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DOUGLAS A. HIBBS, JR.

**Wage Compression  
Under Solidarity Bargaining  
in Sweden**

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Forthcoming in Inga Persson-Tanimura, ed.,  
*Generating Equality in the Welfare State: The Swedish Experience*,  
Norwegian University Press, 1990.

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## FOREWORD

Professor Douglas A. Hibbs, Jr. is engaged in a larger research project at FIEF about union wage policy and its relation to the observed equalization of wage incomes - before and after taxes - in Sweden.

The study presented here was undertaken for the so called "Maktutredningen" (The Study of Power and Democracy in Sweden). It contains an abundance of descriptive data on and analysis of wage formation in Sweden. Hibbs deals with the entire labor market in this paper and among other things tries to answer the question whether union wage policy lies behind the observed equalization of earned incomes or if this phenomenon is largely a reflection of conventional market forces.

Stockholm, January 1990

Villy Bergström

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WAGE COMPRESSION UNDER SOLIDARITY BARGAINING IN SWEDEN<sup>1</sup>

I would suggest that any time a consensus emerges on the need for more equality, it can be at least partly achieved by making a frontal attack on wage differentials.

Lester Thurow (1972, p.81)

I believe it is misleading to argue that policies on low pay would, if successful, have a major effect on income distribution. Moreover, they are unlikely to be successful.

Richard Layard (1980, p.134)

By the late 1970's Sweden had achieved perhaps the most equal distribution of personal income, both before and after taxes and transfers, of any industrial democracy. I

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<sup>1</sup>Most of the work I discuss in this paper was done with the collaboration and assistance of Håkan Locking and Hasse Ekdahl. I am most grateful to Arbetsmarknadsdepartementet (Ministry of Labor of the Swedish government) and Göteborgs Handelhögskolefonder (Gothenburg University School of Economics Research Fund) for financial support, to LO (Swedish Confederation of Trade Unions) and SAF (Swedish Confederation of Employers) for giving me access to wage data, to Dan Andersson, Bengt Blomqvist, Anita Harriman, Anna Hedborg, Lennart Jonsson, Göran Nilsson and Stefan Olby for patient advice about how the wage numbers and the wage formation process should be interpreted, to Robert Erikson for supplying me with several rounds of data from the LNU surveys, to Anders Klevmarken for supplying me with data from the HUS surveys, and to Peter Bruhn and Jyry Hokkanen for research assistance. Bertil Holmlund gave useful comments on an earlier draft. Naturally, responsibility for all errors of fact and judgement is mine.

say 'achieved' because reduction of inequality of post-tax and transfer income was an important goal of fiscal policies pursued by Social Democratic political authorities, and compression of market earnings was a key objective of the "solidaristic" wage policies promoted by trade union leaders, particularly leaders of the central confederation of blue-collar unions, LO.

I have two main purposes in this paper. The first is the relatively straightforward task of documenting trends in the distribution of wages salaries in Sweden during recent decades. The second is the tougher and more controversial job of determining the extent to which the observed compression of relative wages can be attributed to trade union action. Before getting down to the main business of the paper, however, let me put my topic in larger context by addressing the issue of the influence of wage income on the ultimate distribution of economic well-being.

### I. Wages and Economic Equality

Social science has yet to supply a persuasive, comprehensive theory of the process of income distribution, let alone the distribution of economic well-being. Yet although we lack a complete theory of income distribution, we know quite a lot about many of the vital

bits and pieces, most of which are laid out in Figure 1.

Figure 1: Accounting Sequences and Behavioral Relations  
in the Distributional Process  
About Here

Wages are usually viewed as the fundamental constituent unit of income in conventional accounting sequences that begin with the distribution of market earnings and end with the distribution of economic well-being. As depicted in Figure 1, the intersection of hourly wage payments and (effective, annual) labor supply, yields annual market earnings. Earnings plus income from capital accruing to individuals gives factor income, and factor income net of taxes and transfers defines measured disposable income. Disposable income plus consumption of public goods and net contributions from or to other household members gives, after appropriate weighting (which ideally would be based on calibrated utility-of-income schedules), a conception of economic well-being.

How easy it would be to motivate a paper on wage distribution to an audience interested in equality of economic well-being if the primacy of wages in income accounting sequences passed through without any hitches to wage primacy in the structural relations generating final distributive outcomes. Unfortunately, social science does

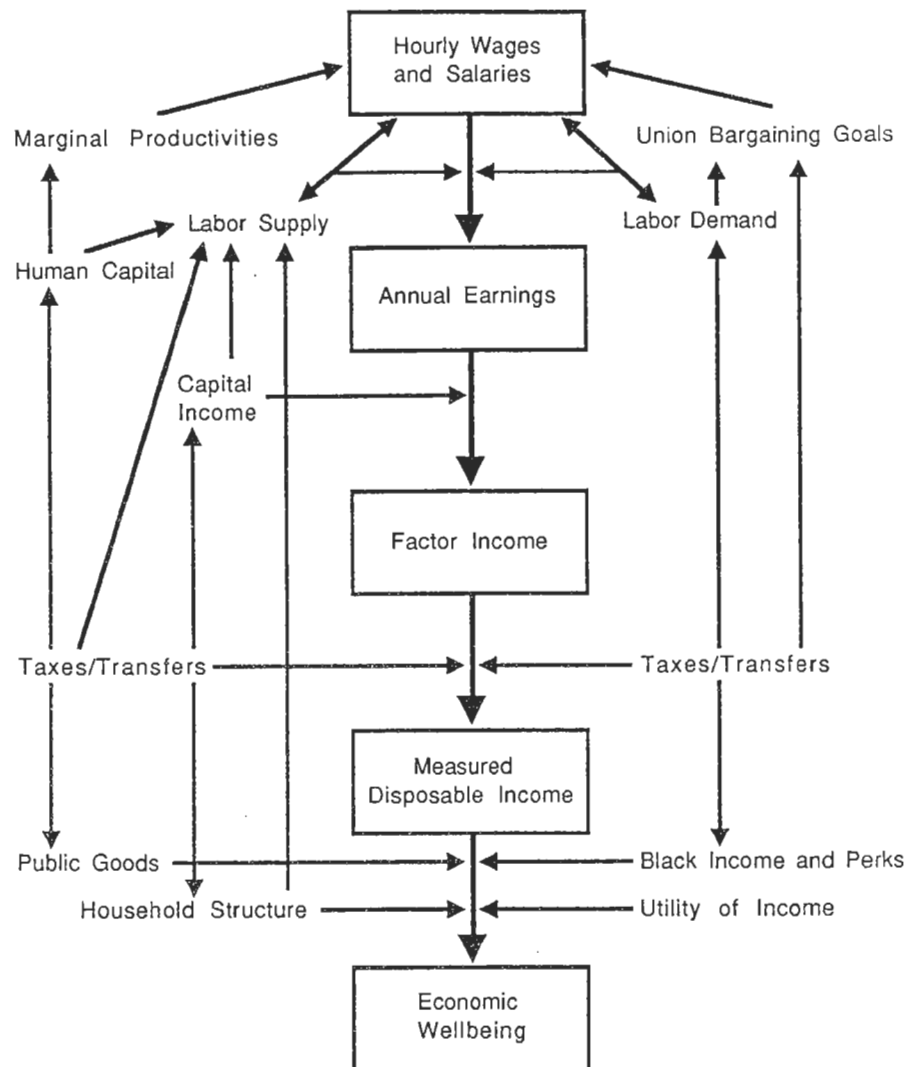


Figure 1: Accounting Sequences and Behavioral Relations in the Distributional Process

reliably inform us that distributional processes are behaviorally complex and full of ambiguity as to relative magnitudes, and in some cases even net signs, of causal linkages.

Figure 1 illustrates a great number of established interdependencies. Indeed, of the many variables shown, I have depicted only utility of income and the tax-transfer system as exogenous. Even these designations are notional. The great body of microeconomics notwithstanding, utility of income surely is based to a significant degree on relative positions and, hence, depends on the income distribution itself.<sup>2</sup> Taxes and transfers are endogenous with respect to distribution at the level of the macro political economy, and with respect to taxable income and hours worked at the level of individual labor market behavior. After all the fiscal system is a political creation. And in Sweden, as elsewhere, party coalitions are based at least partly on distributive interests, and electoral outcomes are determined at least partly by observed and anticipated distributional outcomes under the parties. The evolution of taxes and transfers is therefore driven by political

<sup>2</sup>The relativity of utility has an old and distinguished pedigree in economics (it can be found in Veblen, 1899) and is supported by abundant evidence from all branches of social science (much of it is summarized in Frank, 1985). But it has played a relatively minor role in modern economic reasoning and analysis.

choices, which in turn are influenced by the distributive results that the fiscal system is designed to affect. Given a politically determined tax-transfer structure, individual's influence their fiscal exposure, and hence the overall distributive effects of fiscal arrangements, by, among others, their labor supply decisions. I come back to this point briefly ahead.

Holding politics and the endogeneity of tax and transfer mechanisms aside, Figure 1 does imply a potentially large role for the fiscal system in accounting for income distribution because of the many direct and indirect lines of influence running from taxes and transfers to other relevant variables. This theoretical potential should be magnified for Sweden in view of the sheer scale of the country's fiscal apparatus; by the late 1970s the size and scope of Sweden's tax-transfer system had very few rivals among the industrial democracies.

Working backwards in the income accounting sequence from an individual's economic well-being to his or her hourly wages, we see that public goods, household structure, and unofficial income and in-kind perks -- variables that intervene between disposable income and ultimate economic well-being -- are influenced by the fiscal system. Public goods depend on the fiscal system in the obvious way: They are financed by tax revenues. Household structure is

influenced because of behavioral linkages. Tax and transfer arrangements may condition the formation and size of households, as well as the decisions of various household members to obtain market income<sup>3</sup>. "Black" or unofficial income, and untaxed and under-taxed "perks," also reflect behavioral responses. They are commonly believed to grow, perhaps after long lags, with the size of the tax wedge.

The disjunction between factor income and disposable income created by taxes and transfers is the traditional route for studying the fiscal system's impact on distribution.<sup>4</sup> But this fiscal incidence approach, which amounts to comparing income distributions before and after taxes and transfers, implicitly assumes factor income to be exogenous to fiscal variables. Economic reasoning tells us that this assumption is wrong, at least in principle. For example, taxes and transfers should affect saving and investment behavior and, hence, the

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<sup>3</sup>The literature on this topic has grown rapidly in recent years and, as suits the complexity of the issues, has become quite technical. Blundell and Walker, 1988 provide a good overview of some of the key issues (along with some normative recommendations) geared to non-specialists. More comprehensive professional reviews appear in Danziger, Haveman, and Plotnick, 1981; Burtless, 1987 and Hausman, 1987. Gustafsson, 1988 and the sources cited therein cover the evidence for Sweden.

<sup>4</sup>See Uusitalo, 1985 for a fine review of the literature; also see the chapters by Ringen and Gustafsson and Uusitalo in this volume.

ultimate flow of capital income received by individuals. More generally, taxes and transfers should influence, again in theory, nearly every variable affect believed to affect directly employment and wage income.

We really do not know, however, how much these theoretical objections undermine causal (as opposed to accounting) conclusions about the distributional effects of taxes and transfers based on the fiscal incidence method. The usual argument is that powerful transfer systems increase dispersion of factor income by reducing the labor supply and, therefore, the earned incomes of those who command low pay in the market to begin with. If true, this surely would exaggerate the apparent redistributive clout of fiscal interventions. Yet there are a number of channels by which the tax system plausibly promotes equality of factor income in Sweden. Briefly tracing through the behavioral effects of the fiscal system implied by Figure 1 should help to clarify matters.

The mainstream neoclassical competitive model of wage formation holds that observed wage payments reflect the intersection of notional labor demand and supply.<sup>5</sup>

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<sup>5</sup>Sociological models of the hierarchical distribution of jobs and associated rewards (see Hedström, 1988 for an application to Swedish data), related economic theories of competition among workers for higher paid productive jobs (Stiglitz, 1975) and recent "efficiency wage" theories (reviewed in Katz, 1986), all pose important alternatives

Labor demand is determined at the point where the gross wage rate (wage payments plus payroll taxes) equals a worker's marginal revenue product. Labor supply equals the point at which the net (of income tax) wage equals an individual's marginal disutility of working. Hence, in equilibrium each employee is paid his or her marginal product, adjusted for non-pecuniary aspects of jobs that affect worker utility. Therefore, to a good first approximation, the (potentially observable) distribution of adjusted wages should in the long-run correspond to the (alas, nearly always unobserved) distribution of marginal productivities.

