	.126
Hungary	−.109	−.190	.208	−.127
Italy	.066	−.151	.114	.103
Norway (1989)	.027	−.104	.065	.066
Sweden (1984)	.158	−.190	.152	.196
Non-U.S. average (unweighted)	.021	−.157	.089	.089
	B. FULL SPECIFICATION			
	50-10 Log Wage Differential			
Germany	.584	.301	.067	.216
Britain	.446	.010	.192	.244
Austria	.649	.208	.144	.297
Switzerland	.576	.218	.170	.188
Sweden (1980)	.658	.294	.205	.159
Norway (1982)	.668	.370	.057	.241
Australia	.285	.127	.046	.112
Hungary	.578	.145	.174	.259
Italy	.562	.233	.092	.237
Norway (1989)	.816	.212	.129	.475
Sweden (1984)	.518	.164	.104	.250
Non-U.S. average (unweighted)	.576	.207	.125	.243

TABLE 3 (*Continued*)

	U.S. Differential − Country j Differential (1)	Measured Characteristics Effect (2)	Wage Coefficients Effect (3)	Wage Equation Residual Effect (4)
	90-50 Log Wage Differential			
Germany	.013	−.177	.091	.099
Britain	−.131	−.149	−.056	.074
Austria	.044	−.151	.093	.102
Switzerland	−.225	−.231	−.049	.055
Sweden (1980)	.100	−.091	.080	.111
Norway (1982)	.170	−.191	.166	.195
Australia	.113	−.129	.098	.144
Hungary	−.109	−.206	.196	−.099
Italy	.066	−.108	.048	.126
Norway (1989)	.027	−.132	.056	.103
Sweden (1984)	.158	−.140	.132	.166
Non-U.S. average (unweighted)	.021	−.155	.078	.098

cent of the higher U.S. 50-10 differential. In contrast, the distribution of measured characteristics lowers the 90-50 wage differential in the United States compared to other countries. In each case, the effect is negative with an unweighted average effect of about −0.16 log points in both specifications. For both the 50-10 and 90-50 analyses, we find the impact of measured characteristics to be quite similar for the 1984 Sweden and 1980 Sweden comparisons, again suggesting that greater unmeasured heterogeneity of U.S. workers is not driving our results.

The findings for the measured characteristics effects imply that a considerable portion of the wider 50-10 gap relative to the 90-50 gap in the United States is accounted for by differences in the distribution of productive characteristics. With the same distribution of measured characteristics, the average difference between the U.S. 50-10 gap and that for the other countries would decline to 0.331–0.369 log points (from 0.576), whereas the figure for the 90-50 gap would increase to about 0.18 (from 0.021). Thus if we consider the part of the differential that is not accounted for by measured characteristics (i.e., the sum of the wage coefficients and wage residuals effects) as potentially due to wage structure, we find that the U.S. wage structure widens both the top and the bottom of the wage distribution relative to other countries. In particular, adding the wage coefficients and wage residuals effects, we find that in every case, U.S. prices lead to a widening of both the 50-10 and the 90-50 differentials compared to other countries.

In the decomposition shown in tables 2 and 3, controlling for personal characteristics is especially important since it reveals the 90-50 widening effect of U.S. prices, an effect that is not apparent if one merely compares the raw 90-50 differential in the United States with that in other countries. Further, it reduces the likelihood that we are overstating the compression at the bottom (which would occur if one merely examined the raw 50-10 differentials). However, the U.S. wage structure continues to widen the bottom by more than the top. This is true on average and in nine (full specification) or 10 (human capital specification) of 11 possible cases. Such an effect is consistent with government and trade union wage policies in other countries that have their biggest effect in bringing up the bottom of the distribution.

Columns 3 and 4 of table 3 show the effects of wage coefficients and wage residuals separately. For the 50-10 gap, the U.S. human capital wage coefficients usually have a small widening effect compared to the other countries (accounting for 4.2 percent of the difference, on average), although the effect is negative in four cases. The coefficients effect is notably increased when the full specification is employed (accounting for 21.7 percent of the difference, on average), suggesting that it is the prices associated with the industry, occupation, and unionism variables that are particularly high in the United States. In both specifications, however, the wage residuals effect accounts for a substantial share (42.2–53.3 percent) of the U.S.–country j difference. In the case of the 90-50 gap, the coefficients and residual effects are generally positive and do not differ very much between the two specifications. This suggests that the impact of measured prices primarily reflects higher prices of the human capital variables in the United States. The coefficients and residual effects are roughly equal in size, on average.

C. *The Effect of Institutions: Collective Bargaining and Contract Extension*

Our discussion of trade unionism led us to expect greater U.S. wage dispersion than in other countries because of higher U.S. dispersion within the union and nonunion sectors, a greater U.S. union-nonunion wage differential, and a relatively smaller U.S. union sector. The relative size of the U.S.–other country difference in union versus nonunion wage dispersion is an empirical question. On the one hand, suppose that the wage spillover due to contract extension and voluntary imitation is virtually complete in the non-U.S. countries but that unions in these countries have only a slightly greater narrowing effect for their members than U.S. unions do. Then we would

expect the nonunion differences in inequality between the United States and other countries to be larger because, outside the United States, workers not in unions would essentially be treated as union members. On the other hand, suppose that the spillover to nonunion workers in the non-U.S. countries is partial and that unions in these countries have a much greater narrowing effect for their members than U.S. unions do. Then U.S.–non-U.S. differences in union inequality could be greater than nonunion differences.

These issues are examined in detail in Blau and Kahn (1994), and the results are summarized here. For the countries in our sample for which collective bargaining status was available,[29] we used equation (1) to decompose U.S.–other country differences in the log wage variance. We found that, on average, 86 percent of the larger U.S. variance was due to higher U.S. variances within the union and nonunion sectors. Another substantial portion, about 12 percent, on average, was due to the smaller relative size of the low-variance (union) sector in the United States, whereas the higher U.S. union-nonunion wage differential accounted for only 2 percent of the larger U.S. log wage variance, on average. Thus we must look within the union and nonunion sectors to understand U.S.–other country differences in wage dispersion.