The tax-transfer system in principle affects every aspect of the competitive model. Income- and employment-contingent transfers lower the opportunity cost of voluntary leisure, and income taxes reduce returns to work. Though the net effects of associated substitution and income effects on aggregate household labor supply may well be negative, they have not been found to be alarmingly large in empirical studies. (See the sources cited previously.) The contemporary Swedish tax structure's main supply-side impact (and it is an important one) is probably redistribution of market labor supply from primary earners (traditionally men) to secondary earners (traditionally their female partners),

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to the neoclassical competitive wage model.

rather than a reduction of gross hours of market work. In fact, though annual hours of market work per employee is very low by international standards in Sweden, worked hours per person of working age is well above the continental average. (Pettersson, 1989)

On the demand-side, payroll taxes not shifted backward to lower pre-tax wages yield higher employer costs per unit labor, which should reduce labor demand. Yet Swedish unions are not oblivious to the meaning of the country's high payroll tax rate. The fraction of labor taxes not financing benefits seem to be viewed as a form of income tax taken in advance.<sup>6</sup>

Through the above channels alone, taxes and transfers might reduce private employment and raise dispersion of factor incomes across the potential labor force, though not necessarily the dispersion of observed wages. On the other hand, tax revenue helps finance human capital formation, which raises labor quality and, hence, labor productivity and average wages. By itself, a rise in the average stock of human capital inducing a rise in average wages can increase earnings dispersion. But if publicly supported education and training programs tend to level

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<sup>6</sup>Empirical estimates of back-shifting vary. Contrast Bosworth and Lawrence, 1987, Calmfors and Forslund, 1990, and Holmlund, 1983.

human capital endowments by an even greater margin (mostly, one would suppose, within new cohorts entering the labor force), the fiscal system should via this route enhance equality of factor income over the long-run.

Finally, taxes may influence unions' wage aspirations. If unions pursue net-of-tax wage settlements (implicitly discounting publicly supplied benefits tax revenues might finance), escalating tax burdens probably contribute to wage inflation and, perhaps, to rising pre-tax real wage levels.<sup>7</sup> And if unions representing high-pay workers are more successful at obtaining tax-compensating wage settlements than those bargaining for low-pay workers, tax-induced wage rises will increase inequality of wage income between the respective groups. As I have argued elsewhere (Hibbs, 1987), however, the conjunction of 'solidaristic' trade union bargaining goals and the escalation of marginal tax rates may have had quite opposite consequences in Sweden. By lowering the cost or 'shadow price' of wage equalization in the form of foregone consumption possibilities to higher paid workers, steep and rising marginal rates may have eased the high-pay membership's acquiescence to the trade union

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<sup>7</sup>See Andersen, n.d., Grubb, 1986 and Knoester and vander Windt, 1987 for comparative analyses including Sweden. Calmfors, 1977, drawing on earlier work of Lundborg, develops circumstances under which unions have an incentive to pursue wage deflation.

leadership's goal of compressing the wage distribution.<sup>8</sup>

The net effect of the fiscal system on dispersion of factor (market) income in Sweden is, then, difficult to judge, even as to sign. But if Swedish taxes and transfers have indirectly induced a rise in factor income dispersion, it is unlikely to have been by very much. For by the end of the 1970s equality of market incomes among Swedish full-time employees was greater than equality of after tax and transfer (disposable) income over the entire population -- part and full-time employees, pensioners, those on social assistance, and so on. (Lindbeck, 1983, p.233; O'Higgins et al., 1985, Table 2, for household income per 'equivalent consumption unit.')

Wage and salary income of course dwarfs other sources of disposable income among the working-age population. Since time worked for market pay is to a large degree a matter of choice in a society that implicitly guarantees every adult the right to full-time employment, distribution of wages and salaries in contemporary Sweden is surely the

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<sup>8</sup>By the same token, high marginal effects may help explain why employers did not resist the unions' push for wage equality more vigorously. The cost to firms of preserving differentials in consumption possibilities from labor income rose with marginal rates, in pace with the decline of the net-of-tax cost of equality to skilled workers. Moreover, many firms also benefited from a union wage policy that delivered skilled workers relatively "cheaply." I do not have the space to develop this line of reasoning further in this paper.

key source of equality of discretionary final income among people available for work. In this sense at least, the process of wage income distribution is the main engine of final income distribution.

## II. Solidarity Wage Policy

The idea of a "solidarity wage policy" in Sweden apparently was first voiced at the 1936 LO Congress. But the concept lacked much specificity until the early 1950s when it was fleshed out in the writings of the LO economists Gösta Rehn and Rudolf Meidner. (Rehn, 1948, 1950; Meidner, 1948, 1954; Turvey, 1952 gives English translations.) Up to the mid-1960s the spirit of the policy is captured well by the phrase "equal pay for equal work." Weak industries and firms would not be permitted to survive by paying wages commensurate with their sub-par productivity and profitability. An active labor market policy, providing extensive job placement and retraining services, would ease the pain to dislocated workers created by the forced demise of inefficient firms as human and physical resources flowed toward more efficient ones. Viewed in this way, solidaristic wage policy conformed to orthodox principles, and it is widely believed to have enhanced Sweden's economic performance.

The success of this initial form of solidarity wage policy may help explain why Sweden's interindustry wage structure appears to correspond better to neoclassical norms than, for example, wages in the United States do. Quite a large body of research indicates that US wages exhibit large 'non-compensating' interindustry differentials, whereas recent empirical work for Sweden shows that interindustry differentials, net of the usual allowances for variations in labor quality and working conditions, are negligible. (See Edin and Zetterberg, 1989, Katz and Summers, 1989) Moreover, unlike the situation in the United States, wage levels across Swedish firms or industries show no 'non-competitive' correlations with profitability, average productivity and capital intensity. (Compare Krueger and Summers, 1988, and SIND, 1985).

Around the middle of the 1960s wage solidarity took a more radically egalitarian form, moving away from the initial concept of leveling wages among jobs of comparable difficulty, risk and skill, in the direction of leveling wage differentials more or less across-the-board. The shift, which might be caricatured as a transformation of the idea "equal pay for equal work" to "equal pay for all work," was marked by a concerted drive to improve the relative wages of the low paid, which clearly shows up in

the distributional profiles of the central wage framework agreements negotiated by LO with SAF.<sup>9</sup>

Framework agreements with pronounced low wage provisions ('low wage pots') were a distinguishing feature of wage formation in Sweden from 1964 all the way up to 1983, when central bargaining broke down and the emphasis on equality in the wage formation process (as well as in the political process) began to diminish. Although LO exercised leadership in the drive for wage compression, the white collar union cartel TCO followed suit (especially the unions representing public sector white collar workers and lower echelon clerical employees), and probably for pretty much the same reason: During these years most Swedish trade union leaders shared a deep ideological commitment to equality.

For union leaders motivated by egalitarian ideology, attacking inequality by compressing market earnings has obvious advantages. Despite the unions' considerable influence in politically dominant social democratic circles, wages, not taxes, transfers and public goods, are what unions can affect directly.<sup>10</sup> And, as I suggested

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<sup>9</sup>The institutional setting of Swedish wage formation and the formal structure of the central wage framework agreements are developed ahead.

<sup>10</sup>On the other hand, tax and transfer policy is the main way a union organization can affect distribution beyond its membership. The blue-collar confederation LO, for example, has certainly exercised its political clout on

in the first section, wage compression confronts inequality at the root -- market earnings. Moreover, equality based on the distribution of pay does not depend on ideas about the disincentive effects of taxes and transfers, which may prompt governments to soften the fiscal system's progressive thrust. Nor is earnings equality offset by the ability of well-heeled classes to play the transfer system, to exploit loopholes in the tax structure, or to dominate the consumption of high-end public goods. Egalitarian ideology aside, solidarity wage policy, as the label implies, also tends (up to a point) to help sustain organizational unity by binding the unions' members together, an important institutional interest of all labor movements.

### III. Gross Dispersion Trends

Wage dispersion statistics suggest that the 'low wage pushes' launched by the unions in 1964 had at least some success. Figures 2 and 3 display squared coefficients of variation (squared CV's) computed from hourly wages of private sector blue-collar workers (LO-SAF) and monthly

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behalf of 'progressive' fiscal policy, in order, among other things, to ensure an equitable society-wide income distribution.

salaries of private sector white-collar employees (PTK-SAF),<sup>11</sup> respectively, over the years 1957-58 to 1987-88. In the case of blue-collar workers, two estimates of total wage dispersion are shown; one based on data (assembled by LO) on percentiles of hours, the other on data from SAF on individuals.<sup>12</sup> The SAF data are especially revealing for later half of the period because we have statistics on the

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<sup>11</sup>I have no comprehensive data on wage and salary dispersion for public sector employees. It is very likely, however, that compression of public sector wages was as great, or even greater, than the private sector compression documented here. Also see the fragmentary evidence on public sector wage differentials presented ahead.

<sup>12</sup>The SAF coefficients of variation were supplied to me directly by SAF officials. The LO CV's were computed from percentile hourly wages supplied to me by LO officials. It was necessary to estimate wages at the 100th percentile from incomplete information.

The LO wages include straight-time, piece-rate and holiday payments (known as T+A+H wages); the SAF wages exclude holiday pay (H). The LO series also weight part-time workers less heavily than the SAF data because the former are based on hours and the latter on individuals. Both series are compiled from the same comprehensive employer reports of second-quarter wage payments (total wage payments divided by total hours worked in the quarter yielding average hourly wages for the quarter). Individual data on workers paid in some part by group as opposed to individual compensation formulas are not available. Wages of such workers, therefore, do not contribute to the SAF or LO dispersion series.

Finally, although SAF and LO officials rely on the same raw wage data (wage payment reports from employers) to construct their series, each organization attempts to purge the raw data of obvious errors (wages that appear far too high or low to be plausible). Despite the limitations of these data, I know of no country for which we have such comprehensive information about wages.

between-contract-area and within-contract-area components of total wage dispersion.<sup>13</sup>

The squared CV's indicate that the biggest earnings compressions came between the mid-1960s and the mid-1970s, the first decade of the low wage pushes. Between contract areas, blue-collar dispersion declined by a whopping 74 percent from 1965 to 1975. Over roughly the same period, total dispersion among private white-collar employees fell by 40 percent. During the 1970s and after, trends in overall dispersion among both blue- and white-collar workers are dominated by developments within contract areas. This is not surprising because by the early 1970s the 'within' components made-up over 80 percent of the total dispersions. Wage and salary differentials between contract areas had been squeezed to bare bones levels earlier.

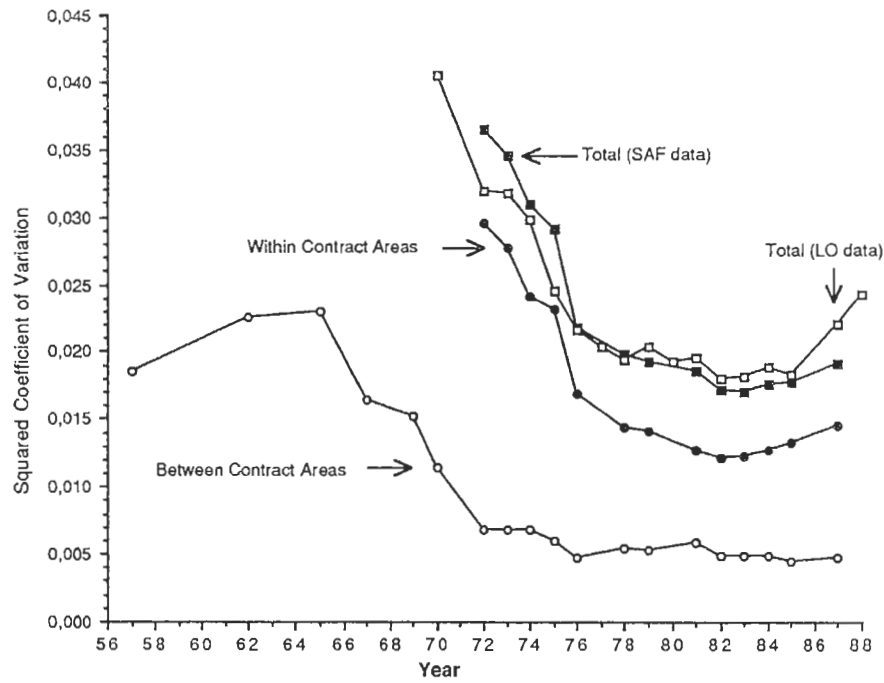
Although the SAF statistics pertain to individuals and the LO statistics to hours of work and the two series are based on slightly different wage concepts, the time paths of total dispersion for blue-collar workers generally evolve in tandem. From 1970, the first observation in the LO series, to 1982-83 when wage compression bottomed-out,

<sup>13</sup>The 'between' dispersions are weighted by shares of employment in each contract area, so the decomposability of variance-based dispersion statistics insures that the overall or 'total' squared CV is equal to the sum of the squared 'between' CV and squared 'within' CV.

dispersion among blue-collar workers declined by 55 percent. The compression of earnings in the SAF series is comparable. From 1972 (the first SAF observation) to the 1982-83 trough, dispersion declined by 53 percent. After 1982-83, some of the compression was reversed in pace with the break down of centralized wage formation and solidarity bargaining. (This is considered in greater detail ahead.) By 1987-88 dispersion was back to the levels of the mid-1970s.