We found that the higher U.S. union and nonunion wage dispersion primarily reflected the larger 50-10 log wage gap within each sector in the United States than in the other countries, mirroring our findings for the aggregate wage distribution. The most striking finding pertained to the nonunion sector, where the U.S. 50-10 differential of 1.082 log points was much larger than the unweighted average of 0.516 for the other countries. The 50-10 gap was also larger for U.S. union workers, but the international difference was much less: 0.689 for the United States compared to an average of 0.404 elsewhere. In contrast, the 90-50 gap for U.S. nonunion workers was about the same as in the other countries, whereas the 90-50 gap for U.S. union workers was actually slightly smaller than that for non-U.S. workers.

This 50-10 pattern is suggestive of larger union spillover effects on nonunion wage structures in other countries than in the United States, although it could still be due to the impact of measured characteristics. In order to shed light on the impact of prices as opposed to the distribution of measured skills, we performed the Juhn et al. (1993) decomposition outlined in equations (4)–(6) separately for

[29] Italy, Australia, and Sweden (1984) were excluded for lack of data, and Sweden (1980) could not be included because of the small sample of nonunion workers (59) in the data set. With a unionization rate of 85.7 percent, Sweden may be considered essentially a unionized country in any case.

union and nonunion workers in each country using the full specification.[30] We find that the standard deviation of log wages continues to be substantially higher in the United States in both the union and nonunion sectors even after taking into account the distribution of measured characteristics. The same pattern obtains for the 50-10 differential: the U.S. gap remains larger than that of other countries in both sectors after adjustment for the distribution of characteristics, with the U.S.–country j difference being considerably greater, on average, for nonunion than for union workers (i.e., 0.423 vs. 0.284 log points). In contrast, while the United States does tend to have a larger 90-50 gap than other countries after adjustment for the distribution of measured characteristics, the difference between the United States and the other countries is smaller than for the 50-10 gap and tends to be about the same size in the nonunion as in the union sector (i.e., 0.192 vs. 0.166 log points, on average).

Finally, we used quantile regression analysis to compare the impact of unions on wages at different points of the conditional wage distribution (using the full specification). We found that, at each point of the distribution, the U.S. ceteris paribus union-nonunion wage differential was larger than that of other countries. The finding of a larger union premium in the United States also characterizes our ordinary least squares results and previous ordinary least squares analyses (Blanchflower and Freeman 1992) and is strongly suggestive of contract extension and other mechanisms by which union wages in other countries "spill over" into the nonunion sector, thus lowering their estimated ceteris paribus union-nonunion differentials relative to the United States.

Within virtually every country, the union wage effect was larger for the lower quantiles of the distribution. (This finding has previously been obtained in quantile regressions on U.S. data; see Chamberlain [1991].) This is consistent with union pay-leveling effects: being in a union matters more for one's wages the lower down one would have been in the nonunion wage distribution. However, the decline in union effects as we move up the conditional wage distribution is steeper in the United States than elsewhere. Thus it appears that union pay policies that bring up the bottom of the union wage distribution are common to all countries, including the United States. The difference between the United States and the other countries is

[30] That is, we employ the overall regressions for the full specification to obtain the estimated coefficients but then examine the distributions of YFULL, $Y(1)$, and $Y(2)$ separately for union and nonunion workers. Ideally one would like to estimate separate union and nonunion equations to allow the coefficients to vary across sectors, but small sample sizes precluded this approach.

that, in those countries, such policies are extended to the nonunion sector to a greater extent.

D. *An Alternative Explanation: Supply and Demand Effects*

The findings in tables 2 and 3 indicate that prices of labor market skills play an important role in explaining international differences in inequality, since international differences in the distribution of measured characteristics do not fully account for the differences in wage inequality. While the results for union effects suggest that differences between countries in union pay-setting institutions are consistent with the observed patterns of wage inequality, we must also consider the possibility that supply and demand forces in the labor market are equally consistent.

To investigate the impact of supply and demand, we divide each country's labor force into three skill groups. We first pool the entire sample and estimate the following wage equation:

$$\text{YFULL}_i = d_0 + d_1\text{ED}_i + d_2\text{EXP}_i + d_3\text{EXPSQ}_i + E'\mathbf{N}_i + \epsilon_i, \quad (7)$$

where ED is education, EXP and EXPSQ are potential experience and its square, **N** is a vector of country dummies, and ϵ is an error term.[31] The estimated coefficients from equation (7) were used to compute SKILL, a predicted wage for each person i in each country j:

$$\text{SKILL}_{ij} = d_0 + d_1\text{ED}_{ij} + d_2\text{EXP}_{ij} + d_3\text{EXPSQ}_{ij}. \quad (8)$$

This predicted wage is a measure of the person's skill based on a worldwide pooled regression including only productivity characteristics (and eliminating country shift terms).

We then divide each country's workforce into three skill groups based on the following percentiles of SKILL: 0–33, 33–67, and 67–100.[32] These percentiles are computed in two ways. First, we construct a set in which the percentiles refer to the country's own distribution of SKILL, so that the skill groups will be the same relative size across countries. This definition considers skill to be a relative concept, with, say, the thirty-third percentile of SKILL in one country considered comparable to the thirty-third percentile of SKILL in another coun-

[31] Equation (7) was run using weighted least squares, with the weights being EMP/sample size, where EMP is average male employment in the country for the years in question and sample size is the size of the micro data sample for the given country. In effect, we weight by the worldwide likelihood that each worker is a member of the sample. Employment information was taken from International Labor Office (1991). The results were similar when unweighted regressions were used. Marital status was excluded in order to include Italy in the analysis.

[32] The intervals are closed at the bottom and open at the top, except for the 67–100 group, which is closed at each end.

try. One cannot analyze the effects of relative supply among these groups since, by construction, they are all proportionally the same size. Second, we construct a set of skill groups based on the U.S. cutoffs for SKILL. These percentiles consider skill to be an absolute concept: for example, those who place below the cutoff for the thirty-third percentile of the U.S. distribution of SKILL in one country are considered comparable to those who place below this level for the SKILL variable in another country. The relative sizes of the three groups can differ across countries under this latter definition. A similar analysis is performed separately for the 1984 U.S. PSID and Swedish HUS data samples.

Table 4 provides information on wage differentials by skill group. Panel A compares skill groups on the basis of own country cutoffs, and panel B uses U.S. skill group cutoffs. In both cases, the findings

TABLE 4

WAGE DIFFERENTIALS BY SKILL GROUP

	33–67 vs. 0–33	67–100 vs. 33–67	67–100 vs. 0–33
	A. Own Country Skill Cutoffs		
Germany	.313	.269	.582
Britain	.238	.178	.416
United States (ISSP)	.530	.265	.795
Austria	.228	.223	.451
Switzerland	.396	.375	.772
Sweden (1980)	.357	.203	.560
Norway (1982)	.230	.265	.495
Australia	.414	.201	.615
Hungary	.195	.189	.385
Italy	.280	.306	.586
Norway (1989)	.180	.249	.430
Non-U.S. average (unweighted)	.283	.246	.529
Sweden (1984)	.133	.232	.365
United States (PSID, 1984)	.328	.300	.628
	B. U.S. Skill Group Cutoffs		
Germany	.320	.369	.689
Britain	.277	.343	.620
United States (ISSP)	.530	.265	.795
Austria	.215	.268	.483
Switzerland	.454	.343	.797
Sweden (1980)	.307	.361	.668
Norway (1982)	.274	.197	.471
Australia	.317	.269	.586
Hungary	.208	.243	.451
Italy	.293	.315	.608
Norway (1989)	.230	.285	.515
Non-U.S. average (unweighted)	.289	.299	.589
Sweden (1984)	.206	.178	.383
United States (PSID, 1984)	.328	.300	.628

are similar to those obtained when we simply compared wage distributions. In particular, there is a larger pay gap between the middle- (33–67) and low- (0–33) skill groups in the United States than in each of the other countries. In contrast, the gap between high- and middle-skill groups tends to be fairly similar in the United States to that in the other countries: the U.S. gap is about the same as the non-U.S. average when own country cutoffs are used and slightly smaller than the non-U.S. average when the U.S. cutoffs are employed. From the top to the bottom, the high (67–100) versus low (0–33) gap, with only one exception (Switzerland with the U.S. cutoffs), is larger in the United States than in each of the other countries. For the 1984 United States–Sweden comparison, the results are roughly similar when the relative cutoffs are used in that the U.S.-Swedish difference is considerably larger for the low-middle gap than for the middle-high gap. When the absolute cutoffs are used, however, the U.S.-Swedish difference between the middle-low gaps is now the same size as the difference between the middle-high gaps. Regardless of the cutoff used, however, the U.S. high-low gap exceeds the Swedish high-low gap.

To analyze the impact of supply and demand, we construct supply and demand indexes by skill group for each country relative to the United States in a manner similar to Katz and Murphy's (1992) analysis of changes over time in U.S. inequality. We focus on the results from panel B of table 4 using the U.S. skill group cutoffs since they are more relevant for the supply indexes (and the net supply index we develop below). Thus the pattern we seek to explain is a relatively high pay gap between the middle- and low-skill groups in the United States combined with a high- versus middle-skill differential in the United States, which tends, with two exceptions (i.e., Sweden in 1984 and Norway in 1982), to be about the same as or smaller than those of other countries. Despite these countervailing differences, the pay gap between the top and bottom tends overwhelmingly to be higher in the United States.

Turning first to demand, we wish to know whether the composition of output by industry (and the consequent derived demand for labor) favors one skill group over another in the United States relative to other countries. Following Katz and Murphy (1992), we construct industry-occupation cells and view the "output" of particular occupation groups as an intermediate product. A demand index, $\ln(1 + \Delta D_k)$, was created for each skill group k for each country relative to the United States, where

$$\Delta D_k = \sum_o c_{ok} \left(\frac{\Delta E_o}{E_k} \right), \tag{9}$$

o refers to occupation-industry cell, c_{ok} is skill group k's share of employment in occupation-industry cell o in the United States, ΔE_o is the difference between country j's and the U.S. share of total labor input employed in cell o, and E_k is the U.S. share of total labor input accounted for by skill group k. The demand index thus measures the degree to which the occupation-industry structure favors skill group k in country j relative to the United States, with U.S. weights.

Supply indexes ΔS_k are computed as follows:

$$\Delta S_k = \ln E_{kj} - \ln E_{ku}, \tag{10}$$

where E_{kj} and E_{ku} are, respectively, the share of country j's and the United States' total labor input consisting of skill group k, with the U.S. cutoffs for skill groups. Thus the supply indexes compare the relative representation of each skill group in country j's labor force, with the U.S. shares used as the norm.

We may then compute net supply as

$$\Delta NS_k = \Delta S_k - \ln(1 + \Delta D_k), \tag{11}$$

where ΔS_k and ΔD_k are defined in equations (9) and (10) above. (Recall that all magnitudes are in log points and have been normalized relative to the United States.) As Katz and Murphy (1992) show using a simple equilibrium model, differences across countries in relative wages for each skill group will be negatively related to differences in net supply, ΔNS_k. Intuitively, the larger the supply of skill group k relative to demand in country j compared to that of the United States, the worse skill group k will fare in country j compared to the United States.