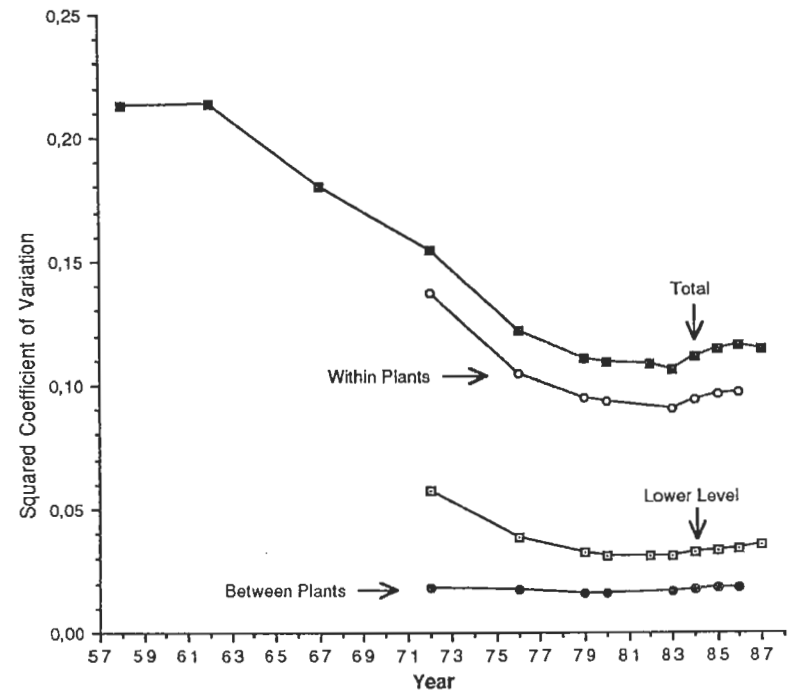
Despite the upturns in dispersion after 1982-83, the squared CV for all private sector blue-collar workers was on the order of 40-45 percent lower in 1987-88 than in 1970-72. The corresponding decline for all white-collar private employees was around 26 percent. Within the white-collar ranks, representatives of lower echelon employees are known to have pushed hardest for equality. No doubt this explains why the decrease in the squared CV for the lower white-collar class ('Lower'), shown in the bottom part of Figure 3, was greater than the compression of wages among all white-collar employees ('Total').

Figure 2: Wage Dispersion Among Private Sector Blue-Collar Workers  
 Figure 3: Wage Dispersion Among Private Sector White-Collar Workers  
 About Here



Sources: SAF, December 1987 and Computations from internal LO data supplied to author

Figure 2: Wage Dispersion Among Private Sector Blue-Collar Workers



Source: SAF, January 1985 and updates supplied to the author

Figure 3 : Wage Dispersion Among Private Sector White-Collar Workers

### Wage Differentials Across the 'Classes'

So far I have looked separately at wage dispersion trends among blue-collar and white-collar workers. Blue-collar wage compression has received the most attention, partly because LO has exercised leadership in promoting wage equality, but mainly because the data available to me on blue-collar wages are much richer. Some informative comparisons can be made, however, of the annual wage incomes of upper and lower echelon white-collar workers and blue-collar workers. The "cross collar" comparisons amount to what sociologists usually think of as income differences between the "classes."

Figures 4 and 5 show annual wage differentials, before and after tax, among two categories of white- and blue-collar workers in the Swedish private sector: Lower and upper echelon white-collar employees ("white" and "executive"), and industrial workers at the average and at the 95th percentile of the annual distribution of blue-collar wage incomes ("industrial" and "industrial 95"). Viewed over the whole period of available data (1970-87 for blue-collar workers and lower echelon white-collar workers, 1970-82 for the white-collar executives), the wage relatives either trend in the direction of greater equality, or are flat.

The data for the upper and lower white-collar employees indicate that the general compression of white-collar wages discussed above (Figure 3) tended to close the gap between the market incomes of executives and clerical employees only very slightly. Before tax, the ratio of their annual incomes fell from about 2.2 in 1970 to around 2.1 by the mid-1970s and after. The after tax decline in the white-collar wage relatives was more substantial. It fell from almost 1.9 in the first year to 1.35-1.40 toward the end of the period.

The most dramatic levelling depicted in Figures 4 and 5 was between the annual wage incomes of Swedish executives and industrial workers. The pre-tax annual wage relatives between managers and average income workers declined from about 3.2 in 1970 to around 2.8-2.85 in 1981-82. The intersection of falling wage relatives before tax and rising tax progressivity produced a bigger after tax equalization: Net of taxes, the the executive-to-industrial worker wage differential declined from approximately 2.5 to 1.6-1.7 over the period.<sup>14</sup>

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<sup>14</sup>The cross-class compression may well be overstated because the tax rates imputed to the higher income executives were too high. On the other hand, no account is taken of transfer payments (negative taxes) in the computations, and transfers probably went disproportionately to the workers.

Figure 4: Relative Gross Wages of White- and Blue-Collar Private Sector Employees  
 Figure 5: Relative Net Wages of White- and Blue-Collar Private Sector Employees  
 About Here

#### LO's Political Problem

Politically, the wage relatives between the lower echelon white-collar employees and blue-collar workers hold the greatest interest. It has been frequently argued, in both SAF and LO circles, that the simultaneous, successful pursuit of egalitarian wage goals by the white- and blue-collar union cartels (LO and TCO) opened up a politically sensitive gap between the relative incomes of skilled industrial workers and clerical employees. LO officials in particular believe that this alleged gap between the incomes of skilled workers and lower level white collar employees is the source of their most severe intra-organizational political problems.<sup>15</sup> The point is

<sup>15</sup>I base this statement on conversations with LO officials, but the point is so frequently made that by now it appears to be taken as "common knowledge." In view of the evidence presented ahead, I am at a loss to explain why. Perhaps the argument applies only to select blue-collar/white-collar union differentials (for example, Metal-SIF), or the gap is obscured in data because exits by affected LO workers into white-collar unions.

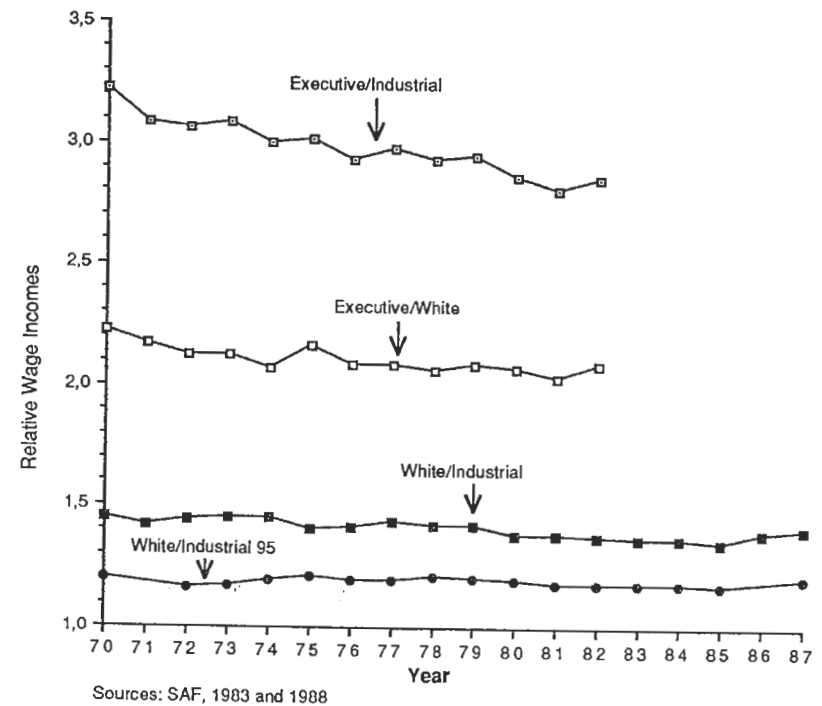


Figure 4: Relative Gross Wages of White- and Blue-Collar Private Sector Employees

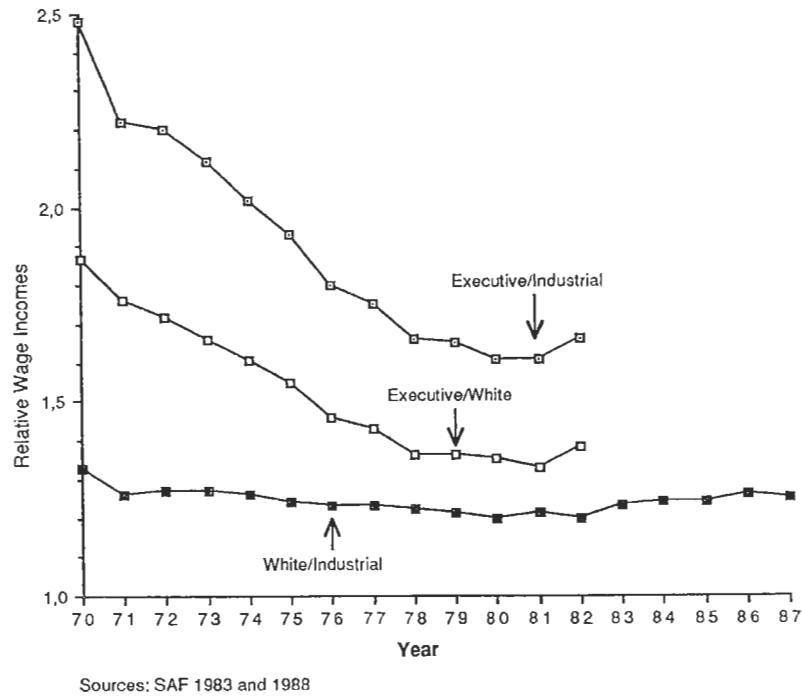


Figure 5: Relative Net Wages of White- and Blue-Collar Private Sector Employees

illustrated abstractly by Figure 6 (which is based on Jonsson and Siven 1985, 1986).

Figure 6: LO's 'Political' Problem About Here

Whatever the origins or motivation of the argument illustrated by Figure 6, it receives no support whatever from the relative wage data in Figures 4 and 5. The most relevant contrast is between the lower echelon white-collar employees ("white") and the high-wage (and, presumably, high-skill) blue-collar workers at the 95th percentile of the LO distribution ("industrial 95"). Figure 4 shows that from 1970 to 1987 the pre-tax white-collar premium was essentially flat, oscillating by only a percentage point or two around a mean of about 18 percent (a ratio of 1.18). And Figures 4 and 5 also show that income gap between average wage industrial workers and white-collar clerical employees actually declined a bit, pre- and post-tax.<sup>16</sup>

#### Dispersion Among All Private Sector Wages

Given data on the average wages of the classes, the separate white- and blue-collar wage dispersions, graphed

<sup>16</sup>No after-tax computations were made for high income blue-collar workers.