Tables 5 and 6 present the results for the demand and supply indexes, and table 7 shows findings for net supply, which integrates the effects of supply and demand.[33] Because market forces include both supply and demand, we concentrate on the findings for net supply. Panel A gives the results when labor input is measured in hours, and panel B gives the results when earnings are used. Tables 5–7 clearly show that supply effects swamp the demand effects for

[33] In the demand indexes, the actual entries have the form $\ln(1 + \Delta D_k)$ and are approximate percentage effects. The occupation-industry categories include six industries crossed with three occupation groups. The industries are (1) agriculture; (2) mining, manufacturing, and construction; (3) transportation, communication, and public utilities; (4) trade; (5) finance, insurance, real estate, and services; and (6) government. The occupations are (1) managers and professionals; (2) clerical and sales workers; and (3) craft workers, operatives, laborers, and service workers. For the purposes of constructing the demand and supply indexes, the self-employed are included in all countries. For the 1984 Sweden–United States comparison, part-time workers are included (in addition to full-time workers and the self-employed) in measures of labor input.

TABLE 5

DEMAND INDEXES BY SKILL GROUP RELATIVE TO THE UNITED STATES
(Six Industries and Three Occupations)

	0–33	3–67	67–100
	A. Labor Input Measured in Hours		
Germany	−.007	.035	−.029
Britain	−.009	.026	−.018
Austria	.032	.036	−.068
Switzerland	−.127	−.054	.149
Sweden (1980)	.043	.047	−.092
Norway (1982)	.017	−.005	−.011
Australia	.068	.021	−.089
Hungary	.212	.076	−.346
Italy	.090	−.021	−.068
Norway (1989)	.027	.035	−.062
Sweden (1984)	.020	−.001	−.017
Non-U.S. average (unweighted)	.033	.018	−.059
	B. Labor Input Measured in Earnings		
Germany	.012	.039	−.036
Britain	−.008	.012	−.005
Austria	.078	.056	−.085
Switzerland	−.165	−.085	.125
Sweden (1980)	.100	.046	−.089
Norway (1982)	.066	.013	−.043
Australia	.109	.040	−.088
Hungary	.340	.103	−.317
Italy	.128	.016	−.079
Norway (1989)	.053	.024	−.045
Sweden (1984)	.062	.028	−.047
Non-U.S. average (unweighted)	.070	.026	−.065

NOTE.—Units for demand indexes are log points.

low-skill workers: when both hours and earnings measures are used, net supply is positive for this group, on average, and within each country. While net supply is also positive, on average, for the middle-skill group, the average net supply figure for the low-skill group exceeds that for the middle-skill group for both the hours measure (0.331 vs. 0.095) and the earnings measure (0.490 vs. 0.146).[34] Thus the supply and demand analysis suggests that low-skill workers should in general fare *worse* relative to the middle in other countries than they do in the United States and cannot explain the smaller low-middle skill differentials that prevail in these countries.

In contrast to the pattern for the low-skill group, the net supply

[34] This is also the case in nine out of a possible 11 pairwise (United States vs. country j) comparisons for both the hours and earnings measures.

TABLE 6

SUPPLY INDEXES BY SKILL GROUP RELATIVE TO THE UNITED STATES

	0–33	33–67	67–100
	A. Labor Input Measured in Hours		
Germany	.409	.211	−1.172
Britain	.039	.530	−1.291
Austria	.386	.095	−.746
Switzerland	.122	.208	−.423
Sweden (1980)	.440	.199	−1.267
Norway (1982)	.378	.021	−.578
Australia	.454	.110	−1.012
Hungary	.369	.104	−.719
Italy	.598	−.294	−.680
Norway (1989)	.313	.243	−.928
Sweden (1984)	.498	−.191	−.465
Non-U.S. average (unweighted)	.364	.112	−.844
	B. Labor Input Measured in Earnings		
Germany	.593	.289	−1.000
Britain	.233	.562	−1.173
Austria	.638	.133	−.746
Switzerland	.128	.257	−.335
Sweden (1980)	.672	.260	−1.119
Norway (1982)	.610	.070	−.597
Australia	.677	.186	−.938
Hungary	.607	.148	−.718
Italy	.786	−.232	−.519
Norway (1989)	.525	.297	−.879
Sweden (1984)	.702	−.069	−.497
Non-U.S. average (unweighted)	.561	.173	−.775

NOTE.—Units for supply indexes are log points.

effects for the high-skill group are consistently negative. Further, they are, on average, quite large in absolute value (i.e., −0.785 with the hours measure and −0.710 with the earnings measure). While in two cases (Italy and Sweden in 1984) net supply is also negative for middle-skill workers (with both measures), in none of the four possible cases is the net supply figure for the high-skill group larger than the net supply figure for the middle-skill group. Thus supply and demand analysis would predict differentials in favor of high-skill workers in other countries relative to the United States. While this may be consistent with the findings from panel B of table 4 that the U.S. differential is moderately (0.034) smaller than the non-U.S. average, when we consider the high (67–100) versus low (0–33) wage differential, the results are inconsistent with the predictions of supply and demand analysis in virtually every case. Table 7 indicates that high-skill workers are considerably scarcer relative to low-skill work-