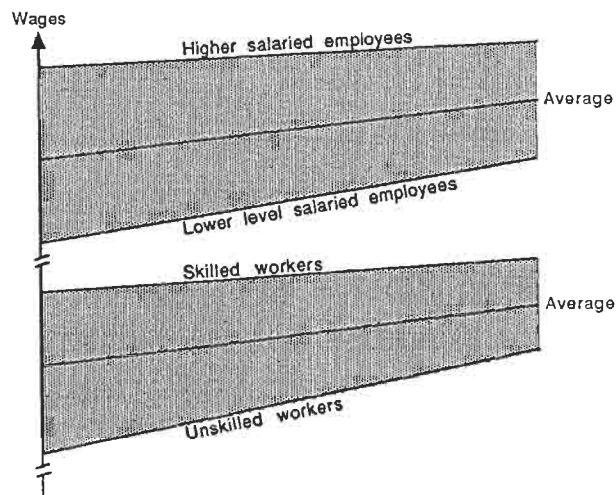


Figure 6: LO's "Political Problem"

in Figures 2 and 3, may be combined to generate dispersions for the entire private sector labor force. The total dispersions are generated by using the variance decomposition formula

$$\sigma^2(\text{total}) = \beta \sigma^2(\text{blue collar}) + (1-\beta) \sigma^2(\text{white collar}) + \beta(1-\beta) (\bar{w}_{\text{blue}} - \bar{w}_{\text{white}})^2,$$

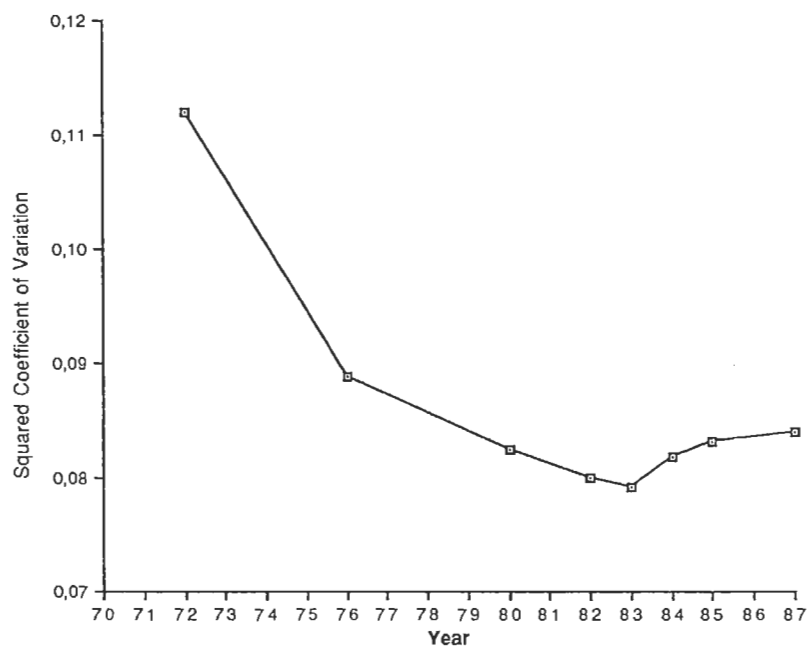
where  $\beta$ ,  $(1-\beta)$  are the labor force shares (approximated here at a constant 0.7 for blue-collar and 0.3 for white-collar), and wages are expressed in the same per unit time basis.

Figure 7 reports results of the computations. The evidence indicates that from the early 1970s to 1982-83, when wage inequality in Sweden reached its postwar trough, the institutionally autonomous processes of wage formation within the white- and blue-collar unions<sup>17</sup> yielded a net decline in the squared coefficient of variation of wages among all private employees of about 30 to 35 percent.

Figure 7: Wage Dispersion Among All Private Sector Workers

About Here

<sup>17</sup>To the degree that 'cross-collar' (LO-PTK) wage rivalry was at work, the wage formation processes were of course not behaviorally autonomous.



Sources: SAF, January 1985, December 1987 and updates supplied to the author

Figure 7: Total Wage Dispersion Among All Private Sector Workers

#### IV. Some Implications of Aggregate Dispersions

##### Relative Blue-Collar Wages

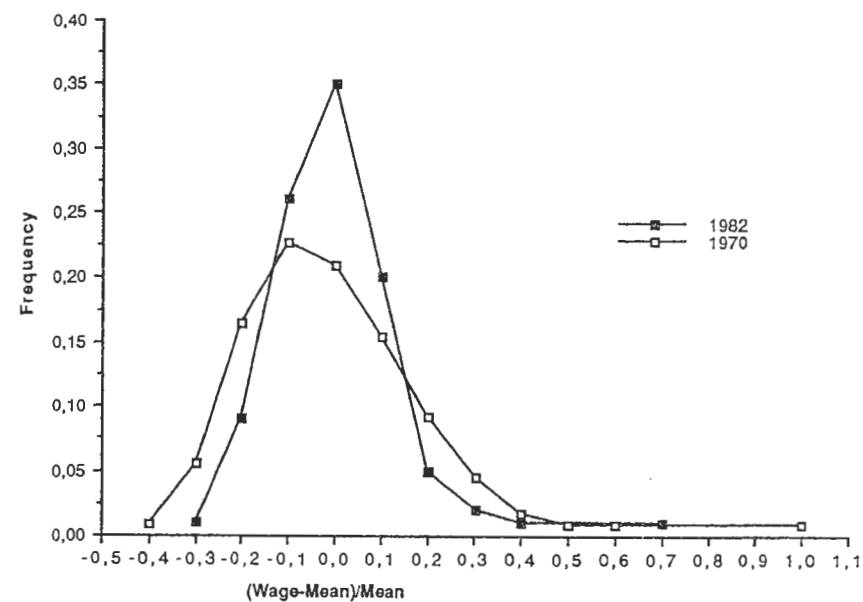
Variance-based measures of dispersion, such as the squared coefficients of variation discussed so far, although commonly used in academic studies of inequality, give rather arid conceptions of actual earnings distributions. Figures 8 and 9, which are based on the LO wage series for blue-collar workers, convey a more down to earth picture of just what trends in the squared CV's meant for changes in the structure of relative pay. Figure 8 shows the complete percentile distributions of wages for 1970 and 1982 -- the years with the highest and lowest overall dispersion in the LO blue-collar wage data. The Figure illustrates how much shrinkage in the wage distribution tails, and bunching of wages at the average, underlaid the cumulative decline of nearly 55 percent in the squared CV observed over the period.

In Figure 9 selected percentiles in the distributions are graphed in proportion to the average wage for the entire period covered by the LO blue-collar series. It is a more refined version of what in Sweden is known as the LO relative wage "cone." The Figure shows that the trends in gross dispersion apply quite uniformly throughout the wage distribution, although of course they are much more

pronounced at the upper and lower tails than at percentiles closer to the average wage.

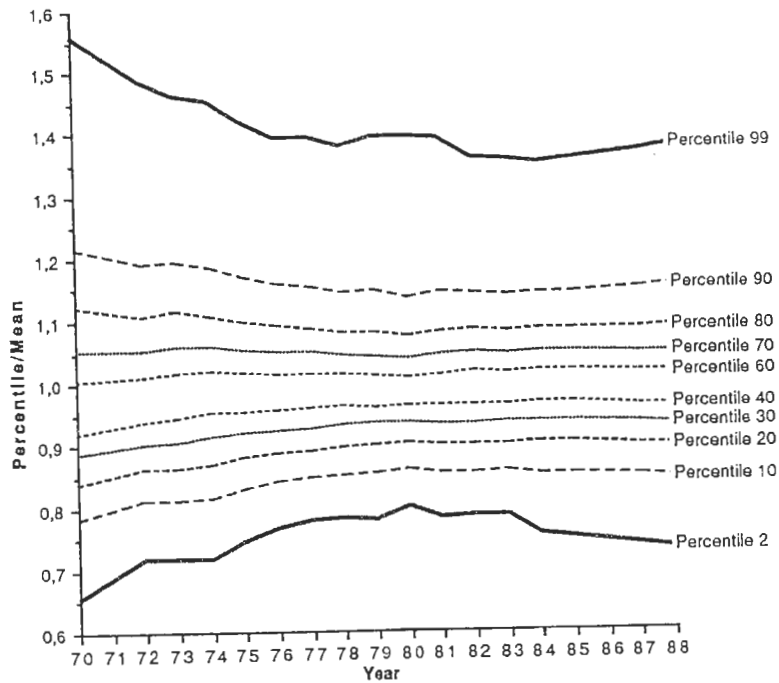
Developments at the extremes reveal the upper limits of the compression, and subsequent decompression, of the Swedish blue-collar wage structure. In 1970 a move from the 2nd to the 99th percentile of wages, which amounts to traversing nearly the entire hourly distribution, would have required a relative wage increase of about 138 percent. By 1982-83 the same move from the near-bottom to the near-top of the distribution could be achieved with a relative increase of only 73 percent. In 1988, after several years of generally rising dispersion, an 88 percent relative wage rise was necessary to move from the 2nd to the 99th percentile. Less comprehensive data for prior years suggest that the compression of relative wages during the last half of the 1960s was as large (and perhaps larger) as the compression from 1970 to 1982-83 shown in Figure 9. (See, for example, Figure 2 and LO, 1987, p.30)

Figure 8: Wage Distributions in 1970 and 1982 for Private Sector Blue-Collar Workers  
 Figure 9: The 'LO Cone': Relative Blue-Collar Wages About Here



Source: Computed from internal LO data supplied to the author

Figure 8: Wage Distributions in 1970 and 1982 for Private Sector Blue-Collar Workers



Source: Computed from internal LO data supplied to the author

Figure 9: The "LO Cone": Relative Blue-Collar Wages

### Mobility Through a Compressed Wage Structure

With a wage distribution as squeezed as Sweden's, it is easy to overstate the importance of mobility through the wage structure, or the redistributive thrust of the tax-transfer system, in accounting for shifts in income equality. For example, in his fine review of 'efficiency and equality in labor markets' done for the Brookings report on the Swedish economy, Robert Flanagan (1987) asked the question "how much equity Sweden would lose by abandoning the solidaristic wage policy." The answer, he decided, was "not much."

Flanagan's conclusion was based partly on his analysis of data available from SAF on the earnings mobility of private sector blue-collar workers across deciles of the wage distribution from 1984 to 1985. Beginning with the sensible proposition that "Negotiated reductions in the inequality of the earnings structure will lower individual inequality only to the extent that individuals maintain their relative positions in the earnings structure," he observes "With so many workers changing their relative earnings position during even short periods of time, it is doubtful that changes in the earnings structure can be regarded as a powerful influence on overall equality..." (Flanagan, 1987, p.151, 153)

This line of reasoning misses the fundamental point that mobility across fractiles of the earnings distribution was so easy in Sweden in the 1980s precisely because the wage structure had become so compressed.<sup>18</sup> The redistributive potential of Sweden's powerful tax-transfer system was another reason that Flanagan was so skeptical about the efficacy of wage compression as a route to ultimate income equality. Again, however, a tightly compressed earnings distribution means that even small differences in individuals' tax obligations or transfer receipts can easily change relative positions in the distribution of disposable income. (This is also overlooked by Lindbeck, 1983.)

The point is illustrated concretely in Table 1, which is geared to the data Flanagan analyzed on 1984-85 earnings mobility across deciles of the hourly wages distribution. Looking from the Third, Fifth and Eighth deciles up and down the relative wage ladder, the Table addresses the following question: Given the distribution of hourly earnings in 1984, how much change in the relative wage at each decile was necessary to achieve the 1984-85 earnings

<sup>18</sup>Flanagan does not draw a sharp distinction between static and short-run distributions, and lifetime earnings equality. I report some estimates on lifetime inter-occupational earnings differentials ahead.

mobility tracked by Flanagan's data?<sup>19</sup> The answer to this question, which I think is more germane to the issue at hand than the one posed by Flanagan, is 'rather little'.

The first thing to notice in Table 1 is that from one-third to one-half of the workers experienced no change at all from 1984 to 1985 in their relative (decile) hourly wage position. In the language of mobility analysis, these are the "stayers." Given the bunching of wages at the average, and the apparently universal tendency of wage distributions to exhibit a right skew, the proportion of stayers increases as one moves away from the mean toward the tails; especially as one moves into the upper tail. (For example, among workers at the Highest decile in 1984, not shown in Table 1, 73 percent were stayers.) The second thing to notice is that "movers" in 1984-85 experienced a change of more than one decile in their relative wage only infrequently: Around 80 percent of the work-force was within one decile of their 1984 relative wage position a year later.<sup>20</sup> And changes of more than

<sup>19</sup>I analyze only three deciles to conserve space. The patterns established in the Table, however, hold for the entire decile mobility matrix. Also note that the mobility data pertain to individuals and the wage distribution data pertain to hours of work. Because part-time hours tend to fall at the lower end of the distribution, the correspondence between 'movers-stayers' and 'wage changes needed' is not perfect. But it is very close.