TABLE 7

NET SUPPLY INDEXES BY SKILL GROUP RELATIVE TO THE UNITED STATES

	0–33	33–67	67–100
	A. Labor Input Measured in Hours		
Germany	.416	.176	−1.143
Britain	.049	.505	−1.274
Austria	.354	.059	−.678
Switzerland	.249	.262	−.572
Sweden (1980)	.396	.152	−1.175
Norway (1982)	.362	.026	−.568
Australia	.386	.089	−.923
Hungary	.157	.027	−.373
Italy	.508	−.273	−.612
Norway (1989)	.286	.208	−.866
Sweden (1984)	.478	−.190	−.448
Non-U.S. average (unweighted)	.331	.095	−.785
	B. Labor Input Measured in Earnings		
Germany	.581	.250	−.964
Britain	.241	.551	−1.168
Austria	.559	.077	−.661
Switzerland	.293	.342	−.460
Sweden (1980)	.572	.214	−1.031
Norway (1982)	.543	.057	−.554
Australia	.569	.147	−.851
Hungary	.267	.045	−.401
Italy	.658	−.248	−.440
Norway (1989)	.473	.273	−.834
Sweden (1984)	.640	−.097	−.450
Non-U.S. average (unweighted)	.490	.146	−.710

NOTE.—Units for net supply indexes are log points.

ers in other countries relative to the United States, yet table 4 shows that, with one exception (Switzerland), they earn more relative to low-skill workers in the United States than elsewhere.

Thus differences in relative supplies and demands for skill in other countries compared to the United States are not broadly consistent with the observed pattern of relative wages by skill in other countries compared to the United States. In particular, they do not explain the most striking difference between the United States and the other countries, namely their greater wage compression at the bottom relative to the top or the middle. Having said that, we must note some important qualifications. First, since relative wages for low-skill workers are higher in other countries than in the United States and we use an employment-based measure of industry demand, we may have understated the demand for low-skill workers that would occur at constant wages relative to the United States. Similar reasoning implies

that our supply estimates may have been overstated. Thus we may have overestimated net supply at constant relative prices. Second, our demand index does not include any differences across countries in within–industry-occupation demands for skill. It is unclear what effect this might have on our results.

Third, we have implicitly assumed a separability in production between other factors and the three skill groups. However, other factors such as women's labor may not be equally substitutable for men's labor of different skill levels. Topel (1992), for example, has suggested that women's labor is more substitutable on average for low-skill than for high- or medium-skill men. In our data, women's work hours account for a larger share of total hours worked in the United States (about 44 percent) than in the other countries (36 percent, on average). Topel's findings suggest that the relatively poor showing of low-skill men in the United States could be due to its high female labor supply. While this phenomenon may explain a portion of our results, we believe that it is not the whole story. In particular, as shown in the next subsection, female labor supply differences across countries are much less closely related to differences in male wage inequality than differences in wage-setting institutions are.

E. The Effects of Institutions: Toward a General Test

The evidence so far has suggested that the relatively decentralized wage-setting system in the United States is responsible for at least some of this country's higher wage dispersion and greater spread at the bottom of the distribution compared to the OECD countries in our sample. While our sample is relatively small (10), it is still possible to investigate whether this relationship between centralization and the wage distribution holds generally, that is, beyond the individual U.S.–other country comparisons we have made up to this point. Performing such a test requires one to operationalize the concept of centralization in wage setting. Several authors have produced rankings of countries with respect to their extent of centralization, including Blyth (1979), Schmitter (1981), Cameron (1984), Bruno and Sachs (1985), and Calmfors and Driffill (1988). These rankings take into account the degree of coordination within and between labor and management organizations, the level at which bargaining takes place, and the power of central bodies to conduct wage negotiations (Calmfors and Driffill 1988). We use as a measure of centralization the unweighted average of these rankings (which are shown individually in Calmfors and Driffill [1988, p. 18]), correcting for differences across authors in the number of countries ranked.

On the basis of this average ranking, Austria, with a ranking of

1.493 out of 17 countries, had the most centralized wage-setting system among the countries in our sample; the United States, with a ranking of 15.191 out of 17, not surprisingly, had the least.[35] While Hungary as a Communist country in the 1980s was not included in the rankings, we assigned it the highest level of centralization since the government set wages there. The results were qualitatively similar when Hungary was excluded.

We then used this (inverse) measure of centralization (DECENT) as an explanatory variable in two kinds of analyses. First, we ran regressions with the following dependent variables: (i) the country's standard deviation of YFULL (i.e., the log of hours-corrected earnings, as shown in table 1); (ii) the 50-10 differential in YFULL (table 1); (iii) the 90-50 differential in YFULL (table 1); (iv) the standard deviation price effects, that is, the U.S.–country j difference net of personal characteristics, with the full specification (table 2, panel B); (v) the 50-10 price effects; and (vi) the 90-50 price effects (table 3, panel B).[36] In addition, in light of Topel's (1992) findings on the impact of female labor supply on male wage inequality, we included the log of the share of total hours worked by women (LNFEM) as an explanatory variable in some specifications.[37]

The second kind of aggregate cross-country analysis involved estimating the determinants of the middle-low and high-middle skill group log wage differentials for absolute skill groups (i.e., using U.S. cutoffs for SKILL). Explanatory variables in this case included DECENT, the log of relative female labor supply measured in hours, and relative net supply. For example, in the analysis of the middle-low skill group wage differential, the net supply of the middle-skill relative to the low-skill group was included as a right-hand variable. Since the net supply measures are defined relative to the United States (table 7), we define the wage differentials and female labor supply relative to the United States as well.[38]

Tables 8 and 9 contain our results. The major findings pertain to DECENT and are striking. First, decentralization of wage setting is

[35] The degrees of centralization for the other countries in our sample were West Germany 6.943, Britain 12.632, Switzerland 10.904, Sweden 2.736, Norway 2.536, Australia 10.766, and Italy 14.325.

[36] In these analyses, the two observations on Norway were averaged using sample size as weights. Sweden (1984) was excluded since, in contrast to the rest of the sample, the wage variable was defined as the log of actual hourly earnings.

[37] For the price effects, the United States was included and given zero for the dependent variable. Also, note that the results were unchanged when female labor input was measured as the share of all earnings accounted for by women.

[38] The United States was included and given zeroes for relative wages and relative female labor supply. Up to a constant, DECENT is already defined relative to the United States.

TABLE 8

EFFECTS OF CENTRALIZATION OF WAGE SETTING AND FEMALE LABOR SUPPLY ON MALE WAGE INEQUALITY (Sample Size 10)

	REGRESSION RESULTS FOR			
DEPENDENT VARIABLE	DECENT (1)	DECENT (2)	LNFEM (1)	LNFEM (2)
Standard deviation of YFULL	.0133	.0148	.0392	.1747
	(.0051)	(.0054)	(.2307)	(.1780)
50-10 differential of YFULL	.0269	.0322	.3344	.6295
	(.0099)	(.0084)	(.4392)	(.2768)
90-50 differential of YFULL	.0044	.0040	−.0828	−.0457
	(.0072)	(.0080)	(.2437)	(.2663)
Standard deviation of YFULL, corrected for personal characteristics	.0127	.0144	−.0679	.2001
	(.0049)	(.0049)	(.2182)	(.1624)
50-10 differential, corrected for personal characteristics	.0155	.0173	.0473	.2058
	(.0072)	(.0077)	(.3003)	(.2547)
90-50 differential, corrected for personal characteristics	.0095	.0108	.0648	.1642
	(.0056)	(.0059)	(.2149)	(.1969)
Specification	DECENT only	DECENT and LNFEM	LNFEM only	DECENT and LNFEM

NOTE.—DECENT, defined in the text, is an inverse measure of wage-setting centralization; LNFEM is the log of the share of total work hours accounted for by women. A constant term is included in all regressions.

TABLE 9

EFFECTS OF CENTRALIZATION, NET SUPPLY, AND FEMALE LABOR SUPPLY ON MALE SKILL GROUP WAGE DIFFERENTIALS (Sample Size 10)

	DEPENDENT VARIABLE			
EXPLANATORY VARIABLE	Middle vs. Low DWMIDLOW	High vs. Middle DWHIMID	Middle vs. Low DWMIDLOW	High vs. Middle DWHIMID
Decentralization	.0113	.0024	.0122	.0025
	(.0057)	(.0027)	(.0048)	(.0031)
Net supply	.0540	−.0540	...	...
	(.0979)	(.0288)		
Female labor supply	−.0603	−.0807	...	...
	(.1882)	(.0942)		
Constant	−.3024	−.0447	−.3076	.0161
	(.0582)	(.0345)	(.0453)	(.0297)

NOTE.—Variables are relative to the United States. DWMIDLOW and DWHIMID are middle-low and high-middle skill group log wage gaps, net supply is the relative net supply of the relevant pair of skill groups, and female labor supply is LNFEM.

found to be positively associated with the standard deviation of log wages (table 8). This effect is 2.6–2.9 times its standard error and holds whether or not female labor supply is included and whether or not the effects of the distribution of male personal characteristics have been removed. Changing DECENT from, say, Sweden's level to Germany's (a change of 4.2) implies an increase in the standard deviation of log wages of about 0.06 log points, a moderate effect.

Second, as was the case in the U.S.–country j comparisons of table 1, wage compression at the bottom of the distribution appears responsible for the association between centralization and the overall log wage variance. For example, in table 8, decentralized wage setting has a positive association with the 50-10 log wage differential. The effect is robust with respect to controlling for the distribution of male personal characteristics and the inclusion of relative female labor supply. It is 2.2–3.8 times its standard error, and raising DECENT from Sweden's to Germany's level raises the 50-10 log wage gap by 0.11–0.14 log points. Similar findings for compression at the bottom of the distribution are obtained in table 9, which examines wage differentials between skill groups: DECENT raises the middle-low wage differential.

In contrast to the strong positive association between decentralization and the widening of the wage distribution at the bottom, DECENT has very weak effects on the spread of wages at the top. In tables 8 and 9, decentralization of pay setting has small positive effects on the 90-50 and high-middle-skill wage gaps, which are in every case but two smaller than their standard errors.

Unlike the findings for DECENT on the wage spread at the bottom of the distribution, the results for female labor supply are mixed and generally are not precisely estimated. The effects of net supply shown in table 9 are also mixed. On the one hand, net supply has the "wrong" sign for the middle-low wage gap: it is *positively* associated with this gap. However, it is smaller than its standard error. On the other hand, net supply is negatively associated with the high-middle pay gap, as predicted and suggested by tables 4 and 7, and is 1.9 times its standard error.

The results of tables 8 and 9 suggest that wage centralization leads to less wage inequality generally and that it has a particularly strong effect in bringing up the bottom of the wage distribution. Admittedly, our sample of countries is extremely small—only 10—and the causality between the wage distribution and wage-setting institutions, as well as our measures of female labor supply and net male labor supply, can run in both directions. However, these results in conjunction with the individual U.S.–other country comparisons lend plausibility to the idea that institutions are important.

F. *Implications: Employment Responses*

Our main finding that the centralized wage-setting institutions in other industrialized nations increase the relative wages of workers at the bottom of the distribution compared to the United States raises the possibility that these workers will experience greater relative employment problems as well. Not only is this in itself an important potential policy implication, it further suggests that wage-setting institutions can influence the distribution of productivity among employed workers, since the least-skilled are the most likely to lose their jobs (or not find jobs to begin with) when wage floors are instituted. Thus the distribution of measured and unmeasured productivity among employed workers may be influenced by wage floors, and our dichotomy between skills and institutions as explanations for inequality differences across countries may in fact be a false one. In this subsection, we examine these issues.

Some previous studies find evidence that wage floors have adverse employment effects for those at the bottom (see n. 3). We examine relative employment/population ratios by absolute skill group for the countries for which our data allow these ratios to be calculated.[39] The results are shown in table 10. While not as strong as the wage compression results presented above, our findings do suggest higher relative employment/population ratios among low-skill workers in the United States than elsewhere.