<sup>20</sup>My entries differ from those reported by Flanagan, 1987, Table 5-4, because I have normed the proportions of workers moving and staying to the pool of workers who had the same employer in both years. Unfortunately, no data

two deciles were so rare that I have omitted such entries from the Table.

Table 1: Relative Wage Changes Necessary to Account for the 1984-85 Earnings Mobility of Private Sector Swedish Blue-Collar Workers  
About Here

The important point to remember, however, is that the significance of movements through a fractile wage structure for changes in absolute equality depends completely on how compressed earnings are to start with (that is, on the earnings density function). The main message of Table 1 is that relative wage changes of just 3 to 4 percent in either direction account for the vast majority of moves in the decile distribution observed by Flanagan. In fact, the 1984 blue-collar hourly wage distribution in Sweden was so tight that a relative increase of less than 34 percent was enough to carry a worker from the lowest decile in the distribution all the way to the highest. By comparison, in the same year a parallel jump across the hourly wage distribution for manual workers in the United Kingdom would have required a relative increase of more than 210 percent, and for a U.S. manufacturing employee the requisite increase was just

on the earnings mobility of job-changers were available to me. Since the propensity to change employers, however, is negatively correlated with relative wages, job-movers may have experienced more upward earnings mobility than job-stayers. But it is unlikely that my main point would be overturned by inclusion of data on the movers.

Table 1. Relative Wage Changes Necessary to Account for the 1984-85 Earnings Mobility of Private Sector Swedish Blue-Collar workers

Decile Position 1985	Decile position in 1984					
	Third		Fifth		Eighth	
	% movers - stayers	% wage change needed for move	% movers - stayers	% wage change needed for move	% movers - stayers	% wage change needed for move
Lowest	2.3	-10.1	-	-	-	-
Second	12.6	-4.7	-	-	-	-
3rd	48.4	0	3.3	-6.0	-	-
4th	20.5	+3.4	19.5	-2.8	-	-
5th	7.9	+6.3	35.7	0	-	-
6th	-	-	22.6	+2.8	5.6	+5.9
7th	-	-	9.2	+5.8	20.1	+3.0
8th	-	-	-	-	41.6	0
9th	-	-	-	-	21.5	+4.0
Highest	-	-	-	-	6.5	+12.1

Sources: Mobility Data computed from Flanagan, 1987, Table 5-4. Percentage wage changes computed from the 1984 10 percentile distribution.

over 490 percent.<sup>21</sup> It is perhaps surprising, then, that we do not observe more "fractile wage mobility" for Sweden than Table 1 reveals.

#### Equality of Lifetime Earnings

Although the static dispersion of wages at each period over time heavily constrains the set of feasible lifetime outcomes, firm conclusions about the ultimate impact of wage compression on lifetime equality ideally require analyses of the intersection of a compressed earnings distribution with the tax-transfer system and lifetime mobility through the wage structure. The ideal analysis requires panel data of long duration, which are not available to me. Figures 10 and 11, however, present some 'second-best' (or, perhaps, third- or fourth-best) data bearing on the issue.

We begin by looking at 1982 market earnings ("gross wage") differentials for workers at 40 years of age across a broad range of occupations in the private and public

<sup>21</sup>The number for the United Kingdom is based on my direct calculation from decile data reported in the New Earnings Surveys for full-time manual workers. For the U.S. I assumed log normality of wages, and used Medoff's computation from the 1984 Current Population Survey of the variance of log manufacturing wages (see Medoff, December 1984) along with an external estimate of the average log manufacturing wage. The U.S. sample includes white-collar employees, which of course yields higher dispersion than would be obtained from a blue-collar only sample.

sectors (considered separately). All incomes are normed to the average annual market wage income of industrial workers (which is set equal to 100). The inter-occupation gross wage differentials yield a more detailed idea for the single year 1982 of the cruder cross-class income differences graphed over time in Figures 4 and 5.

Although the occupations in Figures 10 and 11 span a large part of the job-income and job-status range observed in the economy, they are distinct enough that we may without too much reservation assume away the possibility of significant mobility through the activity structure. Some high school engineers, after periods of additional training, no doubt move up to graduate engineer positions, but very few people starting out as industrial workers become graduate economists, not many nurses rise to the status level of lawyers, and so on.

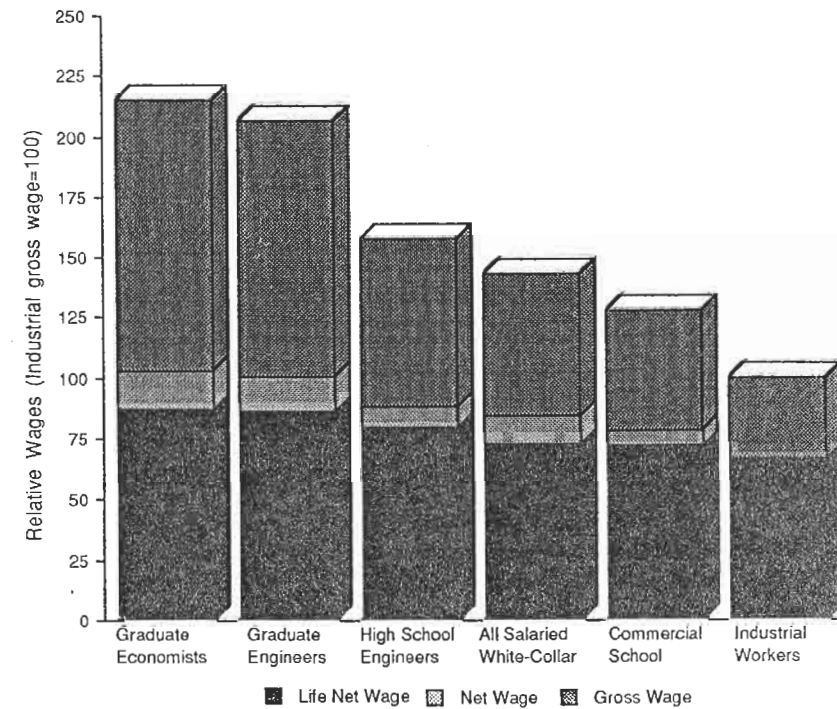
As the Figures remind us, by 1982 the gross wage distribution had become very compressed. In the private sector (Figure 10), the biggest differential shown is the 2.15 to 1.0 earnings ratio of graduate economists to industrial workers; a premium to the economists of 115 percent. In the public sector (Figure 11) it is the 1.7 to 1 earnings ratio of lawyers to nurses, a differential of 70 percent in favor of the former. On top of an already compressed inter-occupation wage structure, the progressive tax system reduces the gross earnings

differentials by nearly half.<sup>22</sup> The biggest differential in the private sector falls from 115 to 56 percent, as we go from gross to disposable annual earnings. In the public sector the tax system narrows the biggest gap from 70 to 40 percent.

Figure 10: Gross, Net and Lifetime Wages in 1982,  
Private Sector Occupations  
Figure 11: Gross, Net and Lifetime Wages in 1982,  
Public Sector Occupations  
About Here

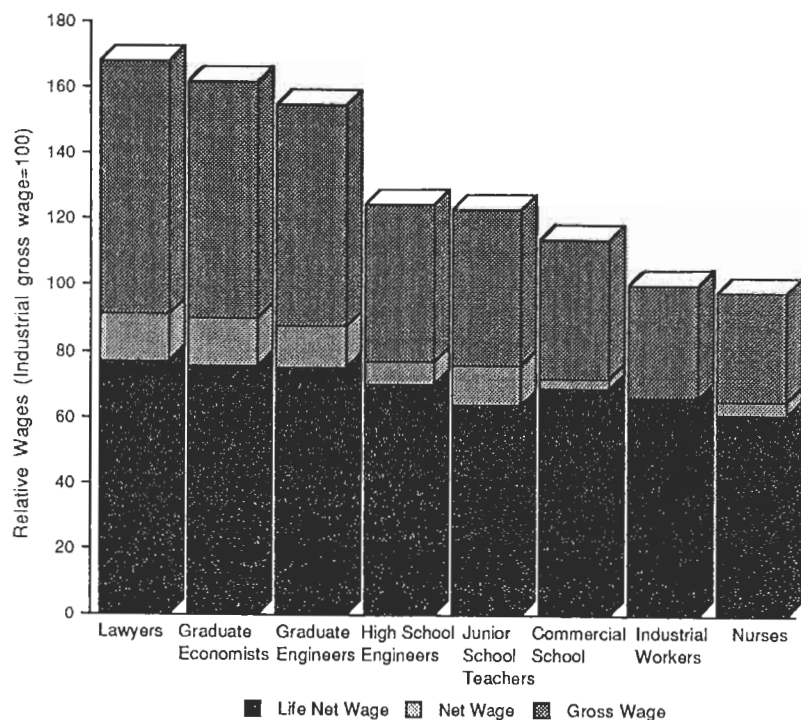
Our main interest here, however, is equality of net lifetime earnings in a compressed structure of relative wage incomes. The lifetime net wages, shown by the bottom layer of 'bars' in Figures 10 and 11, represent the 1982 present value of the net-of-tax wage stream accruing to "statistical" individuals who experience no mobility across the occupational categories from the time they enter the labor force to retirement. The present values of lifetime disposable earnings were computed by holding tax rates constant, applying a 2 percent discount rate, and assuming the age-wage profiles prevailing in the early 1980s. Given the two percent discount rate, the differences between the lifetime net incomes and the 1982 net incomes are due to variation in the number of years

<sup>22</sup>As in the previous description of cross-class wage differentials, the estimated tax effects are probably too large for the higher income groups.



Source: Based on Jonsson and Siven, 1986, p. 26-27

Figure 10: Gross, Net and Lifetime Wages in 1982  
Private Sector Occupations



Source: Based on Jonsson and Siven, 1986, p. 26-27

Figure 11: Gross, Net and Lifetime Wages in 1982  
Public Sector Occupations

spent outside the labor force acquiring the extra education necessary to qualify for the occupations. Hence, the difference in the 1982 net income and lifetime net income of industrial workers is nil, while for graduate economists it is 16 percent.

The computations described above imply a striking equality of lifetime net earnings in Sweden during the early 1980s. (Lindbeck, 1983, reports data for 1979 yielding the same basic picture.) Across the entire occupational class structure shown in the Figures -- industrial workers to lawyers in the public sector, and industrial workers to graduate economists in the private sector -- the income differentials are no larger than 26 to 32 percent. To be sure, if the post 1982-83 tendency of wage dispersion to creep upward accelerated over time, and if the the sharply progressive structure marginal tax rates was abandoned,<sup>23</sup> the startlingly egalitarian distribution of lifetime net incomes over the classes could swiftly be altered. But as things stood in the first part of the 1980s, it would have taken very large doses of unrecorded income, untaxed perks and the like, advantaging some occupations relative to others, to nullify the great compression of lifetime net incomes depicted in Figures 10 and 11.

<sup>23</sup>As I edit this chapter for publication (December 1989), this now appears quite likely.

### V. Union Ideology and Market Forces As Sources of Trends in Dispersion

By international standards, wage equality in Sweden evidently had gone quite far by the end of the 1970s. Inter-industry data certainly show Sweden to have less wage dispersion, in most cases very much less, than other industrial market economies.<sup>24</sup> So do available data on individual wage dispersion in the U.S. and the U.K., which were mentioned earlier. Yet, who knows, wage dispersion in Sweden may have fallen anyway in an unfettered labor market, free of all union ideological pressure for equality, as a result of conventional supply and demand forces. This issue is evaluated from two angles in the remaining sections of the paper.

First, I look at blue-collar wage compression trends in relation to trends in the dispersion of human capital among Swedish workers. Human capital theory points to skill distributions as the decisive source of wage distributions. Human capital formation, however, is

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<sup>24</sup>Yet inter-industry data are of quite limited value for making international comparisons of total wage dispersion. Recall, for example, from Figure 2 that by 1972 only around 20 percent of total wage dispersion among blue-collar Swedish workers was due to differentials between agreement areas (roughly industries). Comparative analyses that include Sweden of inter-industry dispersions may be found in Freeman, 1988, Jonsson and Siven, 1986, Hedström and Swedborg, 1985 and Rowthorn, 1989.

surely endogenous, and its distribution could in some degree represent responses to externally determined relative wage structures, rather than the other way around. Nonetheless, if trends in Swedish wage dispersion conform closely to wage distributions implied by human capital models, one should hesitate before attaching much weight to the unions' egalitarian goals as an exogenous influence on wage dispersion.