Panel A shows employment/population ratios for each skill group. In all cases, employment rates increase monotonically with skill within a country. Further, low-skill workers in the United States, Britain, and Australia have about the same employment rates, and they are moderately higher than the rates in the other countries. Panel B shows relative employment/population ratios by skill group (the differences across skill groups in the log of the employment/population ratio). For the key middle-low comparison, the U.S. difference is considerably smaller than that in Austria, Germany, and Norway, about the same as that in Australia, and larger than that in Britain. Thus table 10 suggests that, in general, the low-skilled have fewer employment problems relative to other workers in the United States than in other countries.[40]

[39] That is, we divided the full population of men aged 18–65 into three skill groups (i.e., high, medium, and low) on the basis of the U.S. cutoffs for employed workers described above. Countries for which we lacked data on nonparticipants in the labor force were omitted.

[40] Consideration of labor supply effects strengthens our confidence in these results. Specifically, the lower relative wages of low-skilled workers in the United States should reduce their labor supply and hence their employment/population ratios compared to workers elsewhere. (Some support for such an expectation is provided by Juhn's [1992]

TABLE 10

EMPLOYMENT/POPULATION RATIOS BY ABSOLUTE SKILL GROUP

A. EMPLOYMENT POPULATION RATIOS

	Low	Middle	High	Overall
Germany	.650	.860	.903	.756
Britain	.797	.812	.888	.815
United States	.792	.860	.904	.852
Austria	.694	.808	.809	.758
Australia	.793	.852	.898	.827
Norway (1982)	.777	.924	.926	.853
Norway (1989)	.740	.906	.987	.832

B. DIFFERENCES BETWEEN SKILL GROUPS IN LOG OF EMPLOYMENT/POPULATION RATIO

	Middle-Low	High-Middle	High-Low
Germany	.279	.050	.329
Britain	.018	.089	.108
United States	.082	.049	.132
Austria	.152	.001	.153
Australia	.072	.053	.125
Norway (1982)	.173	.002	.175
Norway (1989)	.203	.085	.288

As we noted above, differences across countries in employment/population ratios can result in observed workers' being a more selected group in some countries than in others. Thus some of our observed **X**'s and residual effects might be due to the employment effects of wage floors. Panel A of table 10 shows that the United States is at the top of the list (roughly tied with Norway in 1989) for the overall employment/population ratio. To get an idea of the possible selection effects this may imply, we made the simplifying assumption that the nonemployed are all less skilled than the employed (Juhn [1992] makes a similar assumption). Thus, in comparing, say, the U.S. wage distribution with that in Germany, we note that the U.S. employment/population ratio is .852, whereas Germany's is .756. To form a comparably selected U.S. labor force under our maintained assumption, we need to delete the bottom .113 of the U.S. sample.[41] A similar procedure is followed for the other countries in table 10.

finding that the labor supply of low-skilled males in the United States fell during the 1980s, primarily because of their declining real wages.) Thus the fact that we generally find *higher* relative employment among the low-skilled in the United States is some evidence for the existence of demand effects.

[41] The 11.3 percent figure comes from the adjustment of the United States' actual 852/1,000 employment/population ratio to Germany's 756/1,000 level. We delete the bottom 96/852 (.113) from the U.S. distribution to make its simulated employment/population ratio .756.

The results of this adjustment for selectivity do not affect our basic conclusion: the United States continues to have much less 50-10 compression than the other countries but about the same degree of 90-50 compression.[42]

While employment losses for unskilled workers are one possible response to high wage floors, public employment may be another, one that would prevent us from observing a decline in employment/population ratios. Both Björklund and Freeman (1994) and Edin and Topel (1994) suggest that this argument has validity for analyzing Sweden's solidarity wage policy. To examine the hypothesis that the government acts as employer of last resort, we compared the share of government employment across skill groups in our micro data. In virtually all cases, the government demanded a relatively skilled workforce. Moreover, the differences in government employment across skill groups showed no particular pattern across countries.[43] Of course government policy can lead to employment changes in other industries. This and other issues related to the absorption of low-skill workers in the presence of wage compression merit further investigation.

V. Conclusions

In this paper, we compare male wage inequality in the United States and nine other industrialized countries primarily in the middle to late 1980s. Consistent with previous work, the results indicate that overall wage inequality is much greater in the United States than elsewhere. However, when we disaggregate the measure of inequality to examine various parts of the wage distribution, we find that the distribution in other countries is much more compressed at the bottom than at the top relative to the United States. Thus, while the 50-10 differential is considerably larger in the United States than elsewhere, the U.S. 90-50 differential is only slightly larger.

We then evaluate several possible explanations for these patterns. First, differences in the distribution of measured characteristics across countries were found to be responsible for some but not all of the international differences in the wage distribution. If the United States had other countries' distribution of measured characteristics, its overall wage variation would remain much higher than that of other countries. Moreover, while the gap between the middle and

[42] Details of this test are available on request.

[43] While Björklund and Freeman (1994) find roughly equal government relative employment between skilled and unskilled workers in Sweden in 1991, their 1981 findings show a larger representation of skilled workers, a pattern similar to our micro data, which come from 1980 and 1984.

bottom portions of the U.S. wage distribution would be reduced, the high-middle gap would be increased. Most important, the wage distribution in other countries would still be more compressed at the bottom than at the top relative to the United States. These results suggest that U.S. labor market prices contribute to our observed findings.