Previously we saw that dispersion of Swedish wages declined by perhaps as much as 75 percent from the mid-1960s to the early 1980s -- something of a 'golden age' of wage equality, during which the so-called 'low wage pot' central agreements (låglönesatsning) prevailed in the LO-SAF area. Formalization of these central framework agreements provides a second vehicle to assess the impact of trade union goals on observed trends in wage dispersion. It allows evaluation of how well the compression of relative wages that would have been observed under complete implementation of the central agreements at the lower bargaining levels tracks the dispersion of actual wages.

It is of course possible that the egalitarian thrusts of the central wage frames merely mimic the effects of (unobserved) market forces running in the same direction.

But a close correspondence between actual and frame-derived wage dispersions should be taken as strong evidence that the ideology of equality, as delineated in the central agreements, exerted autonomous influence on the trend toward earnings equality.

The approaches described above for sorting out the effects of trade union action and market forces on wage dispersion are flawed, and so neither can supply compelling evidence on the issue. But, as we shall see, each yields a relevant bit of evidence implying an important role for LO's ideology of equality in explaining the history of wage compression in Sweden.

#### Human Capital Wage Dispersions

Human capital wage theory, interpreted narrowly, gives a supply-side account of earnings distributions. Earnings reflect market returns to investments individuals make in acquiring skills, through formal schooling, vocational and on-the-job training and more passive 'learning by doing' (job experience). As Jacob Mincer, one of the founders of the human capital school, once put it, "human capital models single out individual investment behavior as a basic factor in the heterogeneity of labor incomes." (Mincer, 1970, p.6)<sup>25</sup> Yet few would deny that workers'

<sup>25</sup>Like so many ideas in economics, one can trace a simplified form of human capital theory all the way back

skill endowments raise productive efficiency per unit of labor, so the human capital view is intimately connected to the neoclassical marginal productivity theory of wages sketched in the first section. In fact, Mincer wrote "I interpret productivity-augmenting work experience as an investment phenomenon." (Mincer, 1974, p.65)

Stripped of all the theoretical bells and whistles, initial empirical work in the human capital tradition intensively investigated cross-sectional earnings profiles by estimating variations of Mincer's basic equation (Mincer, 1974, chapter 5)

$$(1) \ln w = a + b S + c \text{Exp} - d \text{Exp}^2,$$

where the left side variable is the log of earnings, and the right-side variables are schooling/training (S) and job experience (Exp). A distinctive feature of the model, derived from the underlying theoretical assumptions which I do not present here, is the proposition that proportional returns ( $\ln w$ ) associated with accumulated job experience tend to diminish at later phases of labor force careers, because net human capital investment declines, the stock of human capital depreciates and

to Adam Smith, who in (An Inquiry into the Nature and Causes of) the Wealth of Nations wrote "wages vary with the cost of learning the business" (p.100 in the 1892, London: Routledge edition).

physical and mental abilities deteriorate. Hence the coefficient  $d$  is shown with a negative sign in the equation (1) above.

Early empirical equations in the form of (1) were refined considerably in subsequent work, sometimes in a quite ad-hoc fashion, as in the common practice of adding binary terms for gender and other sociological characteristics to a growing list of loosely rationalized right-side human capital variables. Schooling was split up into formal education and vocational training, experience was divided into tenure on the current job and prior experience (to isolate, following Becker, 1964, firm-specific human capital), and interactions between the two were introduced.

The dispersion of human capital variables among LO workers reported in Table 2, based on five representative surveys taken from 1968 to 1986, present a mixed picture. The variance of schooling, both formal and vocational, rose substantially, probably because of the secular deepening of education and training among successive cohorts of younger job entrants. (The mean-adjusted variance of vocational training falls, but that is not relevant to the human capital story.) On the other hand, the dispersion of job experience, current and previous, declined in the LO labor force over the period.

Table 2: Dispersion of Human Capital Among LO Workers About Here

What we need, however, is a way of weighting and combining the relevant human capital variances, along with their covariances. This requires a precise specification of the human capital model. I experimented with a number of variations of standard set-ups; the most satisfactory is shown in equation (2) with estimates obtained from the 1968 LNU subsample of LO workers. (See the specifications in Holmlund, 1984.)

$$(2) \ln \text{ Hourly Wages } 1968 = 1.88 + 0.019 \text{ Yrs Formal Education} + 0.041 \text{ Yrs Vocational Training} + 0.0197 \text{ Yrs Current Job} - 0.00025 (\text{Yrs Current Job})^2 + 0.0143 \text{ Yrs Previous Jobs} - 0.000178 (\text{Yrs Previous Job})^2 - 0.0005 (\text{Yrs Current Job} * \text{Yrs Previous Jobs})$$

All estimated coefficients in this equation are highly significant at the usual test levels, take the conventional signs and have plausible magnitudes. Among LO workers in 1968, the returns to vocational training were twice those to formal education, and there was a small premium to firm-specific experience which declined with the number of years spent in prior jobs. The negative signs of the quadratic terms imply the familiar concavity of experience-related wage returns.

Table 2. Dispersion of Human Capital Among LO Workers.

Year	1968	1974	1981	1984	1986
Sample size	1373	1333	1643	566	610
Total Years of Schooling					
Mean	7.5	8.3	9.1	9.4	9.8
Variance	2.7	4.9	6.1	6.8	6.0
Formal Education					
Mean	7.0	7.6	8.2	8.1	8.4
Variance	1.6	2.5	3.9	4.6	4.5
Vocational Training					
Mean	0.45	0.71	0.94	1.2	1.4
Variance	1.2	1.7	1.9	3.5	3.7
Total Years of Experience					
Mean	23.2	21.8	19.5	20.2	20.8
Variance	220.9	195.4	179.9	149.6	139.5
Current Job					
Mean	9.8	9.5	8.9	10.3	10.1
Variance	109.9	96.4	75.4	78.3	79.5
Previous Jobs					
Mean	13.5	12.4	10.7	9.9	10.8
Variance	174.0	140.9	114.8	94.6	98.7

Sources: 1968, 1974 and 1981 computed from LNU surveys. 1984, 1986 computed from HUS surveys. Subsamples of LO workers were drawn from the full samples, in some cases by using an identification algorithm based on observations on related characteristics (occupation, union membership, etc.).

Taking the variance of the right-side of equation (2) yields the human capital-based dispersion of 1968 log wages implied by the model. (The resulting quantity is, of course, identical to the explained variance of the 1968 regression.) Applying these 1968 coefficients to the variances and covariances of the human capital variables in the 1974, 1981, 1984 and 1986 surveys gives the time path of human capital-based dispersion of log wages in a hypothetical world in which returns to education, training and job experience remained fixed at 1968 values. The results of this exercise are graphed in Figure 12, along with variances of actual log wages in the LO series described before.<sup>26</sup>

To focus attention on trends, both actual and human capital dispersions are shown in proportion to their respective first year values (which therefore equal 1.0). The change in human capital wage dispersion from 1981 to 1984, which marks the shift from the LNU survey series to

<sup>26</sup>I do not show variances of log wages in the surveys because the 1981, 1984 and 1986 samples include a mixture of current year and prior year wages (due to the relation of interview periods to wage contract dates), which yields erroneous estimates of wage dispersions. The 1968 wages used to estimate the base-year coefficients, however, do not suffer from this problem.

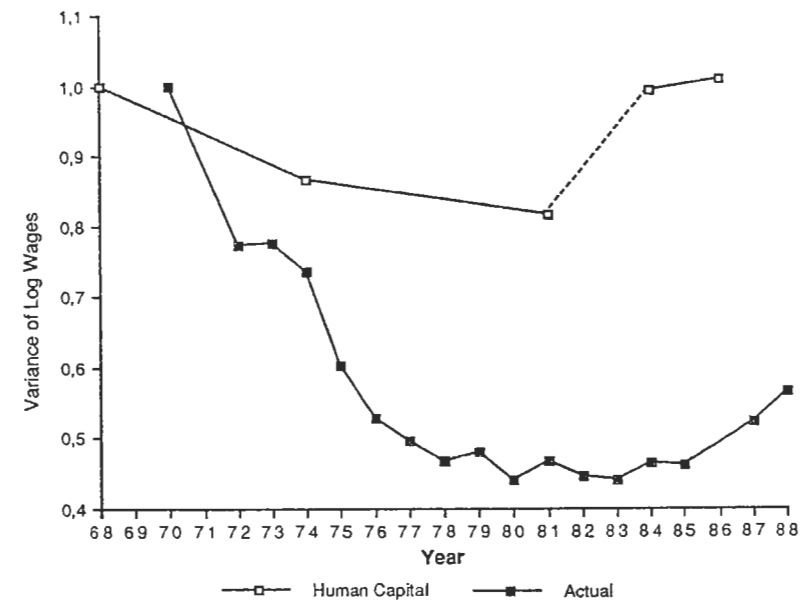
The mixed wages recorded in the 1980s surveys affect some of the results reported by Björklund, 1986 and 1987, who estimated somewhat different human capital set-ups with the full survey samples (not just the LO workers) to generate hypothetical wage distributions of the kind shown in Figure 12.

the HUS survey series, is shown by a dotted line. The break is identified because respondents drawn from the 1984 and 1986 HUS surveys very likely include some non-LO workers temporarily occupying private blue-collar jobs (for example people normally engaged in professional-vocational training), whereas the subsample drawn from the 1968, 1974 and 1981 LNU surveys is comprised of LO members only. Consequently, at least some of the 1981 to 1984 jump in human capital wage dispersion is almost surely due to the shift in sample pools.

Figure 12: Trends in Actual and Human Capital Variances of Log Wages  
About Here

Figure 12 shows that the human capital variance of log wages fell much less than the actual variances from the late 1960s to the early 1980s: From 1968 to 1981 human capital wage dispersion declined around 18 percent, while dispersion of actual log wages fell more than three times as much.<sup>27</sup> By contrast, after the early 1980s actual dispersion rose markedly, while the trend of human capital dispersion (1984 to 1986) exhibits a much gentler upward slope. The gap between observed and human capital wage dispersions began to close.

<sup>27</sup>The time path of the variances of actual log wages is essentially the same as that for the squared CV's discussed previously. Variances of logs are a bit more sensitive to dispersion in the lower tail and a bit less sensitive to dispersion in the higher tail than CV's.



Sources: Actual computed from internal LO data supplied to the author.  
Human Capital based on analysis of LNU 1968, 1974 and 1981 surveys and HUS 1984 and 1986 surveys.

Figure 12: Trends in Actual and Human Capital Variance of Log Wages

Whether these trends in returns to human capital can be attributed to successful implementation of LO's egalitarian wage policies from the late 1960s to the early 1980s, and the erosion of centralized solidarity bargaining afterward, is altogether a different matter. Normal supply and demand forces might account for changes over the period in wage premiums owing to education, experience and the like. In view of the magnitudes we observe in Figure 12, however, this seems to me improbable. (Also see Klevmarken 1982.) More likely, LO's solidaristic wage policy was able to accelerate the trajectory of market forces, here represented by dispersion of human capital, during the years of centralized wage formation under the 'low wage push' framework agreements. (See Andersson, 1987 for a related discussion.) After 1983, as the scope of central bargaining contracted and its egalitarian thrust diminished, raw market forces began to exert greater influence on the wage structure. The next sections develop the distributional implications of solidarity bargaining in some detail.

#### The Institutional Setting of Solidarity Bargaining

From 1956 to 1983 blue-collar wage formation in Sweden consisted of a highly integrated, three tier process: a

central framework agreement negotiated by the peak union and employer associations (LO and SAF), followed by national industry agreements (förbunds nivå), and then local, plant level agreements. The agreements specified wage increases for one, more commonly two, and sometimes three contract years afterward. The parameters of multi-year agreements defined annual wage increases, and the parameters were different for each year of the contract. So for our purposes, central bargains spanning several years may be treated as a sequence of annual agreements.

The central framework agreements specified the aggregate increase in the wage bill for each industrial contract area and provided strong (egalitarian) norms for its distribution among individual workers. In principle, the aggregate cost constraints specified by the frame for each industry were supposed to be binding at the lower levels. In practice, however, aggregate costs routinely exceeded the frame provisions; wage drift, originating largely at the plant level, was a predictable feature of the system.

The process permitted deviations from the distributional profile spelled out in the frames, but only by agreement among employers and unions at industry level negotiations. Yet we know very little about how industry level contractual practice and local level wage drift affected the distributional thrust of the central framework

agreements. Precise investigation of the matter requires formalization of the framework agreements, and simulation of the 'frame wage' series implied by them.

#### Mechanics of the Central Framework Agreements

LO's big push for wage equalization began in 1964 with the first 'low wage pot' framework agreement. Under the typical low wage pot plan, wage increases for each agreement year (indexed  $t$ ) were composed of:

- (i) a common flat rate amount specified in öre (which we denote  $k_t$ ) going to every worker (indexed by  $i$ );
- (ii) wage drift guarantee amounts (denoted  $g_{it}$ ), designed to compensate workers who were disadvantaged by market drift since the last frame agreement;
- (iii) cost of living adjustments ( $c_t$ ), usually paid out in a flat rate manner, which begin to appear in frame contracts toward the late 1970s; and
- (iv) low wage adjustment amounts.<sup>28</sup>

Low wage adjustments were targeted on workers whose actual hourly wages ( $w^a_i$ ) observed in the (second quarter)

<sup>28</sup>Some agreements also included so-called 'trade union pots' and 'non-level increasing' wage components. The amounts tended to be small and I do not discuss them further here. Account was taken of them, however, when computing the 'frame wage' distributions described ahead.

of the previous agreement year ( $w^a_{i,t-1}$ ) stood below a certain reference level wage ( $w^*_t$ ), originally called the low wage boundary (låglönegräns). Adjustment amounts were based on the computation of a low wage pot. Each worker's notional contribution to (and receipt from) the pot was based on a proportion ( $p_t$ ) of the difference between  $w^*_t$  and  $w^a_{i,t-1}$ , up to a plant level ceiling per worked hour ( $L_t$ ). Although the wage bill increase specified in the framework agreement were at the disposal of the parties at industry bargaining, so-called block rules (stupstocksregel) were attached to them. Consequently, as pointed out above, both union and employer organizations had to agree on alternative schemes in order to deviate from the distributional formula of the central frame.

With the main elements of the typical frame agreement now in hand, the "frame" (centrally planned) wage changes from the second quarter of agreement year  $t-1$  to the second quarter of year  $t$  may be written as

$$(3a) \quad (w_{i,t}^f - w_{i,t-1}^a) = k_t + g_{it-1} + c_{t-1} \\ + \min [L_t, p_t(w_t^* - w_{i,t-1}^a)],$$

if  $w_{i,t-1}^a < w_t^*$ , and

$$(3b) \quad (w_{i,t}^f - w_{i,t-1}^a) = k_t + g_{it-1} + c_{t-1}$$

if  $w_{i,t-1}^a \geq w_t^*$ , and hence

$$(3c) \quad w_{i,t}^f = w_{i,t-1}^a + k_t + c_{t-1} + g_{i,t-1} \\ + \min [L_t, p_t(w_t^* - w_{i,t-1}^a)] \cdot D_{it}$$

where  $w_{i,t}^f$  is the second quarter frame wage for each worker under the year-t central agreement,  $w_{i,t-1}^a$  is the actual wage of each worker in the previous year's second quarter (the only wage observed by SAF and LO), and  $D_{it} = 1$  if  $w_{i,t-1}^a < w_t^*$ , else  $D_{it} = 0$ .

Notice that the t-1 to t wage increase specified by (3a)-(3c) includes current agreement year (year t) flat rates and low wage adjustments, and lagged (year t-1) drift guarantees and cost of living adjustments. This occurs because of the relation in time of the pay-out dates of the various contract elements to the actual second quarter wages observed by the central bargaining parties. Elements c and g were normally paid-out after second quarter wages in the current agreement year were recorded.

The profile of earnings increases under central frame agreements struck along the lines of equations 3a and 3b, net of the elements c and g, is graphed in Figure 13.

Figure 13: Planned Wage Changes Under the Low Wage Pot Framework Agreements About Here

As I noted earlier, drift guarantees ( $g_{it}$ ) provided by the central frame agreements were designed to offset potentially dis-equalizing changes in relative wages due to market wage drift from the previous year. More precisely, the guarantee amount going to each worker under a typical agreement may be expressed as the difference between a common guarantee ceiling ( $GL_t$ ), specified in öre and often normed to average drift in the SAF-LO area, and the market wage drift experienced by workers from the last second quarter to the current one. Market drift is the difference between a worker's actual second quarter-to-second quarter wage change and the contractual wage change for the same period. Hence, it is useful to define the variable  $g_{it}^*$ :

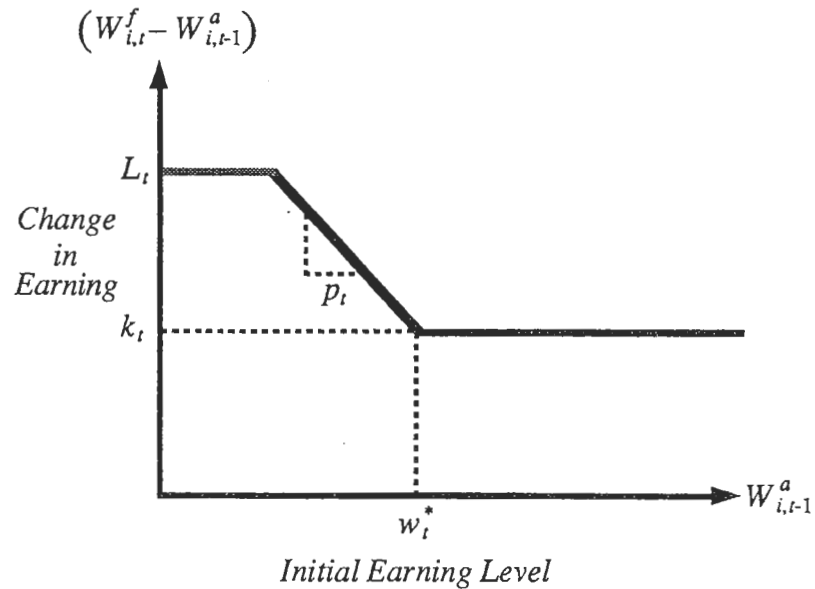


Figure 13: Planned Wage Changes Under the Low Wage Pot Framework Agreements

$$(4a) \quad g^*_{it} = GL_t - \{(w^a_{i,t} - w^a_{i,t-1}) - [k_t + c_{t-1} + g_{i,t-1} + \min(L_t, p_t(w^*_{i,t} - w^a_{i,t-1})) \cdot D_{it}]\},$$

which, by (3c), is

$$(4b) \quad g^*_{it} = GL_t - (w^a_{i,t} - w^f_{i,t}) \\ = \text{guarantee ceiling} - \text{wage drift}.$$

For workers experiencing wage drift (the expression inside the curly brackets in equation 4) greater than the ceiling  $GL_t$ , the drift guarantee amount  $g_{it}$  was supposed to be set to zero.<sup>29</sup> And workers with negative wage drift (a rare event, normally experienced by those downgraded to jobs with lower pay) were supposed to receive the ceiling amount  $GL_t$ . Drift guarantee pay-outs were thus determined by

<sup>29</sup>The drift guarantee formulas in fact were usually written in terms of average wage changes among time and piece-rate workers at the plant level (and sometimes, for the smaller ones, in terms of average wage changes at the level of industry-contract areas). But the intent of the frame agreements was clearly to compensate individuals in the way indicated by equation (4). So the guarantee formulas have been "individualized" according to the implicit distributional intention in order to compute frame wages and frame wage dispersions.

(4c)  $g_{it} = g^*_{it}$  if  $g^*_{it} \geq 0$  (market drift below the ceiling)

$g_{it} = 0$  if  $g^*_{it} < 0$  (market drift above the ceiling)

$g_{it} = GL_t$  if  $g^*_{it} > GL_t$  (negative market drift).

When drift guarantee amounts were paid-out along the lines implicit in the distributional intention of the frames, significant episodes of wage drift that broke out in the market, but were confined to selected workers or regions of the wage distribution, were spread by central design throughout the entire wage structure, after a lag of about a year. (Recall that the lagged guarantee amounts,  $g_{i,t-1}$ , are what affect the current second quarter "frame" wages,  $w^f_{i,t}$ ; see eq. 4c). Such drift contagion necessarily was implied by attempts to restore ex post the distributional thrust of the central wage frame once the pattern of market drift "disturbances" become known.

It follows that drift ceiling amounts may be regarded as centrally planned, officially sanctioned wage drift, in the sense that the frame wage profiles were designed to insure that everyone ultimately got at least GL in "drift," be it through market processes or contractual drift guarantee payments. Indeed, interviews with SAF and

LO authorities indicated that the distinction between the shares of GL coming from the market ( $GL - g_i$ ) and explicit drift guarantee payments specified in the industry contracts ( $g_i$ ) is considered by the bargaining parties to be one of form but not substance.<sup>30</sup>

Finally, it is important to recognize that the definition of wage drift in (4a) and (4b) and, hence, drift guarantees in (4c), are normed to the wage increases specified in the central framework agreements. Drift is defined as the difference between actual second quarter wages and second quarter wages implied by the framework wage profiles, even though under the frames' provisions industry contracts were permitted to establish alternative distribution plans. This conception of wage drift departs from the customary one, which is based on the difference between actual wage increases and wage rises contracted at the industry bargaining level (avtalsområden).<sup>31</sup> The

<sup>30</sup>By this reasoning, given that  $(w^a_i - w^f_i)$  defines frame-based conventional market drift (as shown by the second term on the right-side of eq. 4b), and since  $g_i$  is part of each worker's central frame wage ( $w^f_i$ ), we have (disregarding lags in the guarantee pay-out dates)  
 $g_i$  as planned frame drift,  
 $(GL - g_i)$  as planned market drift, and  
 $[(w^a_i - w^f_i) - (GL - g_i)]$  as unplanned market drift.

<sup>31</sup>The frame-based conception of drift yields the same aggregate quantity (increase in the total wage bill in excess of the central agreement provision) as the customary procedure, as long as the aggregate wage cost constraints specified in the frames were strictly adhered to by industry settlements. Although most aggregate drift arises from plant level settlements, industry agreements are on occasion known to have satisfied frame cost

departure is intentional. My purpose is to evaluate how successfully wage distributions implied by the frame account for observed distributions, and I am indifferent about whether the slippage between frame wages and actual wages occurred contractually at the industry level, or through conventional drift at the local level.

#### Simulating Frame Wage Distributions

Estimates of the wage distributions implied by complete implementation of the framework agreements were obtained by simulation of equations 3 and 4. The accuracy of such simulated dispersions depend on the accuracy of given, observed wages and the reconstruction of the contract parameters and profiles.<sup>32</sup>

The parameters  $k$ ,  $c$ ,  $GL$ ,  $L$ ,  $p$  and  $w^*$  were obtained from close reading of the agreement texts, supplemented by interviews at LO and SAF. The texts are sometimes ambiguous and memories of SAF and LO officials are sometimes hazy. Errors in recovering agreement parameters, however, are probably small and more or less randomly assorted over time.

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constraints by creative accounting.

<sup>32</sup>Ekdahl, 1989, supplies more details on our simulation of the contracts than the brief remarks below.

The LO percentile series discussed previously yield observations on actual second quarter wages  $w^a_i$ . Errors in these data are likely to be rather minor scale and confined to the lowest and highest percentiles;<sup>33</sup> otherwise the wage structure is very well mapped. Nonetheless, percentile wages are averages of individual wages, even though they are based on finely graded intervals of the distribution. This adversely affects computations of drift guarantee amounts because of cancelling effects among individual wages making-up the percentiles, and because drift guarantees should depend on individuals' wage histories, rather than percentile wage histories. Analyses not reported here, however, suggest that distortions from this quarter are not great.

When distributing the low wage pot components (the last term on the right-side of eq. 3c) to build frame wages, it was not possible to implement directly the plant level ceilings ( $L$ ) with the data available for this study. Instead, the effects of the ceilings were approximated by modification of the  $p_t$  parameters in the central agreements.<sup>34</sup> Despite the modifications, our procedure

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<sup>33</sup>Variance-based dispersion measures, however, are quite sensitive to wages in the tails of the distribution.

<sup>34</sup>The agreement parameter series are available by request to the author.

probably imputes wage increases that are somewhat too large on low-wage hours in low-wage plants which, in turn, would tend to yield an underestimation of the dispersion implied by the framework agreements.

Finally, the dating of the contract elements making up frame wages in equation 3 assumes everything goes like clockwork at the lower bargaining levels and that all industry contract cycles are synchronized. Neither of these conditions are satisfied completely. I have been warned repeatedly by SAF and LO officials that second quarter wages always contain some "old wages," even in years when the central frame was struck in good time during the first quarter, because of bargaining delays at the lower levels and small differences in industry contract cycles.<sup>35</sup> The direction of the bias introduced in actual wages and in the simulation of frame wages (which are influenced by lagged actual wages) on this account is unclear. Given the adjustments described in the previous note, however, it is likely that such biases are randomly distributed over time and relatively small in magnitude.