Second, we note that, unlike the United States, most of the other countries have very centralized systems of collective bargaining and many have provisions to extend the terms of union contracts to nonunion workers. Voluntary emulation of the union wage structure by nonunion firms due to threat effects is also likely to be greater in these other countries given the larger size of their union sectors. Consistent with these observations, we find a larger variance of wages and less wage compression at the bottom within *both* the U.S. union and nonunion sectors compared to other countries. Indeed, the larger variance of overall wages in the United States is primarily due to the higher variance that prevails here *within* each of these sectors. Moreover, when one controls for the distribution of measured characteristics, both of these salient features of the U.S. distribution—a higher wage variance and a greater spread at the bottom—are more pronounced in the nonunion than in the union sector. This result suggests that contract extension and other mechanisms that extend union-determined wages to the nonunion sector in other countries have a larger effect on their wage structures relative to the United States than their more centralized wage-setting institutions within the union sector.

Third, we examine indexes of relative supplies and demands across countries to see whether market forces could provide an alternative explanation for the observed patterns, particularly for the high relative wages of low-skilled workers in other countries. Taking both supply and demand into account suggests that low-skill workers should fare *worse* relative to middle-skill workers in other countries than they do in the United States; thus this cannot explain the smaller low-middle skill differentials that prevail in these countries. Thus market forces, as best as we can measure them, do not appear to be consistent with the observed pattern of relative wages by skill in other countries compared to the United States.

Finally, we present two additional pieces of empirical evidence suggesting that wage-setting institutions are an important determinant of international differences in wage distributions. First, looking across countries, we find that wage centralization, as commonly measured by comparative industrial relations researchers, is negatively associated with wage dispersion, the 50-10 differential in the log of wages, and the pay gap between middle- and low-skill workers. Further,

this compression at the bottom occurs even when we control for the distribution of personal characteristics, relative female labor supply, and relative male labor supply net of demand differences. Second, we examine possible employment responses to the pattern of greater wage compression at the bottom in other countries compared to the United States. As would be expected on the basis of employer responses to high wage floors, we generally find that the low-skilled have a higher employment/population ratio relative to the higher-skilled in the United States than in other countries.

To the extent that institutions are important in affecting wage inequality, we would expect adverse impacts on employment and productivity due to resource allocation effects. We have presented some evidence that this is the case. To some degree, labor market policies such as government employment or training programs and relocation subsidies can compensate for such effects, although we did not find evidence of disproportionate government employment among the low-skilled outside the United States. One interpretation of government labor market policy in many OECD countries is that wage-leveling policies are encouraged by the government on the one hand to achieve a desired level of wage inequality. The greater compression at the bottom, in particular, suggests that these other countries attempt to use the labor market to provide a "safety net" for low-wage workers to a greater extent than we do in the United States. On the other hand, their more activist government policies regarding employment, training, and relocation (see, e.g., Björklund and Freeman 1994; Edin and Topel 1994; Edin and Holmlund 1995) may be seen in part as corrective measures for the adverse employment and allocation effects of the wage distribution policies.

Appendix

TABLE A1

DEFINITIONS OF DEPENDENT VARIABLES

Australia	Annual earnings from all jobs
Austria	Net monthly income from employment
Britain	Total annual earnings before taxes
Germany and Switzerland	Net income per month after taxes and social insurance
Hungary	Monthly earnings
Italy	Annual labor income
Norway (1982)	Annual income from all jobs
Norway (1989)	Annual income from work
Sweden (1980)	Income (from all sources) in previous year
Sweden (1984)	Average hourly earnings
United States (1985–89)	Previous year's earnings from occupation before taxes
United States (1984)	Average hourly earnings

TABLE A2

DEFINITIONS OF EXPLANATORY VARIABLES

EDUC	Years of schooling completed
PEXP	Age − EDUC − 6
PEXPSQ	PEXP squared
EXP	Actual experience (PSID and HUS only)
EXPSQ	EXP squared (PSID and HUS only)
MAR	One if married, spouse present; zero otherwise
UNION	Dummy variable for union membership
	Occupation Dummy Variables
PROF	Professional and technical workers (the omitted category)
MGR	Managers, except farm
CLER	Clerical workers
SALES	Sales workers
CRAFT	Craft workers
OPER	Operatives
LAB	Laborers, except farm
SERVWK	Service workers
FARMMGR	Farm managers
FARMLAB	Farm laborers
	Industry Dummy Variables
AG	Agriculture, forestry, and fisheries
MINCON	Mining and construction
MANDUR	Durable goods manufacturing
MANNON	Nondurable goods manufacturing
TRANS	Transportation, communications, and utilities
WTRADE	Wholesale trade
RTRADE	Retail trade
FIRE	Finance, insurance, and real estate
SERVS	Services
GOVT	Government (the omitted caregory
	Industry Dummies for Hungary
AG	Agriculture, forestry, and fisheries
MINMAN	Mining and manufacturing
CONST	Construction
TRANS	Transportation, communications, and utilities
TRADE	Wholesale and retail trade
SERVS	Services, finance, insurance, and real estate
GOVT	Government (the omitted category)
	Occupation Dummy Variables for Australia
MGR	Managers and farm managers
CLER	Clerical workers
CRAFT	Craft workers
OPER	Operatives
LAB	Laborers and farm laborers
SALESW	Sales and service workers
PROF	Professional and technical workers (the omitted category)

TABLE A2 (*Continued*)

	Industry Dummy Variables for Australia
AG	Agriculture, forestry, and fisheries
TRANS	Transportation, communications, and utilities
MINCON	Mining and construction
MANUF	Manufacturing
TRADE	Wholesale and retail trade
FISERV	Finance, insurance, real estate, and services
GOVT	Government (the omitted category)
	Occupation Dummy Variables for Italy
BLUE	Blue-collar
WHITELOW	Lower-level white-collar
WHITEHI	Higher-level white-collar (the omitted category)
	Industry Dummy Variables for Italy
AG	Agriculture, forestry, and fisheries
TRANS	Transportation, communications, and utilities
TRADE	Wholesale and retail trade
IND	Mining, construction, and manufacturing
FIRE	Finance, insurance, and real estate
GOVT	Government
SERVS	Services, finance, insurance, and real estate (the omitted category)

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