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<sup>35</sup>Especially late industry contracts in 1977 and 1980 prompted SAF and LO to modify the second quarter wage data (by imputing common, flat rate increases to all workers, consistent with the gross contractual wage rise which was slated to be paid retroactively). For the same reason we replaced reported second quarter data in 1971 and 1975 with interpolated series, and we omitted 1986 altogether.

#### Frame Wage Dispersions and Market Wage Dispersions

Figure 14 graphs dispersions of the frame wages along with dispersions of the actual second quarter wages. The main proposition that the exercise was designed to test receives obvious support: From the early 1970s until the erosion of central bargaining in the early 1980s the variances of log frame wages exhibit the same pronounced downward trend as the dispersions registered in the market. As I remarked already, I take this to be strong evidence that the frame agreements and the ideology of equality embedded in them exerted powerful influence on the course of wage compression.

Naturally, there was slippage from the frame agreements to the market. In every year the frame implied a more compressed wage distribution than is observed in actual wage data. On average, the gap between actual dispersion and frame dispersion over 1972 to 1982 is on the order of 20 percent. Put the other way around, approximately 80 percent of the "planned" compression of frame wages in the SAF-LO area was achieved in the market -- not a bad record for LO's egalitarian wage policy, especially if one believes that frame wage dispersions are largely

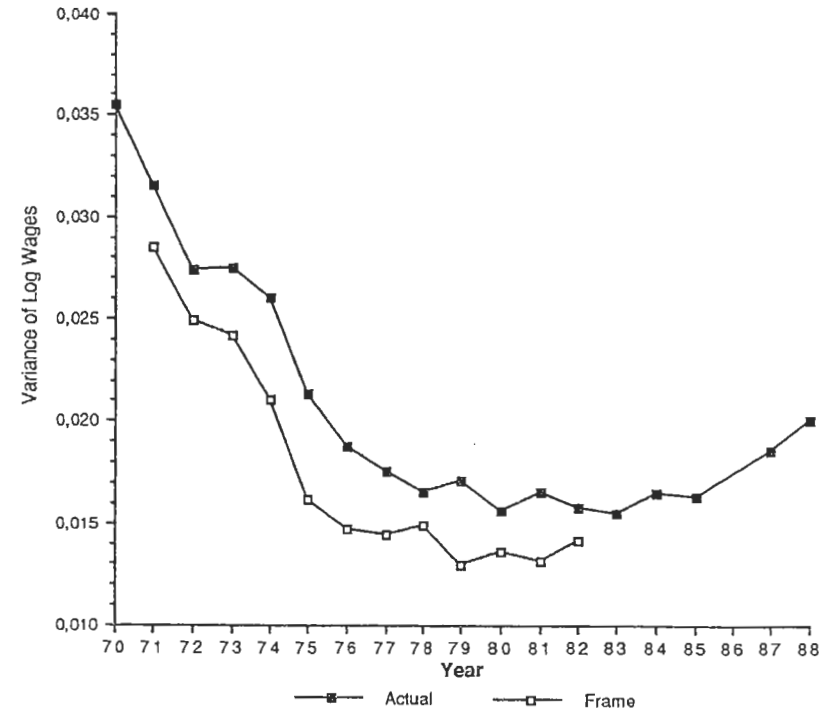
predetermined with respect to anticipated and observed market wage dispersions.<sup>36</sup>

Figure 14: Dispersion of Frame Wages and Actual Wages  
Among Private Sector Blue-Collar Workers  
About Here

The substantial compression of relative wages revealed by the trend of wage dispersion through the early 1980s may, however, convey an exaggerated sense of the likely dimensions of wage redistribution under LO's solidarity wage policy. A distribution-neutral, equi-proportional increase wage plan, which of course would leave the variance of relative wages constant over time, is a natural benchmark by which to calibrate gross orders of magnitude.

Accordingly, taking 1970 as the base year or initial condition, we find at each period the equi-proportional (constant percent) wage increases satisfying the observed growth of the frame wage bill ( $r^f$ ) and actual wage bill ( $r^a$ ), as:

<sup>36</sup>It is of course most likely that the wage compression implied by the framework agreements was very much influenced by what the parties (and, especially, LO) believed was feasible to achieve in the market. I do not pursue this important topic further in this paper, however. But see Hibbs, Ekdahl and Locking, 1990.



Sources: Computed from internal LO data supplied to the author

Figure 14: Dispersion of Frame Wages and Actual Wages  
Among Private Sector Blue-Collar Workers

$$(5a) \quad r_t^f = (w_t^f - w_{70})/w_{70}$$

$$(5b) \quad r_t^a = (w_t^a - w_{70})/w_{70}$$

Next we find the cumulative gross departure in kronor from the distribution neutral benchmark, and express the cumulative amounts of 'redistributed' wages in proportion to each period's total wage bill. This yields frame wage plan (6b) redistribution shares as<sup>37</sup>

$$(6a) \quad \left| \frac{\sum_i (w_{it}^f - (1+r_t^f)w_{i70})}{\sum_i w_{it}^f} \right| \quad \text{for } \Sigma_i ( ) > 0 \text{ or } < 0.$$

and the actual wage outcome redistribution shares as

$$(6b) \quad \left| \frac{\sum_i (w_{it}^a - (1+r_t^a)w_{i70})}{\sum_i w_{it}^a} \right| \quad \text{for } \Sigma_i ( ) > 0 \text{ or } < 0.$$

The actual and frame shares, graphed in the Figure 15, are perhaps surprisingly small in magnitude. The wage

<sup>37</sup>The amounts in the numerators of 6a and 6b need not necessarily represent redistributions (relative to the equi-proportional benchmarks) from higher to lower wage workers. The shares pick up all departures from equi-proportionality (random, from the tails to the middle of the distributions, etc.). Empirical analysis shows, however, that on average they do reflect equalizing redistributions.

compression in the SAF-LO area documented previously was evidently achieved by a cumulative departure of actual wages from distribution-neutrality that at its peak amounted to less than 3 percent of the gross wage bill. As Figure 15 shows, the actual redistribution shares track the associated frame shares closely, with the former averaging about 80 percent of the latter. Recall that this accords almost exactly in scale to the 80 percent average "conformance" of the variances of log actual wages to the variances of log frame wages (Figure 14).

Figure 15: Cumulative Departure From Distribution Neutral Wage Policy as a Share of the Wage Bill and the Maximum Equalization Ratio About Here

Looked at another way, however, the redistribution wage shares should not be understated. The point is illuminated by considering the redistribution shares in relation to the trend of maximum equalization ratios, which is also depicted in Figure 15. (The maximum equalization ratio is the share of gross wage income that would have to be transferred from those above the average wage to those below it in order for everyone to have the same wage, that is, in order to achieve total wage equality.) By 1982-83, when wage equality peaked in Sweden, the maximum equalization ratio had fallen to around 4.7 percent, as compared to the actual wage redistribution share of about 2.8 percent. Hence, the

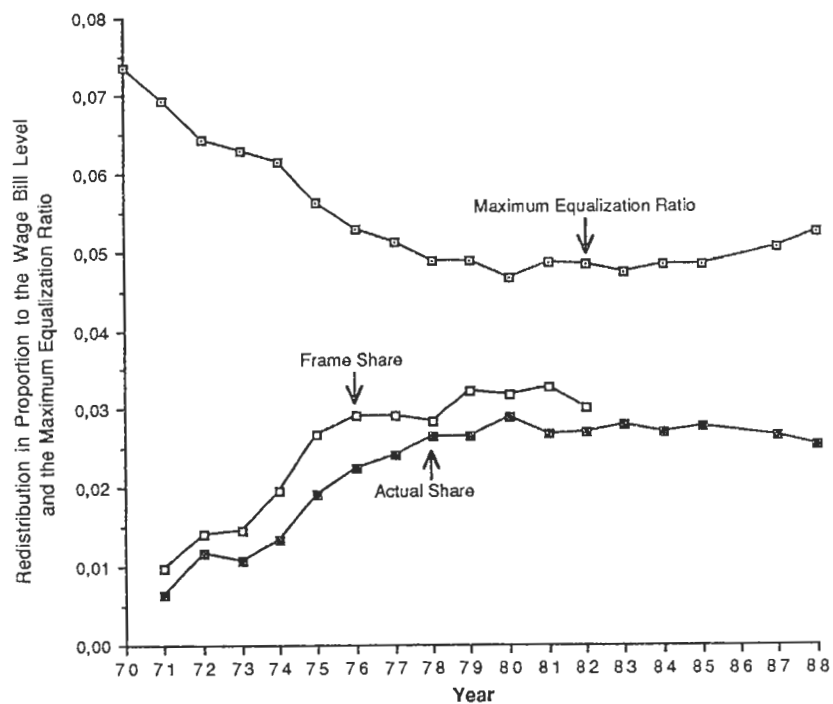


Figure 15: Cumulative Departure From Distribution Neutral Wage Policy as a Share of the Wage Bill and the Maximum Equalization Ratio

1970 to 1982-83 cumulative departure of market wages from distribution neutrality was more than half the magnitude necessary to achieve complete wage equality.<sup>38</sup>

#### VI. A Concluding Word on More Recent Developments in Swedish Income Equality

In the first sections of this chapter I argued that wages contribute decisively to distribution of final income, I documented that wage dispersion within and, to a lesser degree, across the 'collar-lines' declined from the mid-1960s to the early 1980s, and I reported data showing that falling wage dispersion, in combination with high and progressive rates of income tax, very likely produced a great leveling of net lifetime earnings. In the later sections of the chapter I presented analyses indicating that the observed compression of Swedish earnings was driven by the successful implementation of the trade unions' solidaristic, egalitarian wage goals.

Indeed, the substantial rise in wage dispersion after 1982-83 when centralized wage formation in both the LO-SAF and PTK-SAF areas began to dissolve also implies an

<sup>38</sup>When interpreting redistribution shares and maximum equalization shares, however, bear in mind that the former represent departures from distribution neutrality, whereas the latter denote transfers across the mean. Comparing the two is therefore somewhat strained, but I think still worth making.

important role for the ideology of equality, as reflected in the framework agreements of the previous era, in explaining wage compression trends. Centralized negotiations were partly eroded in 1983 when the engineering employers association (VF) managed to pry the industry away from peak agreements covering blue- and white-collar workers<sup>39</sup>, a recurring pattern in subsequent years. In 1984 and 1988 there were no central LO-SAF negotiations at all, and the 1985 LO-SAF agreement was merely a recommendation to the industrial negotiations. On the white-collar side, 1987-88 marked the total dismantling of central bargaining: All PTK affiliates bargained separately. And during the remaining years the LO-SAF frames were "weak"; perhaps an acknowledgement by LO that the era of centralized, egalitarian wage formation had come to an end in Sweden.

In fact, by mid-1970's standards the LO-SAF frames had become rather feeble at the beginning of the decade. In 1980 the low wage boundary ( $w^*$ ) was raised substantially and the adjustment parameter ( $p$ ) was reduced by a large margin. In 1981 and 1982 the low wage adjustment factors were driven still lower, and the boundaries were set so

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<sup>39</sup>Due to the efforts of big blue-collar engineering sector union Metall, however, the 1983 VF-Metall industry contract adhered closely to the LO-SAF agreement which covered the remaining sectors.

high that for practical purposes the entire SAF-LO workforce fell under the "low wage pot" umbrella. Attempts to compress the wage distribution further had essentially come to a standstill by the end of the 1970s. A half decade later the ideological climate in the central union organizations actually favored increased dispersion: LO policy called for escalating the relative wages of the (high-skilled) 'wrongly paid' and, along with TCO, began to feature the principles of 'different pay for different work' and 'fair pay differentials'<sup>40</sup>.

Joined to changes in fiscal policy launched in 1983-85, and greatly accelerated by the 1990-91 tax reform announced a year earlier, these shifts in the union thinking and bargaining practice represented a significant retreat from the decades long commitment to equality in both state and market spheres. An attempt to explain these remarkable developments in Swedish wage formation and public finance lies beyond the scope of this chapter.

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<sup>40</sup>See Ahlén, 1989 for a detailed review of changes in bargaining arrangements and union wage policies up to the end of the 1980's.

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